D. A. TSENOV ACADEMY OF ECONOMICS

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AGILE PROJECT MANAGEMENT IN BUSINESS ORGANISATIONS

AUTHOR'S SUMMARY

of a dissertation for acquisition of the educational and scientific degree of
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Area of Higher Education: 3. Social, economic and law sciences
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Scientific Supervisor: **Prof. Margarita Bogdanova, PhD**

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The PhD thesis was discussed and allowed to be defended pursuant to the Development of Academic Staff in the Republic of Bulgaria Act before a Scientific Panel of the Department of Strategic Planning of the Faculty of Management and Marketing of D. A. Tsenov Academy of Economics – Svishtov.

The full volume of the dissertation is 184 pages. Structurally, it consists of an introduction, five chapters, a summary and conclusions section, and a list of references, which contains a total of 133 sources, of which 16 in Bulgarian. The text of the dissertation includes 25 tables and 18 figures. The text is supplemented by 7 exhibits.

The defense of the PhD thesis will be held on July 18, 2023 at 1:00 pm in the Rectorate meeting room of D. A. Tsenov Academy of Economics.

All material related to the defense are available upon request at the Department of Doctoral Studies and Academic Staff Development of D. A. Tsenov Academy of Economics – Svishtov.

I. GENERAL CHARACTERISTICS OF THE DISSERTATION THESIS

1. Contemporaneity of the topic

Project management in business organizations has continuously evolved over the past decades. While in the 1950s project management was primarily oriented towards technical issues, in the later stages of its development it is increasingly focused on business processes and solutions to organizational problems. (Tripp, 2012) Researchers are thus challenged to continually improve the traditional project management methodologies in search of appropriate theories and practices that most fully contribute to the achievement of organizational goals. They implement regulations and standards that undoubtedly contribute to the improvement of management approaches, but nevertheless, at the end of the 20th century, the relative share of unsuccessful projects was still quite large. The biggest problems are related to delays in execution time, violation of quality or functionality, and budget overruns, i.e. with violation of the parameters of the "iron triangle" (also known as "golden triangle") of costs, schedule, and scope of activities. (Radujković, M., M. Sjekavica, 2017) (Drury-Grogan, 2014).

These are the reasons for the gradual emergence of a new generation of project management methodologies known as Agile[1]. They are claimed to be a better tool for project management in turbulent environments (Highsmith, 2002). The agile approach fundamentally modifies the principles of project management introducing greater freedom at the lower levels, which are closer to the customers and can more quickly determine their needs.

[1] The term Agile is used for greater convenience in the dissertation thesis as a collective term that covers various flexible values, principles, methodologies and techniques without referring to any of them in particular.

However, the transition to agile methodologies is not always successful. As a serious organizational innovation, it requires transformation of work processes, and sometimes overcoming the resistance not only of individual teams, but also the entire company (15th Annual State of Agile Report, 2022). Often, within this process the implementation of one or another aspect of agile methodologies remains partial, which is why various hybrid forms emerge as combinations of traditional and agile approaches.

All these issues are studied extensively both in theory and practice but there are still a number of unsolved problems related to the planning and implementation of a successful transition to flexible management as well as to the feasibility of a detailed and strict planning of this process, which also needs to be flexible.

2. Research goal and objectives

The main **goal** of the dissertation thesis is to analyse and critically assess the challenges of organizational transition from traditional to agile project management and to propose an organizational framework with conditions for a more successful transition to Agile.

The **objectives** of the research are:

1. To clarify the evolution of project management and the key factors and challenges in migrating from traditional to agile management;
2. To carry out a theoretical and empirical analysis of the critical factors for a successful transition to agile management;
3. To perform a field study on the transition to Agile in a controlled environment and analyse the results of the ex-ante and ex-post monitoring on the transition to agile management;
4. To develop a framework model for implementation of Agile in the IT sector and propose organizational interventions to improve the implementation of the agile approach.

3. Subject and object of the scientific research

The **subject** of the research is project management in the IT sector.

Its **object** is the transition from conventional to agile project management of IT companies.

4. Research thesis

The research thesis is that the transition (migration) from traditional to agile project management is a complex organizational innovation the successful implementation of which requires specific interventions according to the identified weaknesses. At the same time, the transition to Agile should be flexible and should not be hindered by bureaucracy. To ensure comparability of the empirical results, the author has proposed a framework model for implementation of Agile in the IT sector and several organizational interventions to accelerate the process of transition to the agile approach.

5. Research methodology

The research methodology includes:

- A study of the literature and the practice of project management from secondary sources - publications on the topic, reference reviews, analyses, case studies, etc. The findings were systematized using the methods or content analysis, comparative analysis, critical analysis of scientific publications and current practices.
- An empirical study on the factors and challenges in the process of transition to Agile. A statistical survey of the opinion of respondents from various companies (n=98) that have already completed the transition to Agile was carried out. The survey questionnaires were composed using the SurveyMonkey and Google Forms applications. The results were processed using Excel and

SPSS. The method of synthesis was used to define the key conditions for a successful transition.

- Experimental testing of Agile transition conditions in a controlled environment. The quasi-experimental method of ex-ante and ex-post peer group surveys (Dumitru, 2012) was used to analyse the opinion of the respondents before and after the transition to Agile in operation processes (response n=31). The observation method and analysis of the results were also used to define its feasibility and the opportunities it creates for the organization (Гавраилов, 2014).
- A qualitative analysis of the transition process was carried out through interviews with managers who supervised and/or participated in the quasi-experiment regarding the results and weaknesses to be overcome. Open-ended questions were used with to gain more detailed information and reveal their attitude towards the problem.
- The proposed framework model for implementing Agile in the IT sector and organizational interventions to accelerate the process of adapting the sector to the agile approach were developed using the method of synthesis and generalization.

6. Research scope constraints

The research has some constraints related not only to its narrow scope (it considers only the IT sector), but also to the access to empirical research information. The small sample size for the statistical survey does not allow drawing general conclusions at sectoral level. The experimental study discussed in the second chapter has the characteristics of a case study to explore the organizational environment in depth and to carry out ex-ante and ex-post assessment of the Agile transition process. This introduces a degree of subjectivity and prevents the conclusions from being interpreted in a wider context. However, they are used as an additional source of insights and awareness

of the transition process stages and are used to make more substantiated proposals for various organizational interventions to improve the transition to Agile.

In the scientific publications the process of transition to Agile is referred to using various terms of which transformation and migration are most commonly used. Despite some differences in their interpretation, in this dissertation they are used synonymously.

Similarly, the terms "project management" and "management of projects" are used as synonyms although some authors believe that they are not.

7. Approbation

The scope of the research includes approbation of the conditions for transition to Agile. It was carried out by applying the quasi-experimental method of ex-ante and ex-post surveys of an equivalent group in a controlled environment. Some of the conclusions from the approbation were used to develop the proposed framework model for pilot implementation of Agile in the IT sector.

The main ideas of the author were presented at doctoral conferences, a round table on the research topic and at an international scientific conference.

II. STRUCTURE AND CONTENTS OF THE DISSERTATION

The dissertation consists of an introduction, three chapters, a summary and conclusion, a list of references and exhibits. Structurally, the dissertation follows the research approach adopted by the author and the related research goals and objectives.

The full volume of the dissertation is 184 pages. The list of references contains a total of 133 sources, of which 16 in Bulgarian. The text of the dissertation includes 25 tables, 18 figures and 7 exhibits.

The dissertation is structured as follows:

INTRODUCTION

CHAPTER ONE. Evolution of project management concepts

1. Stages in the evolution of project management
2. Methodologies for agile project management
3. Challenges in the transition to agile management – a theoretical analysis
4. The process of transition to Agile
5. Summary and conclusions

CHAPTER TWO. An empirical study of the transition to an agile approach

1. Statistical Analysis

1.1 Research methodology and context

1.2. Sample description

1.3. Analysis results

2. Field study of the transition to agile management

2.1. Field study context

2.2. Description of the target group used for the field study

2.3 Field study results

2.3.1. Stage One of the field study (an ex-ante analysis)

2.3.2. Stage Two of the field study (an ex-post analysis)

3. A qualitative analysis of the transition process
4. Summary and conclusions

CHAPTER THREE. Organisational interventions for transition to the agile approach

1. A framework model for pilot implementation of Agile in the IT sector
2. Agile approaches and tools at organizational level
3. Implementation of the agile approach in a hybrid environment – a "Crisis Management" case study
4. Summary and conclusions

CONCLUSION
REFERENCES
EXHIBITS

III. A BRIEF SUMMARY OF THE DISSERTATION

The introduction presents the research framework of the dissertation - the relevance of the problem, the achievements in the literature to date, the theoretical and practical framework of the research and the selected tools for achieving its goals and objectives. The main elements of the scientific research are defined: the object, the subject and the research thesis of the dissertation; the main purpose of the research is formulated, as well as the research tasks, the research methodology and constraints and the intentions of the author to solve the defined problem are stated.

CHAPTER ONE *Evolution of project management concepts* discusses the *Traditional management model (par. 1.1.)*, known in the IT sector as "waterfall model", which is based on the linear approach of consequent execution of project stages. Many organisations still rely on this traditional project management approach (Traditional Project Management), which by definition is the application of knowledge, skills, tools and techniques to carry out project activities for achieving the project goals (Vinekar, V., Slinkman, C. W., & Nerur, S., 2006).

The main advantages of the model are presented - its predictability, clear documentation provided that the technology is well known and no changes are expected in it, the possibilities of advance budget planning in a deterministic environment, which creates a sense of security among contractors. At the same time, some shortcomings of the model are indicated - lack of feedback from the later phases to the initial ones, which excludes the correction of errors; absence of any possibility of changing the customer's requirements once they have been determined; impossibility of overlapping phases, i.e. for transition to the next phase before the previous one has been finished; limited participation of stakeholders, who are involved only at the beginning and at the end of the project. In general, the inadequacy of the traditional approach to the current environment, in which conditions are constantly changing, has been noted. This calls into question heavy

documentation and strict project implementation frameworks that are no longer relevant to the dynamic environment.

Next, several *Variations of the traditional management model (par. 1.2.)* are reviewed. The first one is the V model of software development, in which, after the first linearly-linked phases, two new phases are added – *Verification* and *Validation* of results based on the large number of additional tests carried out in the integration phase.

Another variation are the *iterative models* of project management, which are an attempt to introduce a more unified software development process applicable to all projects in the sector. More specifically, iterations are implemented as more frequent feedback both within the team and from customers. In addition, a certain extent of phase overlap is possible. However, the overall integration, i.e. linking all individual parts in the iterative models, takes place at the end of the process. The final product as a working software application is delivered to the customer in the last phase, and if it needs any improvements, they are made subsequently. This is why the iterative approach is often referred to as continuous refinement.

Iterative models, on the other hand, have several sub-variants, but in general they expand the traditional model by providing feedback between all phases and allowing them to overlap.

The next stage in the development of project management models in the IT sector is the *incremental approach*. In it, individual components (increments) of the product are developed in full, tested and implemented as separate parts of the final product. They are relatively independent of each other. Unlike the iterative approach, in which continuous improvements to the entire product are made at the end of the life cycle, in the incremental approach improvements are made to the individual components which only have to be integrated to become the final product.

Another model is the *spiral model*, which combines the waterfall model with the development of a prototype of the final product of the project and is thus most similar to the agile approach concept. Along the project lifecycle, each stage is iterated and passes through the spiral model which results in a cyclical iteration of the phases of planning, risk analysis, engineering, and evaluation (testing), after which the cycle is repeated (Reddy, 2021). If any design or functionality changes are required, they are made in the next cycle.

At the end of this section, the variations of the traditional model are presented in tabular form, showing the gradual development of the agile approach concepts. The table clearly shows the gradual emergence of Agile as the next generation of project management methods.

Paragraph 1.3. presents the features of the *Agile approach* as a new project management methodology and the definitions of the main terms formulated by the Agile Alliance, the global organization of practitioners of the agile project management approach, in its 2001 Agile Manifesto - a fundamental document containing the 12 main principles of agile management. The author comments on the manifesto's fundamental values related to people and communication; software application; customer collaboration; bringing changes to the fore.

Paragraph 2 deals with several basic methodologies for agile project management putting an emphasis on Scrum - one of the most widespread Agile methods used in 66% of the companies according to the (15th Annual State of Agile Report, 2022). 15th Annual State of Agile Report (2022). It discusses the origin of the methodology, the specifics of the work process, which is carried out in separate sprints - time slices of the software development process that usually last from one to four weeks. At the end of each sprint, the team has a working version of the product and reports which backlog tasks have been completed. The goal is to create the final product in iterations contacting the customers and seeking their feedback at each iteration. Thus, the team gradually completes the final

product. Other aspects such as daily scrum meetings, retrospective meetings, progress indicators are also discussed.

The main roles of the participants are defined as product owner, scrum master, programming team. The advantages of this methodology are indicated, the biggest of which is the empirical nature of result validation, which largely guarantees the success of the project.

The second agile management methodology discussed in the dissertation (par. 2.2. of chapter one) is Kanban. A specific feature of this approach is that it does not place such a heavy emphasis on team roles as scrum does. Rather, the emphasis is on visualizing the results so that everyone can see them using a whiteboard (most often a virtual one), on which information is continuously summarized, moving from planning through implementation to completion phase. Usually, these phases are arranged from left to right, and you can visually observe the progress of the execution in real time. It is extremely important to limit the number of tasks that are performed simultaneously, which reduces the stress of excessive workload and allows the team to concentrate on the tasks at hand.

In addition to visualising the tasks on a board, various charts (burndown charts) are also used to indicate how far the team has come and what tasks remain to be completed by the end of the project.

One of the great advantages of Kanban is that its implementation does not require large costs. Of course, a more serious intervention is needed to prepare the team to implement Kanban, but this is part of the implementation process of any agile methodology.

Further, the relationship of Kanban with the Lean approach implemented by the Toyota company in the 1970s to manage the supply of spare parts is discussed. Besides continuous improvement, an important principle is respect for the team. That is why, when assigning tasks, it is ensured that no new ones are opened until

the previous ones are completed. This creates trust in the team and conditions for reducing risks in the work process.

Overall, Kanban, as a simple approach, provides a very good basis for orderliness and good communication within the team for execution of specific tasks. At operational level, there is clarity and consistency, which creates a sense of control for the entire team and indirectly reduces potential risks of conflicts due to tension in the work process.

The DevOps continuous delivery method is discussed in par. 2.3. It is a combination of software "development" and software implementation "operations" and aims to integrate the two main functions into a continuous process. The method originated in 2007 in response to the problem of a lack of good interaction between developers and the IT teams responsible for implementation.

Section 3 of Chapter One presents a theoretical analysis of the challenges in the transition to agile management. The analysis covers challenges related to: 1) management, 2) relationships, 3) processes, 4) technology. The relationship between the listed challenges, which complement each other, is substantiated. For example, the change in technology is related to a change in processes, respectively in relationships, which requires a change in the management control tools.

However, these summaries do not provide an answer to the question of how, with what specific steps or interventions, the process of transition to Agile should be carried out in the most painless way and at the lowest cost. It is also believed that there is no single standard model of transition to Agile. It is company-specific and depends on the external and internal environment.

Section 4 of Chapter One discusses the process of transition to Agile. The main question that arises when planning this transition is whether it should be top-down or, conversely, the initiative should come from the team (bottom-up). Depending on this, possible strategies for implementing the transition are determined. The paradox here is that when it is top-down, it practically resembles

the traditional approach, i.e. at the beginning is the plan, not the initiative of the team. Several variations of the process of transition to Agile, presented in the scientific literature on the subject and by consulting companies that are very active in presenting their services for implementation of the agile approach are considered. Several key issues are discussed that should be analysed when a team or company leadership undertakes an Agile implementation process. These are related to the objectives of the migration, the limits of flexibility (degree of team autonomy), the choice of methodology, the new competences required, the scope of the changes, the way of measurement, etc. The conclusion of the analysis is related to the uniqueness of each transition to Agile, which is why the search for a balance of possible contradictions becomes a priority task.

The chapter ends with a *summary and conclusions*. The main highlights are related to the established trends of the gradual improvement of project management practices and their continuous enhancement to compensate for the shortcomings of the traditional approach, which naturally leads to the agile approach.

The advantages and disadvantages of the approaches used are briefly presented and the unique nature of Agile is once again justified. As a fundamentally different way of working, it changes relationships in companies and introduces new principles and cultural practices that are based on stronger horizontal relations, greater autonomy and mutual trust. They also require a different type of leadership, which is perhaps the biggest barrier to migrating to Agile.

CHAPTER TWO presents an empirical study on the transition to an agile approach. In par. 1, the results of the statistical study of the critical factors for a successful transition to agile management are reviewed to outline key problems and challenges in the transition of project teams working in the IT sector from a traditional to an agile approach. The study was planned with a view to clarifying several sets of questions related to the specifics of the transformation to Agile.

The methodology and context of the study are described in par. 1.1. of Chapter Two. The questionnaire survey was carried out by means of an electronic survey card containing 13 closed questions and one open question. Some of the questions are multiple-selection, i.e. with several answer alternatives, which are not necessarily mutually exclusive. Others are aimed at qualitatively assessing respondents' opinions on key aspects of the transition to agile management and the benefits of the agile approach. Respondents' opinion on the closed questions was assessed using a 7-point Likert scale (from strongly agree to strongly disagree).

The survey was distributed among potential respondents who had experience in agile management as follows:

- in two LinkedIn groups of people who use the Agile approach;
- in the IT departments of three companies operating in Bulgaria – IBM, HP and SAP.

The respondents are 98 experts from IT departments of companies operating on the markets in Bulgaria as well as in the EU, and worldwide.

The survey card is in English as it is the respondents' working language. Several sets of research questions are covered, derived from researched literature and good practices in other companies. These questions are related to: the benefits of an agile approach, the impact of Agile on the respondents' work, challenges to migrating to an agile approach, incl. ranking issues during Agile migration, organizational factors required for effective Agile implementation with an emphasis on training.

The research is not representative, since the number of experts (potential respondents) cannot be determined. The companies in transition to Agile cannot be identified in advance as well. Therefore, respondents determine for themselves how much they know about the survey topic and decide whether to respond.

The main results related to the groups of questions mentioned above are presented in Section 1.3. of Chapter Two. In general, the statistical study confirms the theses of previous authors who worked on the subject, but at the same time it also highlights some specific issues, which are the basis for the proposals in the third chapter of the dissertation.

Due to the small size of the sample (n=98) and due to the large number of groups of respondents (11 different groups), even when the groups are consolidated the cross-analyses do not allow to derive statistically significant results and to draw conclusions about the reasons for the weaknesses found in the transition to Agile. This is one of the constraints of the study. Regardless of this constraints, the empirical study provided results that enrich the understanding of possible mistakes and omissions in the transition to Agile, as well as the consequences of its inadequate implementation in organizations and/or teams. These findings are particularly useful in generating a framework model for pilot Agile implementation in the third chapter of the dissertation.

Section 2 of Chapter Two presents the results of an experimental study of transition to agile management. It was carried out in the IT department of a large retail company that runs supermarket and hypermarket chains in more than seven countries in Europe, including Bulgaria. A bottom-up Agile implementation approach was chosen at the initiative of part of the company's IT department team with the author's participation. The reason for the change is the built-up tension in the department related to a disproportionate workload on the team, delays in receiving critical information from other departments, and most importantly, authorizations to take steps to fix ongoing software problems.

The aim of the experimental study is to investigate the significance of the critical success factors in the transition to agile management established in the

previous stages of the study and to validate the process in a controlled environment.

A specific methodology, known in the literature as participatory action research, was applied (Reason, P. and Bradbury, H., 2008).

The target group of the experimental study, which is located in three countries and covers several levels, is described. Their responsibilities before the implementation of Agile are defined as classically hierarchical subordination.

The first survey in the pilot study was conducted in the period October - November 2020, immediately before the start of the process of transition to an agile work model. The survey contains 10 questions aimed at respondents' assessment of the traditional approach to work and their level of satisfaction.

The main research hypotheses are:

- The traditional model does not contribute to establishing efficient communication**.**
- Management has incomplete information regarding the current situation in the work teams subject to investigation.
- Workteam members believe that they cannot communicate freely with their managers.

The hypotheses were tested using descriptive statistics – cross-tabulation frequency analysis of several groups of variables. Due to the small number of respondents, it is impossible to adequately apply the chi-square statistic to assess whether the relationship between two nominal variables is statistically significant. Therefore, the strength of association was assessed using cross-tabulations and was calculated using Cramer's V.

Six working hypotheses were tested for the relationship of employee satisfaction level from the traditional model in terms of 6 factors.

1) The first working hypothesis is regarding the relationship between 1) the level of employee satisfaction with the traditional model and 2) whether the respondent's opinion was respected in the work process.

Here the hypotheses are:

H_0: There is no relation/association between the two variables.

H_1: There is relation/association between the two variables

The value of Cramer's V test is 0.806 and is statistically significant at $p<0.001$. Therefore, the alternative hypothesis that there is a relationship/association between the two variables can be accepted. A high coefficient value indicates a strong relationship.

2) The second working hypothesis is regarding the relationship between 1) the level of employee satisfaction with the traditional model and 2) respondents' opinion about the reasonable level of their workload. The value of Cramer's V test is 0.830 and is statistically significant at $p<0.001$. Therefore, the alternative hypothesis that there is a relationship/association between the two variables can be accepted.

3) The third working hypothesis is regarding the relationship between 1) the level of employee satisfaction with the traditional model and 2) respondents' understanding of the tasks under the traditional model opinion about the reasonable level of their workload. The value of Cramer's V test is 0.562 and is statistically significant at $p<0.003$. This shows a moderately strong relation between the two variables.

4) The fourth working hypothesis is regarding the relationship between 1) the level of employee satisfaction with the traditional model and 2) respondents' opinion about the ease of communication with their managers. The value of Cramer's V test is 0.611 and is statistically significant at $p<0.001$. This shows a moderately strong relation between the two variables.

5) The fifth working hypothesis is regarding the relationship between 1) the level of employee satisfaction with the traditional model and 2) respondents' opinion about the ease of communication with the other team members. The value of Cramer's V test is 0.547 and is statistically significant at $p<0.002$. This shows a moderately strong relation between the two variables.

6) The sixth working hypothesis is regarding the relationship between 1) the level of employee satisfaction with the traditional model and 2) respondents' opinion about the communication channels in their teams. The value of Cramer's V test is 0.640 and is statistically significant at $p<0.001$. This shows a moderately strong relation between the two variables.

The testing of the working hypotheses confirms the general research hypotheses. Therefore, we may conclude that the level of respondents' satisfaction depends on a complex range of factors:

- Their opinion was not taken into account under the traditional approach;
- Their workload is not reasonable (they are practically overwhelmed with tasks);
- The tasks are not sufficiently i=understandable;
- Difficult communication with their managers;
- Difficult communication within the other team members;
- Inefficient communication channels within the teams.

Each of these factors contributes to the general feeling of dissatisfaction, which gives rise to potential conflicts and reduces the effectiveness and motivation of the team. This shows the complex nature of the problems related to the traditional model, which requires a cardinal solution related to changing the work approach.

Stage Two (ex-post analysis)

The second questionnaire was distributed to and answered by the same groups of respondents in the March 2021, i.e. after the introduction of the Agile approach.

The main changes related to the new approach are the introduction of daily meetings as well as two-week sprints with discussions of the work done after each sprint and summarize the “lessons learned”.

The main research hypotheses are that the introduction of an agile management approach resulted in:

- Improved communication both among the team members and with their managers.
- Higher satisfaction of the team members.
- More understandable tasks and improved work efficiency.

The survey card contains additional questions compared to those before the introduction of Agile.

Descriptive analysis shows a very high level of satisfaction, which is detailed in a positive opinion regarding the reduced time compared to the traditional model, positive attitude towards switching to the agile model, more reasonable distribution of work tasks, lower stress levels, improved communication with the other team members and with the managers. Working in an Agile environment is valued as meaningful, with clearly defined processes.

The general conclusion from the study on the effects of implementation of the flexible approach proves a positive relationship, i.e. positive effect on team performance, but it is not as strong as the relationships between dissatisfaction and traditional approach discussed in the previous paragraph. This shows that the team's conviction is not so high yet and additional efforts are needed to improve work processes, develop the potential of the agile approach and apply it more effectively in the company's IT department.

According to the respondents, the implementation of the agile approach reveals some of its advantages, such as:

- Elimination and/or mitigation of current discrepancies between the views, understandings and work procedures of separate teams on the one hand and management on the other.
- An interactive process of development and validation of software, faster reaction of stakeholders.
- Faster decision-making process.
- Better control over critical situations and enhanced crisis-management levers.
- Improved possibilities for error analysis and sifting.

In order to confirm the general research hypotheses formulated in paragraph 2.3, several working hypotheses related to the benefits of Agile are formulated. Due to the small number of respondents, the Chi-square test was not relevant, so Cramer's test was applied once again to define the strength of the relationships between the variables.

The following results were obtained from a study of the relationship between satisfaction with the flexible approach, on the one hand, and the following factors, on the other:

- Respondents' assessment of whether their opinion is valued with Agile. The value of Cramer's V test is 0.464 and is statistically significant at $p<0.05$. This shows a moderately strong relation between the two variables.
- Respondents' opinion on the degree to which their workload is reasonable with Agile. The value of Cramer's V test is 0.673 and is statistically significant at $p<0.001$. This shows a moderately strong relation between the two variables.
- Respondents' opinion on the degree to which they understand their tasks with Agile. The value of Cramer's V test is 0.416 and is statistically

significant at $p<0.1$. This shows a moderately strong relation between the two variables.

- Respondents' opinion on the ease of communication among team members with Agile. The value of Cramer's V test is 0.556 and is statistically significant at $p<0.001$. This shows a moderately strong relation between the two variables.
- Respondents' opinion on the ease of communication with their managers with Agile. The value of Cramer's V test is 0.642 and is statistically significant at $p<0.001$. This shows a moderately strong relation between the two variables.
- Respondents' opinion regarding the communication channels with Agile. The value of Cramer's V test is 0.302 and is statistically significant at $p<0.3$. This result means that no relationship between the two variables can be proved.

The general conclusion from the study on the effects of implementing the agile approach proves a positive relationship, i.e. positive effect on team performance, but it is not as strong as the links between dissatisfaction and traditional approach in the previous paragraph. This shows that the team members' awareness of the benefits of the agile approach is still not that high and additional efforts are needed to improve work processes, develop the potential of the agile approach, and implement it more efficiently in the IT department of the company.

Section 3 of Chapter Two presents a qualitative analysis of the transition process. Interviews were conducted with managers from the company's IT department. The purpose of the interviews is to determine what are the organizational problems that have not yet been solved and for which opportunities for improvement should be sought.

Communication with other teams as well as within the IT department team comes to the fore among the mentioned organizational problems.

Another problem from a managerial point of view is "*insufficient transfer of knowledge within the team. In an ideal team, interchangeability is the key to success. It allows better results and peace of mind at work*." Knowledge transfer in self-organizing teams is one of the tools to achieve autonomy (team cross-functionality) but it also requires people with different skills they are willing to develop.

Another problem is the lack of clarity in the logic of changes in team organization. This is related to the purpose and philosophy of the change.

In terms of technology, an important aspect is how the necessary changes are introduced to the team to reduce their "*fear of change*". Due to the specifics of work in the company's IT department, innovations that require time to research and implement are introduced every week. In this process, it is important to have access to the necessary resources, e.g. access rights, data transfer medium, administrative functions, etc. The team has established a system for pilot testing that minimizes the risk of errors, which is another organizational team innovation. In this respect, there are "*two aspects when talking about challenges - technical and psychological... Without 'stepping into the other's shoes', some of the details may be left out, more successful and long-lasting solutions may remain undiscovered*."

The summary and conclusions at the end of Chapter Two summarize the statistical analysis of the two surveys regarding the experimental implementation of Agile in the IT department of the selected company.

CHAPTER THREE deals with the organizational interventions for migration and adaptation to an agile approach. Section 1 presents a framework model for pilot implementation of Agile in the IT sector.

The section starts with the main **principles** of the framework model related to:

- Flexibility of the implementation process;

- Minimization of documentation;

- Support by the management of the company.

The model comprises 9 steps to be taken in two stages.

Stage 1. Preparation

1. Assessment of the need for an agile approach.

2. Generating possible Agile solutions.

3. Selection of a suitable Agile methodology.

4. Estimating the knowledge and attitudes in the organisation.

5. Development of a framework for transformation of the business processes related to Agile implementation.

Stage 2. Implementation of Agile

6. Presentation of the framework model in a suitable format.

7. Training and coaching sessions with the teams involved in Agile.

8. Team self-organisation and approbation of Agile.

9. Review and tailoring of the framework model.

The objective, input and output, and results of each stage are described.

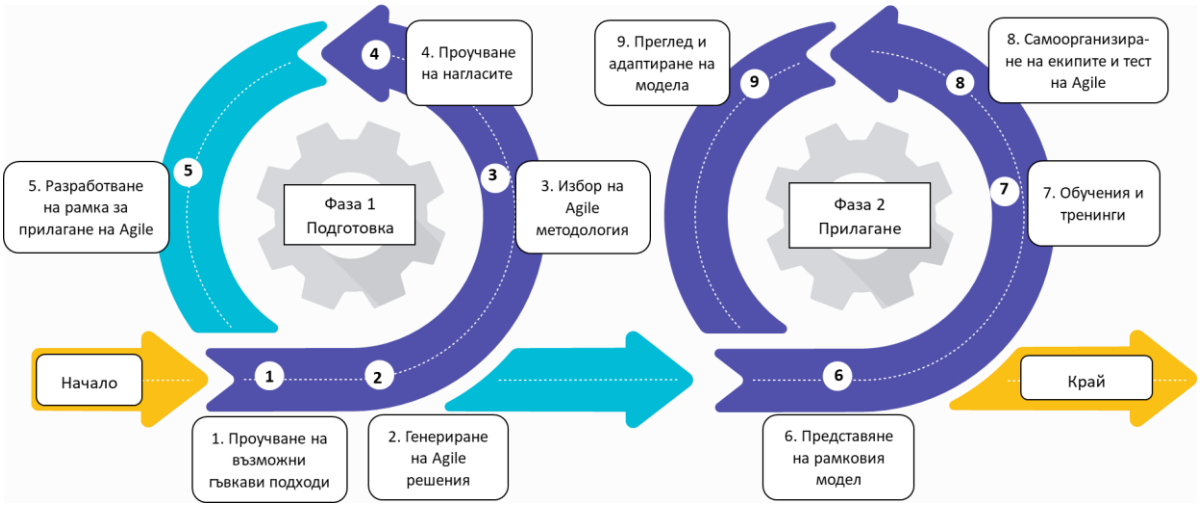

Figure 1. A framework model for pilot implementation of Agile

Source: Author's design

Provisions have been made related to the cyclical nature of the model, which is itself flexible in terms of implementation. In practice, this makes it a continuous process that leads to improving the implementation of the approach or to scaling up, i.e. to its expansion to include other teams in the organization and achieve maturity in the application of Agile.

The proposed framework model visualizes the building blocks of transition to Agile. It describes the steps that summarize the implementation of Agile, and on this basis the components of the transition can be predicted - the scope of tasks, the required resources and its duration. They depend on the absorptive capacity for change of the team and of the organization. Therefore, the framework is subject to tailoring according to the organization's goals and implementation environment.

A special phase in the tailoring should be related to the extent to which team members work together or remotely from each other. Early views of Agile productivity are strongly tied to the need for face-to-face work in shared spaces.

One of the big problems of transition to Agile is related to cultural changes in organizations. Since most variations of the Agile methodology originated in Western cultures, the transfer of practices to countries with different national cultural characteristics is sometimes unsuccessful. The agile approach is linkes to the concepts of democracy. It promotes freedom of thought for the employees at the lower hierarchical levels, empowers them, recognizes their right to make decisions, to be autonomous in many ways (Дънешка, 2016). In this regard, organizations in which this management approach is less prominent are expected to have a longer period of adaptation to Agile associated with longer transformation processes and, above all, with slower changes in cultural attitudes.

Regardless of its duration, however, Agile implementation should also be agile. This means to plan a rhythmic execution of tasks in the individual steps of the process and to follow this rhythm similar to the sprints in the scrum

methodology. Fixing the time will ensure an efficient transformation – just as the agile approach itself is successful precisely because of the way it is implemented. The volume of tasks in individual steps as well as the number and duration of cycles will depend on the environment in the organization.

Section 2 of Chapter Three presents agile approaches and tools at organizational level – it is the current trend in the scientific literature, since scaling up Agile in organizations is considered a major challenge at present.

In general, the options for scaling up the application of the agile approach are to expand Agile: 1) for larger projects; 2) for project portfolios, or 3) in other parts of the organization. All three options are the subject of great interest and are related, on the one hand, to the idea of achieving organizational maturity by transiting to Agile, and on the other hand, to a greater flexibility of the organizational strategies themselves.

A strategy can become agile when the process of its preparation is modified. Agile as a process can have a much wider scope and this can affect even the planning process. Instead of a linear approach of sequentially moving through the stages of strategy preparation, this can be done through a greater rhythmicity of activities and more frequent user feedback that is validated after each iteration. Direct contacts with stakeholders provide incentives for the team to work on new ideas and solutions, i.e. the strategy team itself is in an environment of agility. Among the great advantages of such agile strategies is that they are developed in direct and continuous communication not only with customers but also with internal stakeholders. This creates a sense of ownership and recognition of the strategy and makes it more effective and realistic. Applying such an approach is at the heart of the most successful disruptive innovation strategies, which tend to benefit from the latest innovations and result not only in more innovations but also to establishing new markets for the realization of these innovations.

In general, agile strategies are considered in close relation to the lean methodology, as they seek to eliminate all redundant elements and resources that contribute nothing or very little to the final result. In this study, agile strategies are marked only as an extension of the Agile pilot implementation framework model and remain outside the scope of the dissertation.

The author summarized the main challenges in scaling Agile associated with:

- distributed large-scale project development;
- difficult coordination between different (agile and mon-agile) teams;
- knowledge sharing in the organisation;
- multidisciplinary task execution;
- new methods for organisation and development of agile practices.

Another problem is related to changing some of the roles (e.g. product owner) by allocating them to several people, because in large projects one person cannot manage to cover all the responsibilities related to a certain role.

The biggest problem is the conclusion of contracts in the conditions of an agile approach because Agile principles preclude detailed negotiation of deliverables, timelines, and additional details as Agile relies on trust and frequent communication with clients to clarify the scope of projects. At the same time, established companies operate primarily through contracts that create a “false sense of security” (Moran, 2015). To overcome this mindset requires adapting contracting approaches and also pricing models that are tailored to traditional projects rather than Agile iterative improvements.

At the same time, Agile contributes to better financial performance. More frequent (compared to the traditional approach) delivery of software and the expected overall functionality enables higher levels of ROI. In addition, frequent feedback provides more information and leads to informed management decisions about when to continue and when to abandon a project (Moran, 2015) before

unnecessary costs are incurred. This reduces the overall risk of project failure and allows for more efficient solutions for alternative use of resources – for example by reallocating them to projects with higher returns.

The main question to be answered is at what scale Agile is applicable. Since the agile approach is less burdensome (Boehm, B. and Turner, R., 2004) and more appropriate for small projects, then what is the threshold, what is the indicator to tell when it is effective, when it is reasonable and there are returns from scaling up Agile.

Section 3 of Chapter Three presents a case study of the development and implementation of a crisis management tool in an IT department that has implemented Agile but works with other, traditionally managed structures. An escalation matrix is proposed as an organizational intervention, which aims to describe the possible risk operations in the event of a customer service conflict and to create a risk-response system. At the same time, the escalation matrix was created precisely for an agile approach, since during its development and continuous updating, the team must collaborate with the users of the software, to determine all potential conflict points and take measures to avoid them.

A case study context explaining the need for this tool in a hybrid agile deployment environment is described in detail.

The matrix is based on the mind map method. Based on the case approach, the roles of the participants in the escalation matrix are described. The connection with agile team management is derived as a necessary condition for successful escalation when an organizational problem occurs in a given project.

The theoretical basis of the proposed tool is explained - the Harzburg concept of management and leadership, developed by AFW Wirtschaftsakademie Bad Harzburg GmbH (Angermeier, 2002).

The Harzburg model integrates the following concepts:

- Management by delegation;

- Management by exception;
- Management by objectives Управление по цели.

The point of the model is for each employee or department to carry out their commitments in their assigned area of responsibility independently, with the higher level engaging only if necessary. (Angermeier, 2002) In this way, processes run more smoothly, transparently and efficiently.

Escalation can be controlled through tools from the scope of operational risk management.

Generally, they affect decision (Rosseger, 2016):

- of prospective nature – for prevention of future problems;
- of current nature – to resolve current problems;
- of retrospective nature - to mitigate problems that have already occurred.

The customer service conflict escalation process map and the roles of the participants are explained.

The list of possible interventions related to the agile approach can be very long. Theory and practice are constantly developing new tools that can be used to make the internal environment more open, to give more powers to teams, to combine elements that until now have not been used together. The organization’s drive is the key factor for deciding what methodologies, in what sequence or symbiosis, will be used to improve management and achieve satisfactory results.

In general, the experimental implementation of Agile is considered successful from the perspective of the company's management. It proves and validates some of the author's assumptions about the Agile pilot implementation model.

Based on theoretical analyses, empirical research and experimental implementation of Agile as well as monitoring and analysis of results, a framework model for pilot implementation of Agile in the IT sector and several

organizational interventions to accelerate the process of transition to the agile approach is developed and proposed. In addition to the presented two-stage framework model, reference is also made to possible agile strategies and tools at organizational level. Agile strategies are an important follow-up to the pilot implementation of Agile and generally provide prospects for competitiveness in the context of Agile methodology in management. Agile strategies are a very interesting line of research, but for now they remain outside the scope of the dissertation.

In the conclusion, the author reviews the findings and discusses the achievement of the goal and the implementation of the planned tasks of the research.

It can be concluded that the research objective has been achieved. The results of a study on the challenges of organizational transition from traditional to agile project management are presented, and organizational models and tools for a more successful transition to Agile are proposed.

The conclusions of the study confirm that the biggest obstacle in the transition to Agile is the awareness and understanding of the importance of this approach. It is not a series of steps to execute correctly but a mindset that takes time to implement and realize. However, regardless of the difficulties of the transition, its benefits are indisputable and worth the effort.

IV. LIST OF THE SCIENTIFIC CONTRIBUTIONS OF THE DISSERTATION THESIS

- Based on an in-depth analysis of project management concepts, the author systematized the gradual enhancement of theory and practices that lead to the emergence of Agile ideas as the next generation of project management methods based on stronger horizontal relations, greater team autonomy and mutual trust.

- A theoretical and empirical analysis of the critical factors for a successful transition to agile project management was made. A statistical analysis of the different aspects of migrating to Agile was carried out, which is important for improving the understanding of the process and for preparing for it - not only as a methodology, but also as an attitude for adequate behaviour within the team.

- An experimental testing of the conditions for transition to Agile in a controlled environment was carried out, applying the quasi-experimental method of ex-ante and ex-post survey to analyse the respondents' opinion before and after the introduction of Agile into the work processes. The analysis is complemented by a qualitative study of the transformation to an agile approach through interviews with managers about the results and weaknesses to be overcome. On this basis, conclusions and generalizations have been made, having methodological and theoretical significance for the process of migrating to agile project management.

- A framework model for the pilot implementation of Agile in the IT sector is developed, with distinct stages, steps, inputs and outputs, and several organizational interventions are proposed to accelerate the process of adapting the research object to the agile approach.

V. AUTHOR'S PUBLICATIONS RELATED TO THE TOPIC OF THE DISSERTATION THESIS

I. SCIENTIFIC PAPERS:

1. Bogdanova, Margarita, **Andrey Yordanov,** *Escalation management in IT projects – case study,* XIV. IBANESS Congress Series on Economics, Business and Management – Plovdiv / Bulgaria, May 29-30, 2021

2. Йорданов, А., *Гъвкаво управление на проекти в IT сектора*, Кръгла маса на катедра „Стратегическо планиране“ по проект „Методика за гъвкаво управление на проекти в публичния сектор“ – 22 Oct. 2019.

II. ARTICLES:

1. **Йорданов, А.,** *Предизвикателствата пред това да бъдеш Agile /Scrum*, Годишен алманах „Научни изследвания на докторанти“, Брой XII - 2019 г., Книга 15 – Студии и статии

III. STUDIES:

1. **Йорданов, А.,** *Предизвикателства пред въвеждането на гъвкаво управление в проектни екипи*, Годишен алманах „Научни изследвания на докторанти“, Брой XIV - 2021 г., Книга 17 - Студии и статии

2. **Йорданов, А.,** *Трансформация към гъвкаво управление на проекти – предизвикателства пред IT индустрията*, Годишник на Стопанска академия, бр. 125, 2022 г. ISSN: 0861-8054

VI. STATEMENT OF ORIGINALITY OF THE DISSERTATION THESIS

Regarding the dissertation thesis to be defended for acquisition of the educational and scientific degree of Doctor of Philosophy (in Economics) in the Doctoral Programme in Planning, I hereby declare that:

1. The results achieved in the dissertation thesis “Agile Project Management in Business Organisations” and its scientific contributions are original and are not borrowed from research and publications in which the author has not participated. The information presented by the author in the form of copies of documents and publications, personally compiled references, etc. corresponds to objective truth
2. Scientific results obtained, described and/or published by other authors are duly and correctly cited in the references section.

Svishtov **Doctoral Student**:.....

29 May 2023 /Andrey Antonov Yordanov/