TRADITIONAL VS. AGILE IT PROJECT MANAGEMENT

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Abstract
As IT projects grow in complexity and operate in increasingly dynamic environments, selecting an appropriate project management methodology is crucial to ensuring project success. This research investigates the impact of managerial experience in utilizing the agile project management approach on the perception of four key project success indicators: cost-effectiveness, completion time, product quality, and client satisfaction. A survey conducted among 100 IT professionals in Bosnia and Herzegovina revealed that while the agile approach yields higher product quality and client satisfaction, the same could not be concluded for cost-effectiveness and completion time in a statistically significant way. The study highlights the growing role of Agile in modern IT project management and provides practical guidance for project managers, IT professionals, and decision-makers, offering strategies to optimize project management practices and improve outcomes in diverse organizational contexts.

Key words: *agile methodologies; IT project management; traditional approach; project outcomes; project success*

JEL Classification: *M15*

I. INTRODUCTION

Making sure that project outcome satisfies not only customers, but all stakeholders has become more important than just having project finalized within agreed timeline, budget, and defined scope (Cervone, 2010). Methodologies used for managing IT projects are traditional and agile and choosing between the two depends on the type and the characteristics of a particular project (Gaborov, Karuovic et al., 2021). Traditional project management approach has been criticized as the evidence shows that projects are becoming more complex and the setting in which they are delivered is becoming increasingly volatile. Agile project management is seen as an alternative strategy with the potential to address the drawbacks of traditional project management approach (O'Sheedy, 2012). Agile approach lays less emphasis on creating strict project requirements and plans because it recognizes that change is an unavoidable component of projects.

The benefits of using Agile over Traditional project management may include improved collaboration, faster delivery times, and enhanced customer satisfaction (Sharma, Sarkar et al., 2012). However, Agile methodologies can present a challenge of their own. According to Forrester's report (2022), while Agile practices are widely embraced, many organizations still face challenges in scaling and achieving true proficiency. Despite the widespread adoption, only a small percentage of organizations have reached a level of maturity where Agile is fully integrated and delivering its promised benefits.

In recent years, the IT market in Bosnia and Herzegovina has experienced steady growth, driven by both domestic demand and international outsourcing opportunities. Many international companies, particularly from Western Europe, have outsourced software development, customer support, and IT solutions to Bosnian firms, recognizing the country's growing reputation for delivering high-quality services at lower costs (Kovacevic, 2021). However, challenges remain, including the need for better education and training programs to address the skills gap and ensure that the workforce is prepared for rapidly evolving technologies.

This study investigates how Agile experience impacts perceived project success in Bosnia and Herzegovina. Despite the global rise of Agile, the adoption and contextual effectiveness of these methodologies in transitional economies remain underexplored. This paper aims to fill that gap by analyzing the perceived project outcomes based on varying levels of Agile experience.

II. LITERATURE REVIEW

Project management is defined differently across major frameworks. According to PMBOK, it is "the application of knowledge, skills, tools, and techniques to project activities to meet the project requirements" (PMI 2017, p. 707). PRINCE2 defines it as "the planning, delegating, monitoring, and control of all aspects of the project and the motivation of those involved to achieve the project objectives within expected performance targets" (PRINCE2 2023, p. 6).

The project manager should choose the most appropriate strategies, tools, and methods to ensure the project's success. In addition, project team should have range of required skills in order to complete a project successfully (Hornstein, 2015). Unlike other types of projects, IT projects are characterized by their elevated complexity and higher likelihood of failure, presenting significant challenges for management (Trigo and Varajão, 2020). The emergence of agile methodologies is rooted in the shortcomings of earlier methods and techniques, which struggled to address the demands of modern, high-tech companies (Highsmith and Cockburn, 2001). Another significant result was the creation of the Agile Manifesto, which clearly outlined the fundamental values and principles of agile development (Beck, Beedle et al., 2001).

In traditional management approaches, the development process follows a lifecycle model, where detailed planning is done upfront, and evaluation of outcomes occurs only at the project's conclusion (Engelhardt, 2019). The Waterfall model, introduced by Royce in 1970, is one of the most widely used traditional methodologies. It consists of four distinct phases: requirements gathering, design, implementation/development, testing, and maintenance (McCormick, 2012). Alshamrani and Bahattab (2015) highlight the importance of understanding that all traditional methodologies are based on the life cycle development model, emphasizing the process journey rather than the final product.

On the other hand, Agile project management approaches prioritize client satisfaction through continuous iteration and delivery of working product. Studies have shown that practicing agile approach leads to faster project completion, improved communication between team members, and higher customer satisfaction (Sharma, Sarkar et al., 2012). According to some research, agile approach improved the scope and cost management of software development projects by enhancing the skills of the development teams, better managing user requirements, enhancing the quality of the code development process, and delivering products in the shortest amount of time (Santos, Beltrão et al., 2018). Also, by avoiding the rigorous activities and tasks during the planning stage the agile approach helps save money and other resources (Cervone, 2010).

Project management has experienced substantial transformation over the years influenced by technological advancements and digital transformation introducing new challenges (Grab, Weiss et al., 2019), shifting from traditional methodologies to modern practices in rapidly changing environments. Research highlights that one of the most challenging issues is selecting the most suitable methodology from traditional, agile, and other approaches considering each has its own advantages as well as disadvantages (Ciric, Lalic et al., 2019). To maximize value, project managers must align their working philosophy with that of the organization (Kuura, Blackburn et al., 2014).

According to Hornstein (2015), successfully integrating project management practices within an organization might impose as challenging, influenced by factors such as the organizational culture and its adaptability to change. Tolfo and Wazlawick (2008) emphasize that project managers must recognize potential cultural barriers, develop strategies for managing change, and understand how to effectively implement the most suitable methods and procedures to mitigate these issues. Important thing in overcoming these challenges is continuous learning which is vital for the effective use of advanced project management software, data analytics tools, and collaborative platforms (Lee et al., 2019). Implementing training programs and professional development initiatives is crucial for equipping project managers with the skills needed to navigate these technologies and fully leverage their advantages (Nwaimo et al., 2024).

In conclusion, the literature review highlights the shift from traditional to Agile project management in response to the limitations of rigid, linear approaches, emphasizing that Agile's iterative processes, stakeholder collaboration, and adaptability enhance product quality and client satisfaction. However, it also notes challenges in scaling Agile, managing risks, and ensuring control in complex environments—suggesting that in many cases, the optimal approach lies not in choosing one methodology over the other, but in combining the strengths of both to suit project-specific needs.

III. RESEARCH MODEL

Building on the existing studies, a relevant research model has been established to analyze the impact of managerial experience in utilizing the agile project management approach on the perception cost-effectiveness,

completion time, end product quality, and client satisfaction.

Previous research highlights that Agile approaches enhance cost-effectiveness by reducing waste, improving team communication, and accelerating project timelines (Santos, Beltrão et al., 2018). Agile practices, such as regular feedback loops and incremental progress reviews, allow teams to identify and rectify potential issues early, thereby minimizing rework and resource expenditure (Conforto and Amaral, 2016). Furthermore, by avoiding exhaustive upfront planning and adapting to evolving user needs, Agile methodologies consistently demonstrate superior cost management and value delivery compared to traditional methods (Cervone, 2010). Thus, the following hypothesis is proposed:

H1: The use of Agile project management approach is positively related to higher cost-effectiveness.

Studies have shown that Agile practices lead to faster project completion by streamlining workflows, improving team communication, and focusing on delivering incremental value (Sharma, Sarkar et al., 2012). Iterative approach eliminates the need for exhaustive upfront planning, enabling teams to begin work quickly and adapt as requirements evolve, thereby reducing delays (Cervone, 2010). Hence, to analyze whether flexible and iterative approach leads to faster delivery by fostering efficiency, adaptability, and better communication throughout the project the following hypothesis is proposed:

H2: The use of Agile project management approach is positively related to shorter project completion time.

Agile methodologies emphasize delivering small, functional increments of a product while incorporating frequent feedback from stakeholders, allowing teams to refine and enhance quality at every stage of the project (Kautz, Johansen et al., 2014). Moreover, Agile's commitment to continuous improvement and technical excellence encourages teams to focus on maintaining simplicity while addressing challenges promptly, resulting in a more reliable and refined end product (Hoda et al., 2017). Thus, the following hypothesis is proposed:

H3: The use of Agile project management approach is positively related to increased quality of end product.

The ongoing collaboration and client involvement throughout the project lifecycle minimize misunderstandings and allows for quick adjustments to accommodate changing requirements which is a critical factor in achieving high satisfaction levels in dynamic environments (Santos et al., 2018). Moreover, Agile promotes transparency through frequent communication and progress updates, helping clients feel more engaged and informed, which builds trust and confidence in the process. Thus, the following hypothesis is proposed:

H4: The use of Agile project management approach is positively related to higher levels of client satisfaction.

Previously defined hypotheses represent the basis for consequent research framework and the research model that is presented in the Figure 1.

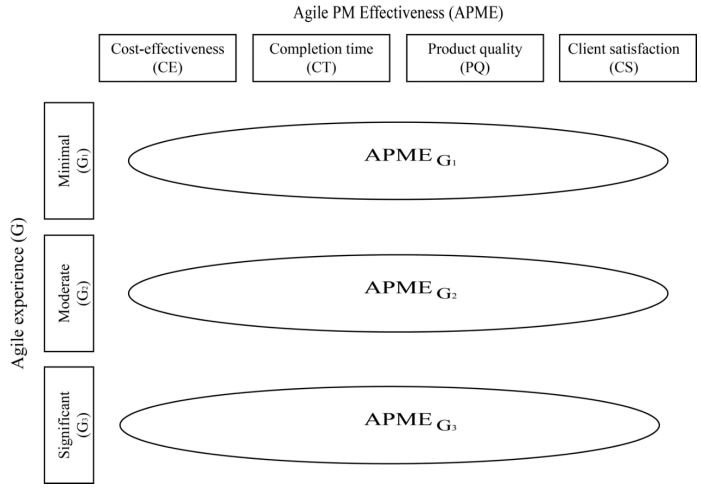


Figure 1 - Research model

IV. DATA AND METHODOLOGY

As a primary instrument for data collection, a questionnaire was distributed to 120 professionals, yielding 100 valid responses. Participants were project managers and consultants from various organizations in Bosnia and Herzegovina. The objective of the survey was to collect at least 100 responses to enable proper data analysis. The survey achieved a response rate of 83.33%, with 100 participants offering their valuable insights. In terms of Agile experience, 27% of respondents reported involvement in 10 or more IT projects using Agile methodologies, while 22% had participated in 5-10 projects, 28% in 3-5 projects, and 18% in 1-2 projects. Only 5% indicated no prior Agile experience. The length of Agile use varied, with 41% of respondents reporting 3-5 years of experience, 31% having used Agile for 1-3 years, and 23% for more than 5 years. A small proportion (5%) reported no experience with Agile practices. When combining project involvement and duration of Agile use, 42% were categorized as having moderate experience, 35% as having significant experience, and 23% as having minimal or no experience in Agile project management

Questions aimed to explore the benefits and challenges of experience with using Agile methodologies compared to traditional project management approaches. Predominantly questions used Likert scales to measure experiences, for example rating cost-effectiveness or end-product quality on a scale from "Strongly Disagree" to "Strongly Agree." Multiple-choice questions asked respondents to select from predefined choices, ensuring structured and comparable responses.

The questionnaire was organized in six sections to gather comprehensive data for the study. It began with organizational demographics and participants' experience with Agile project management. The remaining sections focused on evaluating key project success factors: *cost-effectiveness, completion time, end-product quality, and client satisfaction*. This structure allowed for analyzing the relationship between Agile experience and perceived project outcomes across multiple dimensions. It was structured around the research objectives and hypotheses to ensure alignment with the study's goals and it was developed based on the prior research (Ciric, Lalic et al., 2022; Diem, 2021). The questionnaire was then shared with a few professionals from the industry to obtain their input and suggestions, ensuring the content was both precise and applicable. This approach allows for the collection of targeted and firsthand information from respondents, ensuring that the data gathered is both relevant and reliable for addressing the research questions effectively.

The variables were carefully chosen to align with the research objectives and hypotheses. The dependent variables include *cost-effectiveness, completion time, product quality, and client satisfaction*, which represent key project outcomes. The independent variable is the level of experience with Agile project management methodologies, categorized into three levels of experience: minimal or no experience, moderate experience and significant experience. The dependent variables were analyzed to determine whether differences in Agile experience levels significantly influenced project outcomes, per the respondents' opinion. The selection of these variables provides a comprehensive basis for evaluating the hypotheses and exploring the relationships between Agile project management experience and key project outcomes.

Data were analyzed using MANOVA (Multivariate Analysis of Variance), with preliminary checks for normality and homogeneity of variance to ensure the appropriateness of the dataset for further analyses.

V. RESULTS AND DISCUSSION

To ensure valid and reliable results, assumptions for MANOVA were tested. Although the Kolmogorov-Smirnov test showed some deviations from normality, skewness and kurtosis values remained within acceptable limits, allowing for cautious interpretation. Given the sample size, MANOVA's robustness to minor deviations supports the analysis. Descriptive statistics and normality test results are shown in Table 1.

Table 1. Normality test

Variables	M	SD	Skewness	Kurtosis	K-S
Cost-effectiveness	2.96	0.665	-0.795 (SE = 0.241)	1.720 (SE = 0.478)	0.364 ($p < 0.01$)
Completion time	3.25	0.744	-0.742 (SE = 0.241)	0.195 (SE = 0.478)	0.253 ($p < 0.01$)
End product quality	3.32	0.750	-0.897 (SE = 0.241)	0.351 (SE = 0.478)	0.288 ($p < 0.01$)
Client satisfaction	3.28	0.817	-1.014 (SE = 0.241)	0.523 (SE = 0.478)	0.281 ($p < 0.01$)

Most variables had skewness and kurtosis values within acceptable ranges, suggesting near-normal distributions despite minor asymmetries. The Kolmogorov-Smirnov (K-S) test, which formally tests for normality, indicated significant deviations for all dependent variables, as p-values were below 0.05 While this suggests that the variables do not perfectly follow a normal distribution, the skewness and kurtosis values indicate that the deviations are not severe enough to invalidate the use of parametric tests like MANOVA. That is, at least one criterion for drawing a conclusion about the normality of the distribution has been met.

Table 2. Homogeneity of variance (The Box M test)

Box M	F	df1	df2	p-value
120.335	5.627	20	20634.787	0.000

Further, Box's M test was used to assess the equality of covariance matrices across groups. The results shown in Table 2 indicate homogeneity of covariance is violated because the p-value is less than 0.05 which suggests significant differences between the covariance matrices of the groups. However, this test is only one of the assumptions and although the covariance matrices are different, this doesn't necessarily mean all assumptions for further analysis are violated. Based on the test for normality of distribution, we can conclude that at least one of the key assumptions, the normality of distribution, is satisfied. Accordingly, in the interpretation of post hoc test results, a more conservative approach will be adopted, meaning that a smaller significance threshold will be used, specifically $p < 0.01$.

The assumption of independence of instances for the MANOVA test is satisfied considering the survey was distributed to independent individuals across different organizations with the data collected anonymously.

The MANOVA analysis results (Table 3) showed a statistically significant multivariate effect of the group on the combination of dependent variables (Wilks' Lambda = 0.734; F (2,97) = 3.934; p = 0.000).

Table 3. Multivariate Test

Wilks'Lambda	F	p
0.734	3.934	p=0.000

The follow-up data analysis was performed using ANOVA test and the obtained results are summarized in Table 4.

Table 4. ANOVA

Dependent variables	F	df1	df2	p	η2
Cost-effectiveness	2.198	2	97	p=0.117	0.043
Completion time	2.677	2	97	p=0.074	0.052
End product quality	9.821	2	97	p=0.000	0.168
Client satisfaction	10.177	2	97	p=0.000	0.173

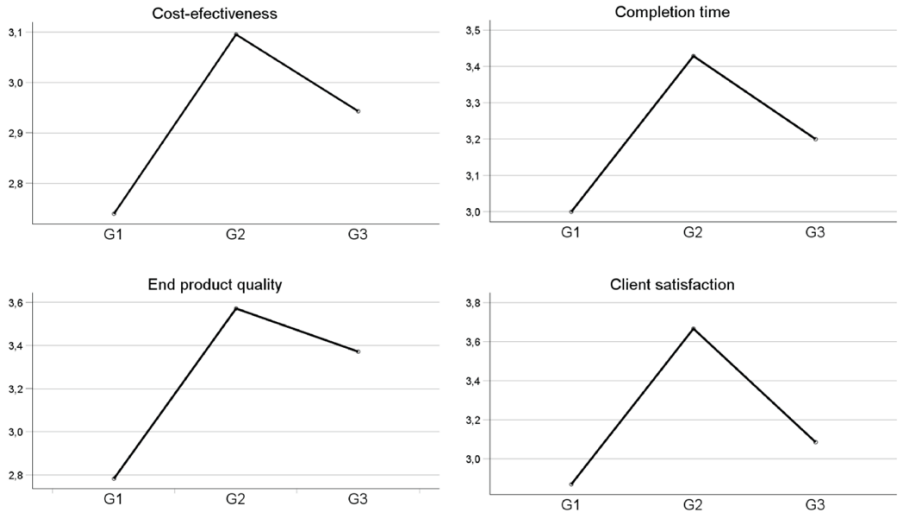
The ANOVA results showed no statistically significant differences in perceived cost-effectiveness and project completion time across groups with varying levels of Agile project management experience, with only small effect sizes explaining 4.3% and 5.2% of the variance, respectively. However, significant differences were found in evaluations of product quality and client satisfaction, where Agile experience had a relatively large effect—explaining 16.8% and 17.3% of the variance. These findings suggest that while Agile experience does not notably impact perceptions of cost and time efficiency, it substantially influences perceived quality and stakeholder satisfaction. Post-hoc analysis confirmed that differences were especially significant between respondents with minimal and moderate Agile experience.

The Dunnett's T3 test (Table 5) revealed that participants with moderate and significant Agile experience reported significantly higher perceptions of end-product quality and client satisfaction compared to those with minimal or no experience, while no significant differences were found for cost-effectiveness or completion time.

Post-hoc analysis (Table 5) and accompanying graphs (Figure 2) indicated a non-linear trend across all four variables, with perceptions improving from low to moderate experience, then slightly declining at higher experience levels. This suggests that moderate Agile exposure may foster optimism about its benefits, whereas more experienced users may adopt a more critical perspective based on real-world challenges and limitations. Overall, while Agile experience enhances perceptions of quality and satisfaction, it does not consistently translate to perceived efficiency or cost benefits.

Table 5. Multiple Comparisons (Dunnett's T3 test)

Dependent Variable	Agile experience (I)	(J)	Mean Difference (I-J)	Sig.
Cost-effectiveness	G1	G2	-0,36	0,184
		G3	-0,2	0,747
	G2	G1	0,36	0,184
		G3	0,15	0,641
	G3	G1	0,2	0,747
		G2	-0,15	0,641
Completion time	G1	G2	-0,43	0,033
		G3	-0,2	0,660
	G2	G1	0,43	0,033
		G3	0,23	0,497
	G3	G1	0,2	0,660
		G2	-0,23	0,497
End product quality	G1	G2	-0,79	**0,001**
		G3	-0,59	0,025
	G2	G1	0,79	**0,001**
		G3	0,2	0,447
	G3	G1	0,59	0,025
		G2	-0,2	0,447
Client satisfaction	G1	G2	-0,8	**0,001**
		G3	-0,22	0,707
	G2	G1	0,8	**0,001**
		G3	0,58	**0,009**
	G3	G1	0,22	0,707
		G2	-0,58	**0,009**



G1 - Minimal or no experience; G2 - Moderate experience; G3 - Significant experience

Figure 2 - Estimated Marginal Means of Dependent Variables

The obtained results reveal that Agile project management experience does not significantly impact the perception of *cost-effectiveness* andF project *completion time*, as both variables showed small effect sizes and non-significant p-values. Hence, the hypotheses H1 and H2 are not supported. Factors such as organizational inefficiencies, early-stage implementation costs, or project complexity may limit Agile's potential to improve these aspects. In contrast, Agile experience significantly enhances the perception of *end-product quality* and

client satisfaction, with large effect sizes supporting hypotheses H3 and H4. Practices like iterative development, early defect resolution, and continuous client engagement contribute to better deliverables and stronger client relationships, highlighting the value of Agile methodologies in improving qualitative outcomes of IT projects.

VI. CONCLUSION

This study presents a comparative analysis of Agile and Traditional project management methodologies in the context of IT projects in Bosnia and Herzegovina. Using survey data collected from industry professionals and statistical analysis, the study found that greater experience with Agile methods significantly improves the managers' perception of achieved product quality and client satisfaction. Emphasis of Agile on iterative development, continuous feedback, and stakeholder involvement enables teams to address issues early and deliver outcomes that better meet client expectations. However, no significant relationship was found between Agile experience and the managers' perception of achieved cost-effectiveness or project completion time, suggesting these outcomes may be influenced by factors such as organizational maturity, implementation costs, and project complexity.

The findings indicate that while Agile methodologies excel in enhancing qualitative outcomes, their impact on efficiency and cost savings is less predictable and context-dependent. To maximize benefits of agile approaches, organizations should invest in team training, foster adaptability, and develop structured communication practices. The study also underscores the need for careful implementation planning, especially given challenges like resistance to change and the steep learning curve. As Bosnia and Herzegovina's IT sector continues to grow, these insights provide valuable guidance for aligning project management practices with the demands of a dynamic and competitive industry.

While this study offers valuable insights into how experience with project management methodologies affects IT project outcomes, several limitations should be acknowledged. Limited geographic scope and reliance on self-reported data may affect the broader applicability and objectivity of the findings. Furthermore, the chosen statistical approach may not capture more complex relationships between variables, and some results were close to the threshold of statistical significance, indicating the need for larger samples or longitudinal approaches. In addition, the focus on four specific outcomes leaves room to explore other influential project success factors. Future research should broaden geographic scope, integrate qualitative methods, and investigate contextual, economic, and technological influences to strengthen both practical and theoretical contributions to project management.

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