

Project Team Productivity Drivers: A Systematic Literature Review Exploring Organizational Attributes and Productivity Factors Using Agile Methods

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ABSTRACT

Organizations have implemented agile methodologies to expedite the delivery of projects and provide tangible business benefits. Although agile principles offer numerous benefits to the project and projectized organization. However, there is limited insight into the critical attributes and factors that determine the success associated with it. This SLR aims to identify the critical productivity factors and characteristics that enhance the productivity of project team members using agile methods in the context of project management. This SLR utilized the PRISMA method; by conducting a comprehensive search on the Scopus database using appropriate keywords, a total of 302 initial research articles were obtained. By applying inclusion and exclusion criteria, screening procedure reduced the number of research articles to 25. A feasibility test conducted on the complete text of 25 research articles includes 16 articles for qualitative synthesis. The co-word analysis was also performed through VOS Viewer to identify the keywords and themes from the research publications. The study identified four major productivity factors and several attributes that affect the productivity of agile project teams using agile methodologies. The productivity factors consist of the role of leadership, project commitment, agile mindset, and organizational agility.



Introduction

The productivity of project teams within the project management framework significantly influences the overall success of a project. Researchers have investigated some critical elements, including team climate, work overload, team leadership, and stakeholder evaluation, impacting the efficacy of project teams (J.K and O.A, 2022; Omar and Ahmad, 2014). Communication competencies of project managers have also been recognized as strongly and positively associated with team member satisfaction and productivity (Majeed et al., 2023). Moreover, shared leadership within agile teams, as stated by (Hofman et al., 2023), directly enhances team performance and indirectly positively influences project efficacy and effectiveness. This highlights the essential role of leadership quality in fostering productivity within agile teams.

Agile teams are characterized by their adaptable and collaborative nature, prioritizing delivering value to customers through continuous improvement and responsiveness to change. This methodology enhances software team response effectiveness and positively impacts project outcomes (Recker et al., 2017). Initially, the agile methods implemented in the software development industry have shown potential benefits in project management processes (Jan et al., 2021) and effectiveness in addressing the complexity of modern software systems and the rapidly evolving business environment (Safwan, 2013). However, the implementation of agile methodologies also poses some challenges, including issues related to management style, the software development process, resistance from software developers (Hanslo et al., 2020), and organizational culture, which has been identified as a crucial component influencing the adoption of agile practices (IJAR and Shaar, 2019; Mkoba and Marnewick, 2022).

The IT sector is not the only one using agile methodologies, as it has been embraced across diverse industries, including the construction industry, financial services, and transportation (Chia et al., 2022). This methodology seeks to improve collaboration among project stakeholders to enhance the adaptability of product development processes (Zasa et al., 2021). It emphasizes collaborative environments to achieve agile management, allowing project managers to uphold vision and continuous monitoring. At the same time, participants adapt to an agile and productive discipline facilitated by the environment (Franky, 2011).

The study of (Aarseth et al., 2017; Sweetman and Conboy, 2018) investigated the impact of agile methodologies on project management, engineering, project governance, and sustainability of product and production. However, implementing agile development methodologies has a favorable effect on team's productivity, software quality, and customer satisfaction. Also, it increases the speed at which the product is delivered to the client (Santos et al., 2011). Some other studies also investigated the influence of hybrid methodologies and psychological safety on productivity in the context of agile methods (Copola Azenha et al., 2021; Hennel and Rosenkranz, 2021).

The complexity and different characteristics of agile methodologies and their potential impacts on team efficiency emphasized the need for a more comprehensive understanding of the factors that influence the performance of continuous agile software development projects and the quality of shared leadership within agile teams (Hofman et al., 2023; Tam et al., 2020). The intricate nature of agile methodologies and the diverse array of viewpoints present in literature make it crucial to conduct a systematic review to thoroughly examine and categorize existing knowledge. Although immense literature is available on the current knowledge, there is still a notable lack of comprehensive systematic literature review which mainly explores the factors that contribute to project team productivity in the context of agile methodologies.

The practice implementation of agile methodologies and their favorable impact on the productivity and efficiency of software development projects have gained wide recognition (Lechler and Yang,

2017), which is why the importance of team productivity in agile software development has been increasing in recent years. A systematic literature review by (Hernández et al., 2019) identified 21 productivity metrics that apply to work teams in agile software development. These metrics are significantly related to the timely and frequent delivery of software, evaluating organizational performance, and assessing the effectiveness of agile project teams. Past literature highlighted the significance of these aspects in assisting decision-makers in choosing suitable agile methodologies according to their value for various organizations and projects (Alqudah and Razali, 2017; Alqudah et al., 2019). These highlighted elements jointly contribute to recognizing and enhancing the efficiency of agile project teams.

Moreover, the study of (Mohammad Ghasemi, 2015) found a direct relationship between organizational agility and effectiveness, suggesting that organizational agility is a vital characteristic that enhances the efficiency of project teams utilizing agile methodologies. These findings indicate that establishing a flexible organizational culture might benefit the efficiency and output of agile project teams. When the organization transformed the way of working from traditional to agile methods and changed its culture towards agility, it yielded to meet the customer demand and fulfill their high expectations. That's why organizational agility has been extensively studied because of its potential influence on team effectiveness. Extensive research has examined the relationship between organizational agility and team performance, revealing insights into many aspects that influence this relationship. (Puriwat and Hoonsopon, 2021) highlighted the significance of organizational agility in influencing product innovation performance, specifically in the context of technological turbulence. The author emphasizes the importance of organizational agility in understanding foreseen circumstances and efficiently reaching them, thus improving the performance of continuous innovation.

Team productivity is a significant issue in the software business as it directly impacts the success of project teams (Fatema and Sakib, 2017; Iqbal et al., 2022). It is crucial to assess each team member's performance to produce effective outcomes. Hence, engaging in exploring this subject matter is interesting (Iqbal et al., 2022). According to the existing knowledge, this performance measure indicator is minimal discussed in the literature (Hernández et al., 2019)

The main purpose of the literature review is to disclose the differences between possible solutions for the agile approaches to improve further and streamline our thoughts on how the agile approaches impact the productivity of project teams. Different perspectives on agile approaches are pointed out in the literature review, and a comprehensive study is required to understand the current state of knowledge of agile teams. It has been observed from the literature that research is done on agile teams. Still, a considerable gap exists in examining the factors that impact the effectiveness of agile in project teams worldwide. To fill the existing gap by conducting a comprehensive investigation of the elements and qualities that increase the effectiveness of project teams functioning within the agile method. Based on the examination, the following key questions will be used to accomplish this:

RQ1: What are the crucial organizational attributes and factors, as indicated in the existing literature, necessary for enhancing projectized teams' effectiveness in agile environments?

Materials and Methods

The systematic literature review assesses and integrates information or data from existing studies. Systematic literature review is an evidence-based paradigm, and this approach aims to examine and incorporate empirical study outcomes to get the answer to the specific study question (Brereton et al., 2007). This section's primary purpose is to explain the specific approach applied to manage and conduct the literature examination. This method enables researchers to integrate data

smoothly and professionally. Moreover, this section will offer a full methodology justification for this systematic review. The following technique is presented below.

Conducting the Review

To comprehend the historical research methodologies applied, the author executed a systematic literature review utilizing the PRISMA method (Moher et al., 2009) guided by the PRISMA statement (Liberati et al., 2009). This method enables researchers to succinctly synthesize prevailing evidence through a meticulously structured, rigorous, and clear stepwise approach. Important phases of a systematic review include discovering relevant literature, inclusion, eligibility, and screening. This chapter covers phases I through IV of the Systematic Literature Review, which applied the PRISMA approach to describe and record the findings.

Identification

The literature search process involved utilizing the digital library, which was accessible through the remote library of the University of China, with Scopus as the chosen database. Numerous keywords and search strings were tested on the Scopus journal article database. Ultimately, the employed search Keywords were:

((agile AND method*) OR (agile AND practices) OR (agile AND implementation) OR (agile AND impact) OR (organization* AND factor*) OR (organization* AND attributes) AND (team AND productivity) OR (team AND performance) OR (team AND effectiveness) OR (team AND satisfaction))

Subsequently, the inclusion criteria were established, the criteria utilized, and the exclusion criteria were applied. The defined inclusion criteria are mentioned below:

- a) The keywords are only relevant to the research question.
- b) Publication within the past 23 years (2000-2023)
- c) Only research articles were included in the document type selection.
- d) Academic articles written exclusively in English were included.
- e) Geographical location and affiliation of the articles: worldwide
- f) The included articles are only relevant to the subject area of “Business Management and Accounting and Social Sciences. (The Scopus database does not categorize project management as a distinct subject area)

The stipulated exclusion criteria are:

- 1) Literature unrelated to the discussion on the methodologies of Agile methodologies or agile practices in projects.
- 2) Articles that are not related to the context of project management.

Screening

Checks for duplication and literature screening were conducted using titles, abstracts, and keywords. Literature that cannot be accessible in full text does not pass the screening stage. Subsequently, literature that successfully passes this stage proceeds to the feasibility assessment process

Eligibility

This stage involves thoroughly reading the entirety of the literature that has passed the screening stage to determine its eligibility following the research question. The chosen literature will be an eligible source for use in research.

Included

The final step in the PRISMA method involves identifying and selecting literature that meets the criteria for inclusion and can be used as a reference in research based on the outcomes of the preceding stages. The workflow outcomes employing the PRISMA method in this SLR are depicted in [Figure 1](#). This figure illustrates the identification process based on the search keywords and applied inclusion criteria, resulting in obtaining 302 records from the Scopus research article database.

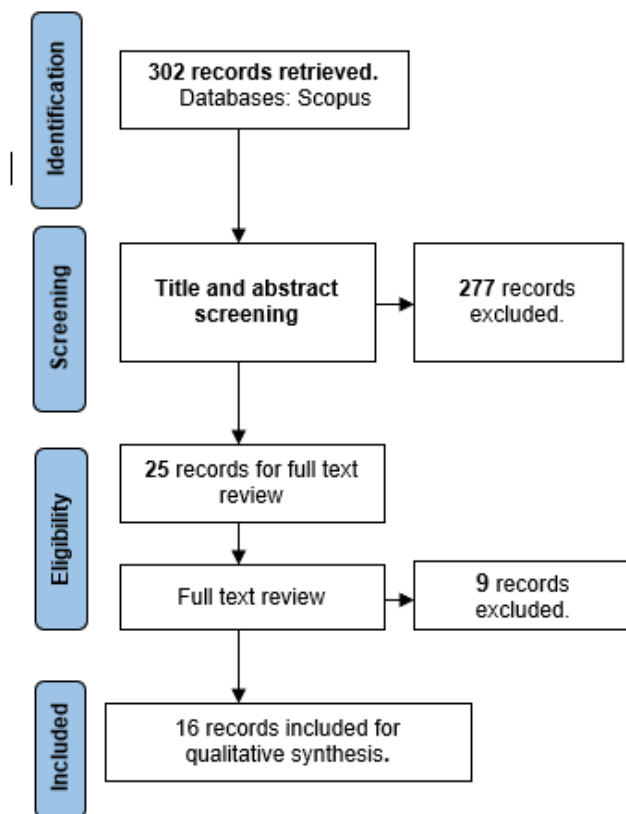


Figure 1: SLR workflow based on PRISMA.

The keyword co-occurrence analysis utilizing VOS-Viewer is also performed on the 302 selected papers to determine the presence of keywords and relevant themes. The primary focus of this co-word analysis is on examining individual 'words' obtained from the authors' keywords, as explained by (Donthu et al., 2021). A total of 162 keywords comprising 6 clusters from the 302 related papers are subjected to further analysis. Identifying emerging themes is conducted by analyzing keywords with the highest cumulative link strength. Van Eck & Waltman, (2010) conducted a study on VOS-viewer computer programming, highlighting that it is freely accessible and is used for visualizing bibliometric maps. VOS-viewer distinguishes itself from other computer programs used for bibliometric analysis by emphasizing the visual depiction of bibliometric maps. VOS-viewer is particularly valuable for presenting extensive bibliometric maps in a user-friendly and understandable manner. The Center of Science and Technology Studies has efficiently utilized VOS-viewer in multiple projects.

This review focuses on recognized themes such as agile methodologies, agile software development, agile manufacturing, team performance, and team productivity. [Figure 2](#) displays a visualization of the network formed by the co-occurrence of terms. This visualization provides

Furthermore, Table II presents detailed information from the 16 selected papers. This table includes the year of publication, the title of each paper, and the respective source title or journal name.

Table 2: Detail information about the selected papers

No	Year	Title	Source Title	Authors
1	2023	“Do agile work practices impact team performance through project commitment? Evidence from the information technology industry”	“International Journal of Productivity and Performance Management”	(Uraon et al., 2023)
2	2023	“Analyzing the impact of agile mindset adoption on software development teams’ productivity during COVID-19”	“Journal of Advances in Management Research”	(Sathe & Panse, 2023)
3	2023	“Impact of Shared Leadership Quality on Agile Team Productivity and Project Results”	“Project Management Journal”	(Hofman et al., 2023)
4	2022	“Agile Projects in Nonagile Portfolios: How Project Portfolio Contingencies Constrain Agile Projects' Teamwork Quality”	“IEEE Transactions on Engineering Management”	(Bechtel et al., 2022)
5	2021	“Ambidexterity in Agile software development: a conceptual paper”	“Journal of Organizational Effectiveness”	(Lindskog & Magnusson, 2021)
6	2021	“Interruptions in Agile Software Development Teams”	“Project Management Journal”	(Wiesche, 2021)
7	2021	“Investigating the “Socio” in Socio-Technical Development: The Case for Psychological Safety in Agile Information Systems Development”	“Project Management Journal”	(Hennel & Rosenkranz, 2021)
8	2021	“The Changes in Team Cognition and Cognitive Artifact Use During Agile Software Development Project Management”	“Project Management Journal”	(Drury-Grogan, 2021)
9	2021	“Adoption of Agile Methodology for improving IT project performance”	“Serbian Journal of Management”	(Roshan & Santhosh, 2021)
10	2020	“Agile ways of working: A team maturity perspective”	“Journal of Software: Evolution and Process”	(Gren et al., 2020)

11	2019	“Using a coach to improve team performance when the team uses a kanban process methodology”	“International Journal of Information Systems and Project Management”	(Shamshurin & Saltz, 2022)
12	2018	“Coordinating Knowledge Work in Multiteam Programs: Findings from a Large-Scale Agile Development Program”	“Project Management Journal”	(Dingsøyr et al., 2018)
13	2017	“How Agile Practices Impact Customer Responsiveness and Development Success: A Field Study”	“Project Management Journal”	(Recker et al., 2017)
14	2017	“A leadership framework for distributed self-organized scrum teams”	“Team Performance Management”	(Srivastava & Jain, 2017)
15	2010	“Toward agile: An integrated analysis of quantitative and qualitative field data on software development agility”	“MIS Quarterly: Management Information Systems”	(Lee & Xia, 2010)
16	2006	“The impact of an agile methodology on the well-being of development teams”	“Empirical Software Engineering”	(Syed-Abdullah et al., 2006)

Findings and Discussion

This section thoroughly explores the findings and discussion of a systematic literature review, providing detailed insights into 16 selected studies. Table III shows the identified productivity factors and their attributes that impact project team productivity in the context of agile methodologies.

Table 3: Productivity factors and attributes identified.

Productivity factors	Attributes	Primary studies
Role of Leadership	Leadership styles Leadership in scrum teams Technical Competence of Scrum Master Influence of coach	(Hofman et al., 2023; Lee & Xia, 2010; Srivastava & Jain, 2017; Syed-Abdullah et al., 2006)
Project Commitment	Psychological safety Social agile practices Task commitment	(Hennel & Rosenkranz, 2021; Hummel et al., 2015; Lindskog & Magnusson, 2021; Syed-Abdullah et al., 2006)
Agile mindset	Communication Practices Coordination & Collaboration	(Lee & Xia, 2010; Santos et al., 2011; Syed-Abdullah et

	Daily standups Sprint based work	al., 2006)
Organizational Agility	Team Autonomy Team diversity Adaptability and flexibility	(Dingsøyr et al., 2018; Hofman et al., 2023; Lee & Xia, 2010; Shamshurin & Saltz, 2022; Wiesche, 2021)

The implementation of agile methodologies shows a strategic transfer to fast and efficient project management methods, whose focus is on accelerating the project schedule as well as simplifying the workflow of project activities. Therefore, numerous organizations have rapidly adopted agile methodologies, which result in improved project delivery, streamline processes and an addition of business values, ultimately fulfilling the organization's primary objective. This transition signifies a dedication towards adaptability, collaboration and creativity within the ever-evolving business landscape leading to successful project execution. Although, agile methodologies offer numerous sustainable benefits, struggle in their adoption, leading to reduce the productivity of project team members. (Tam et al., 2020). This systematic literature review identifies five key productivity factors and attributes that could influence the productivity of teams working on agile projects. The subsequent sections outline details of each productivity factor.

Role of Leadership

According to the existing knowledge, this review highlighted the importance of leadership role, which impacts the productivity of project team members in the context of agile methods. Hofman et al., (2023) demonstrate the shared leadership quality identified as a leading factor in strengthening the productivity of agile project teams and project outcomes. This leadership approach aligns perfectly with the fundamental principles of agile techniques, when numerous team members adopt leadership roles instead of depending exclusively on a chosen leader (Zhou et al., 2024). This technique allows team members to develop a shared understanding of collaboration, a shared leadership culture, and, ultimately, essential trust in their competencies and shared obligations (Spiegler et al., 2021). Another leadership framework Srivastava & Jain (2017) introduced is tailored for the self-organized scrum team. It emphasizes the critical role of agile leaders with communication skills, an innovative mindset, contextual agility, and the ability to manage complex situations.

One of the studies introduced the concept of "scrum master," which plays a critical role within the leadership paradigm and makes major contributions to team dynamics and project productivity. The term "scrum" refers to a framework used in agile project management, particularly in software development, where the teams can deal with complex tasks while consistently delivering products of the highest value productively and innovatively (Schwaber and Sutherland, 2017). This scrum framework delineates project team members into three roles: (1) the product owner, (2) the development team and (3) the scrum master (Karabiyik et al., 2020). The scrum master role is usually designated during a project, and the master can even be a member of the development team, particularly if that individual has technical knowledge. However, this role shouldn't be undertaken by the product owner (Grebić and Stojanović, 2021).

The current literature highlights various methods for agile software development (ASD), but the most popular method is scrum, particularly in information system development (Srivastava and Jain, 2017). In this context, the role of a scrum coach is well-defined by (Shamshurin and Saltz, 2022). The scrum coach guides the project team through iterative steps to enhance their agile practices. Although not directly involved in solving technical challenges, the scrum coach actively participates in all scrum meetings, engaging in discussions that foster participation in all scrum

meetings and engaging in discussions that foster an environment where the team collectively reflects on progress and determines the best course of action. Functioning as a leader, the scrum coach plays a critical role in adapting the methodology to a team specific circumstance, thereby enhancing overall productivity as the team navigates the complexities of the project (Olszewski, 2024).

Project Commitment

The second productivity factor is project commitment, as identified from the shortlisted literature, which is a vital component of the efficiency of the agile project team. It includes the constantly evolving psychological process that impacts the effectiveness of project teams. The study of (Uraon et al., 2023) heightened that teams with dedicated project commitment are more enthusiastic to devote effort in achieving common project goals, encouraging a sense of responsibility, job satisfaction, and value within the project team. The author also demonstrated the connection between the psychological mechanism involved in agile transformation and team effectiveness. They propose that the agile practices foster project commitment which in turn acts as a mediator between agile taskwork and teamwork on team performance.

Agile practices in social contexts incorporate communication strategies that promote knowledge sharing and foster relationships (Hummel et al., 2015), ultimately enhancing the productivity of agile project teams. Hennel & Rosenkranz, (2021) identified that psychological safety is a critical attribute for the agile team because social agile practices (SAP) positively enhances the psychological safety of the project team. Due to this psychological safety, the project team fosters the use of social agile practices (SAP), which positively impact the project's performance. These agile techniques depend on the dedication of team members' commitment towards the task and activities, and the division of these activities throughout a sprint contributes to the timely completion of the project (Uraon et al., 2024)

Agile mindset

Agile mindset is the third productivity factor identified as a factor involving attitude, values, and set principles that individuals and team members adopt in software and project management. Srivastava & Jain, (2017) highlighted that agile is a versatile method that requires consistent delivery throughout the project. It also requires continuous coordination and collaboration, which must be ensured through clear communication. This study also highlighted that close collaboration allows agile teams to continuously recognize and appreciate each other's skills and abilities and foster strong relationships within the project team. When the organization implements the agile methodologies, which involve iterative planning and execution cycle, regular customer feedback, and the development of minimal viable products, it yields improved project team collaboration and project success (Bechtel et al., 2022)

The agile mentality is a way of thinking that promotes collaboration among team members and flexibility according to the changing environment. This mindset enables particular skills in the project development team to support positivity and help team members minimize negative behavior (Sathe and Panse, 2023). When the team members adopted the agile way of working, they iterated their ideas, worked in sprints, and engaged in stand-up meetings. Some set criteria are used to implement each sprint, such as the team being present during each sprint to get everyone on a similar path before initiating the project (Roshan and Santhosh, 2021). It enhances goal orientation, communication, and teamwork. Thus, team members can examine their performance daily and make changes accordingly, which helps to enhance the collective performance of the project team (Uraon et al., 2023)

Organizational Agility

The last productivity factor is organizational agility, which means the ability of the organization to adjust, react, and survive according to the business environment. An agile organization is characterized by its workforce, development process, leadership style, and organization structure (Gren et al., 2020). These agile workforces are known for their ability to self-organize teams. However, the organization must manage its team autonomy and diversity, as these are critical factors that enhance software development agility. Moreover, it is not always true that team autonomy and diversity lead to increased software development agility. The authors' findings (Lee and Xia, 2010) suggest that when autonomy is enhanced without a corresponding increase in diversity, the level of response decreases. The findings also indicated that a software team should efficiently handle team autonomy and diversity, considering the specific aspects of agility that the team member must focus on. The study results further validate that project team diversity enhances the response rate because it solves various challenges efficiently.

According to the above literature, the agile organization cultivates a framework and culture that enables project teams to quickly adjust according to project requirements, customer demand, and market conditions. This organizational agility increases productivity by allowing agile teams to iterate rapidly, instantly adapt to changing requirements, and consistently refine their procedures.

Conclusions

This systematic literature review (SLR) examines critical factors such as leadership role, project commitment, agile mindset, and organizational agility, revealing their essential roles in improving the efficiency of agile project teams. The first identified factor is the organization's leadership role through which the agile project team productivity might be enhanced (Hofman et al., 2023). This study also highlighted that various leadership styles are fundamental elements in fostering collaboration, adaptation, and overall effectiveness of projects. The study of (Shamshurin and Saltz, 2022; Srivastava and Jain, 2017) Introduced the importance of the scrum master role in the context of agile methodologies by emphasizing that as a leader, the scrum master has various responsibilities that must be completed during the project and creates a flexible environment for iterative development and ongoing improvement.

Project commitment has been identified as a psychological factor that ultimately influences team efficiency through psychological safety, social agile practices, and task commitment. The research performed by (Hennel and Rosenkranz, 2021; Hummel et al., 2015; Uraon et al., 2023) highlighted the importance of project team commitment, which yields promoting responsibility, job satisfaction, and value within the agile project environment. The Agile mindset has been identified as a critical factor that consists of effective communication methods, coordination, collaboration, and iterative work cycles contributing to the enhancement of flexibility and adaptability in agile project teams (Santos et al., 2011; Srivastava and Jain, 2017; Syed-Abdullah et al., 2006). These agile practices establish the role of a self-organizing project team, having the capacity to quickly adapt and adjust in the dynamic environment and hence increase productivity.

This systematic literature review established the basis for assessing the relationship between agile project teams' organizational attributes and productivity factors. Scholars and practitioners can leverage this foundation to acquire a more comprehensive understanding of the challenges and opportunities that arise using agile methodologies in various industries.

Limitations of the study

This SLR explores the organizational attributes and productivity factors that enhance the productivity of project team members utilizing agile approaches in their projects. However, this research has several limitations, which are listed below:

- This SLR only identified those factors and attributes that enhance the productivity of agile project teams. However, the study omitted those factors that detract from the productivity of agile project teams. Only the positive traits may result in an inadequate representation of the challenges and constraints encountered by agile project teams. A comprehensive analysis would need a simultaneous exploration of possible inhibitors, providing a more equitable and sophisticated comprehension of the underlying dynamics.
- The year-wise shortlisted articles have a shallow frequency between 2018 and 2020, as Table I shows the distribution of papers.
- The study's ability to make broad conclusions may be limited by the inherent variation in agile methods and team structures in many businesses and contexts. Variations in team structure, project scope, and industry-specific factors may impact the flexibility and adoption of agile methodologies across different organizational contexts. These distinctions could potentially affect the applicability of research findings in diverse scenarios.

Future Research

Future studies should explore multiple avenues to deepen our comprehension of the operational dynamics within agile project teams.

Initially, examining and determining the limiting factors within the agile project team is essential. Understanding these challenges, barriers, and potential constraints that hinder productivity is vital for developing specific solutions and effective strategies.. Subsequent research can explore the elements and characteristics that improve and hinder the efficiency of agile project teams. This investigation would offer a more comprehensive and applicable insight for scholars and professionals navigating the complexities of the agile project landscape.

Agile methodologies have moved beyond the software development industry and are widely adopted in numerous sectors. Future research might be on how industry-specific characteristics and requirements affect the effectiveness of project team productivity using an agile approach to the project. Moreover, future research may also examine how organizational and national cultural factors influence agile practices successful implementation, like how cultural factors support collaboration, creativity, and flexibility in agile project teams.

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