Scrum Vs Xp In Large Organizations

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Abstract-
Large companies frequently employ two well-liked software development approaches: Scrum and XP (Extreme Programming). Enhancing teamwork, output, and the caliber of software outputs are the goals of both frameworks. This study contrasts and compares Scrum with XP in major enterprises, emphasizing important queries and factors to take into account before using either methodology. According to the statistics, scrum is the methodology most commonly employed in major firms. Whether to embrace XP or Scrum depends on the particular needs and needs and context of an organization, and each has pros and cons. Certain success factors have been established in the context of both approaches.
Keywords: Scrum, Extreme programming, large, organizations, adoption, success.

I. INTRODUCTION

Agile techniques are becoming an increasingly important methodology for many programming development companies to improve the quality of their products. However, the strategy was originally designed to support small- to medium-sized self-organizing groups, not large-scale organizations. [1].

In addition, organizations are increasingly adopting Agile approaches for internal programming development. Agile transformation is commonly driven by factors such as reduced costs, rapid deployment, preconditions, and mental model organization [2]. Large and intricate software projects often require effective discipline together with the extra plan that is necessary to guarantee success. Furthermore, Agile layout is an almost unstructured cycle consisting of multiple little tasks to guarantee optimal delivery outcomes [3]. Agile tactics' suitability for huge associations is frequently regarded as defying[4][5]. This problem is even worse in larger projects since the application domain's complexity frequently exceeds the knowledge and expertise of a small number of clients as well as developers.

In fact, achieving cooperation and communication among people who value and trust one another is a key component of the agile methodology's success. Individual-focused exercises are a feature of some agile approaches, such as XP's programmable pair exercise. In this case, selecting appropriate personnel managers is essential to providing them with the necessary training and direction and to create a set of business procedures that continuously promote excellence. These kinds of activities might not always go smoothly, especially for more experienced and conventional developers. Additionally, clients should be included in the process of improvement, which in some circumstances might be problematic on its own[6].

One of the biggest challenges of today's agile software development environment is finding the right Agile methodology that provides the highest quality product possible while maintaining efficiency and cost-effectiveness. This paper compares and contrasts the two leading Agile methodologies, Scrum and EXtreme Programming (XP). Scrum focuses on providing a self-organizing and adaptive process, while XP emphasizes technical excellence through a focus on customer input and feedback. Both have their pros and cons and both can deliver great products, but only in the right situations. Through this research, some research questions were identified as shown below to analyze and compare Scrum and XP to gain an understanding of how to best utilize each methodology for successful project completion.

RQ1. Which method is used most in Large Organizations?
RQ2. What are the reasons behind adopting this method over the other method?
RQ3. Defining the strong and weakness points of adopting scrum and xp in Large Organizations?

RQ4. What are the success points of adopting scrum and XP in large organizations?

II. RELATED WORK:

Agile methodologies are currently being gradually rearranged by associations in their product improvement efforts. Taking everything into account, an intentional and extensive implementation of Agile

techniques in businesses is now elusive and mostly focused on project-level activities [7]. Large rates and intricate projects deal with constantly shifting needs and demands for time-to-market. Efforts have been made to include the XP in large-scale initiatives in an attempt to reduce these risks, but the outcomes have been inconsistent [8].

Furthermore, large-scale or complex projects, as well as established associations, present greater challenges for the application of agile approaches. Large-scale, intricate connections and endeavors typically involve a great deal of interdependencies, which means that coordination is essential. Therefore, under these situations, less expensive forms of coordination—normalization and arrangement—are easier to manage. More specifically, a large number of individuals in large-scale projects and organizations believe that coordinating mutual adjustment over a large scale is a challenging task. Agile strategies are typically disliked for large, complex projects or established associations since they depend on mutual adjustment [9]. Nonetheless, small businesses can successfully employ agile approaches. Currently, as seen below, various attempts are being made to develop XP and Scrum for use with large projects:

Extreme Programming (XP*)

According to Jacobi and Rumpe (2001), the Extreme Programming (XP) approach can be developed by incorporating features of different-leveled techniques. They agreed to use the XP approach to create the hierarchical structure. By adhering to the lightweight approach, it is possible to break down large projects into a collection of smaller XP endeavors that have the same overall goal to achieve. However, as a result of combining and adjusting each XP standard with those from the hierarchical redesign technique, five essential standards were developed in this different-leveled process. These standards are as follows: Client involvement for aloft confirmation; use of concise, unambiguous interfaces to divide the system; each sub-adventure has a sub-goal that is a subset of the main goal; 80% decisions, followed by gradual development, and well-orderly with project gatherings and advice community. [10].

Figure 1. The progressive approach's five primary standards. Adopted from [10]

Agile Scrum Methodology

Adoption-wise, the challenge will be in transitioning from a medium-to-large association to Scrum, since it may take more than a year for the changeover from the traditional technique that relies on the waterfall to the Scrum system, which necessitates substantial adjustments. A suitable model modification, as shown in the following, will be helpful in managing the process of such reception and keeping up with the change:

According to Weidner (2014), the organization should enhance a change management process and then assess the progress made in relation to the plan. When conducting an Agile interaction of this kind, it is important to monitor the progress made in relation to the plan and make necessary adjustments to the arrangement based on observation and/or unanticipated outcomes. At this point, one may offer a question starter regarding how to make the scrum adoption process a little bit simpler.

In order to address this, initial efforts should be focused on providing early participant preparation and evaluating the association's readiness for agility. The initial pilot venture can then be identified by examining the collection of software from the leading ventures. This would highlight the benefits of advancing the association's light programming development, so raising interest in and enthusiasm for others to try the novel procedure [10].

III. COMPARISON SCRUM OVER THE XP IN LARGE ORGANIZATIONS:

Q1. Which method is used most in Large Organizations:

Scrum is the most widely adopted method in large organizations [12], there was also study conducted in 2021 by Mishra, Abdalhamid, and others demonstrated that, as shown in Figure 2's results, the Scrum

approach was most frequently used, accounting for 88.5% of the responses. The XP approaches came in second, at 32.7% [13].
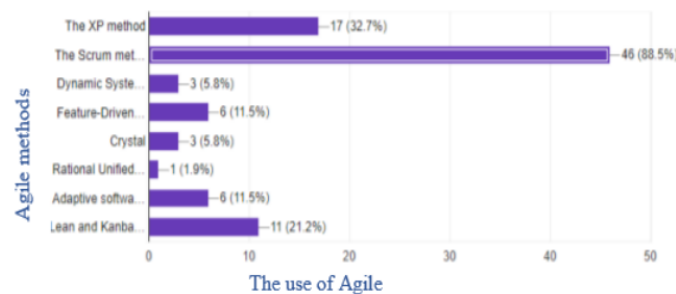
Figure2. The Agile methods often used. Adopted from [13].

Q2. What are the reasons behind adopting scrum over the XP method?
The reasons behind adopting Scrum over XP in large organizations can vary, but some common reasons include:
Scrum's focus on project management aspects aligns with the needs of large organizations, who often have complex projects requiring efficient coordination and collaboration [14].

Scrum provides a structured framework for managing projects, with clear roles and responsibilities, which can help large organizations ensure accountability and transparency in their development processes [15].

However, when a significant emphasis on engineering processes is required to assure greater progress or quality, then XP is helpful. Because XP strictly adheres to engineering techniques like pair programming and minimal design, it is a good fit for projects where producing high-quality software is a top concern[16].In the end, the specific needs and limitations of the project and the organization should determine whether to use XP or Scrum.

Q3. Defining the strong and weakness points of adopting scrum and xp in Large Organizations?
Software teams frequently utilize Scrum and Extreme Programming to set up agile software development procedures [17]. The following summarizes the benefits and drawbacks of XP and Scrum adoption in large organizations:

The strengths of adopting Scrum in large organizations include:
1. Scrum offers a well-defined project management structure that includes well-defined roles, ceremonies, and artifacts. This aids in creating a sense of accountability and order among development teams in large enterprises [14].
2. Transparency is increased: Scrum encourages regular communication and transparency, which is advantageous in large businesses with several teams or stakeholders [18].
3. Scalability: Because Scrum divides work into smaller, more manageable tasks and promotes teamwork and coordination, it can be scaled up to tackle large and complicated projects [9].

The weaknesses of adopting Scrum in large organizations include:
1. Absence of emphasis on technical practices: Scrum places a lot of emphasis on project management issues, but it might not do enough to highlight technical practices like testing, continuous integration, and code quality [18].
2. Dependency on good project management abilities: Scrum may not function successfully in companies where project management is not prioritized or when there is a shortage of qualified project managers due to its heavy reliance on these abilities [18].

The strengths of adopting XP in large organizations include:
1. Strong emphasis on technical techniques: XP emphasizes technical practices like pair programming, test-driven development, and continuous integration. These procedures can raise productivity, enhance code quality, and produce superior software development results all around [19].
2. Collaboration and teamwork: Close cooperation and teamwork are encouraged among developers, stakeholders, and customers by XP. This promotes a sense of shared responsibility and can result in higher-quality and more customer-focused software [19].

3. Flexibility and adaptability: XP promotes accepting change and making adjustments in response to changing needs. This can be helpful in large businesses when it's necessary to react swiftly to market demands or where requirements might change often [19].

The weaknesses of adopting XP in large organizations include:
1. Limited Application: XP has a more restricted application, primarily focused on   software systems development [20].
2. Less Well-Defined Roles: Roles such as the Product Manager are less well-defined compared to Scrum, which can lead to ambiguity in large organizations [20].

TABLE1: Show Advantages And Disadvantages Of Adopting Scrum And XP In Large Companies.

Methodology	Advantages	Disadvantages
Scrum	• well-defined project management structure. • Increasing transparency • Scalability	• Absence of emphasis on technical practices. • Dependency on good project management abilities.
XP	• Strong emphasis on technical techniques • Collaboration and teamwork • Flexibility and adaptability	• Limited application • Less well defined roles

Q4. What are the success points of adopting scrum and XP in large organizations?
Several success factors can result from large firms implementing Scrum and XP. Increased output, better software quality, a quicker time to market, improved teamwork and communication, a higher level of customer satisfaction, and a greater capacity for change are some possible success factors. Numerous case studies and studies on the application of XP and Scrum in major enterprises have noted these success factors [15][16][18]. Because XP and Scrum target various areas of software development, they compliment each other, which is why XP approaches have been successfully adopted by large enterprises [21]. Furthermore, large businesses can benefit from the combination of Scrum and XP in order to attain important success characteristics like high quality, on-time delivery, and project scope.

However, the success points of adopting Scrum and XP in large organizations can be attributed to several factors which are:

First, the use of Scrum and XP promotes increased productivity by breaking down work into smaller, manageable tasks. This allows teams to work more efficiently and deliver value more quickly.

Second, the emphasis on continuous improvement in both Scrum and XP fosters a culture of innovation and learning within the organization. Teams are encouraged to regularly reflect on their processes and make changes as needed, leading to improved software quality over time.

Lastly, the collaborative nature of Scrum and XP promotes enhanced team collaboration and communication. This leads to better coordination and alignment among team members, resulting in higher customer satisfaction and the ability to adapt to changing requirements more effectively [9].

IV.   RESULTS AND DISCUSSION
The main results that obtained by identifying four research questions are:
1.The most effective and used method in large organizations is Scrum.
2.Specific needs and context of an organization determine whether to use XP or Scrum.
3. While Scrum offers well-defined project management structure, transparency and scalability, it may face challenges in large teams and has undefined team composition. On the other hand, XP promotes a whole team approach and high bandwidth communication but has a more limited application and less well-defined roles. The choice between the two should be based on the specific needs and context of the organization.
4.The success points of adopting Scrum and XP in large organizations include:
- Increased productivity through the division of work into smaller, more manageable tasks - Better software quality through ongoing innovation and quality improvement.
- Improved teamwork and communication leading to improved team member coordination and alignment .
- Adaptability to changing requirements through iterative and flexible approaches - Timely delivery, high quality, and scope of functionality in projects.

In large organizations, Scrum and Extreme Programming can be used together to achieve a balance between project management and technical excellence. This hybrid approach allows for effective coordination, iterative development, and continuous improvement while ensuring high-quality software delivery. In large organizations, Scrum is often the preferred project management framework, providing a structured approach to managing projects and ensuring alignment among teams. On the other hand, Extreme Programming brings in

technical excellence and discipline in software development through practices such as pair programming, testing, and continuous integration. By combining elements of both Scrum and Extreme Programming, large organizations can leverage the benefits of both methodologies. Scrum is responsible for project planning and tracking, while Extreme Programming focuses on technical aspects of software development.

V. CONCLUSION AND FUTURE WORK

In conclusion, while XP and Scrum are useful approaches that may be applied in large businesses, Scrum is the most commonly employed one in these settings. The organization's unique needs and the intended results will determine which method is best. Scrum may be a better fit for firms that value collaboration, flexibility, and continuous development, whereas XP may be a better choice for those who value ease of use, quick turnaround times, and high-caliber software. In the end, choosing between Scrum and XP should be predicated on a careful evaluation of business culture, leadership dedication, teamwork and communication, and training and instruction. Additionally, some achievements in implementing XP and Scrum in big businesses are noted, including: Increasing productivity, Improving teamwork and communication and Adaptability to changing requirements. For future work, If the study was expanded to consider the unique elements of implementing XP and scrum in small and medium-sized firms in addition to large ones, further findings could be attained.