EFFECTS OF SCALING AGILE FOR SOFTWARE DELIVERY

HEMANT SHARMA, NIMISHA SINGH
Symbiosis International (Deemed University) (SIU), Symbiosis Centre for Management and Human Resource Development (SCMHRD), Pune, India
hemant14@live.com, nimisha_singh@scmhrd.edu

The global economy, driven by both confidential and communal areas, dynamically depends on the successful finishing of ventures, with trillions of dollars contributed every year. Even though, normal enterprise the executives models habitually experience serious disappointments since of diverse situation. Accordingly, scientists and specialists are investigating possible measures to habitual grounding and completing techniques. The idea of "Nimble" has arisen as a trivial organization approach, acquiring ubiquity at first in the product industry. Agile techniques spotlight on practical plan, scope malleability, buyer relationship, and powerful collection association. Agile innovation, including strategies like Powerful Frameworks Advancement Strategy, Extreme Programming (XP), SCRUM, Agile Modeling (AM), and completely clear, conquer these hindrances and improves development accomplishment. The thought of Coordinated has advanced into different scaling strategies, including Scaled Agile Framework (SAFe), Disciplined Agile Delivery (DAD), and Large Scale Scrum (LeSS). Understanding the details and subtlety of scaling Light-footed philosophy is critical for associations demanding to alter and increase in a swiftly emergent job the executive's prospect.

DOI
https://doi.org/10.18690/um.epf.5.2024.23

ISBN
978-961-286-867-3

Keywords:
Agile Scaling, Software Delivery, Agile Frameworks, Organizational Agility, Agile Transformation

JEL:
O32, O33, M15

University of Maribor Press

1 Introduction

1.1 Background of the Study

The economy of the private as well as the public sector relies on the projects assigned to them. The investments in such a projects are in the trillions of dollars annually. There are significant failures in the projects due to various circumstances. The researchers and practitioners seek alternative techniques for the conventional models of planning and implementation. Hence, arise the concept of "light weight" management techniques referred to as "Agile" which gained popularity in the software industry(Serrador & Pinto, 2015). Moreover, the traditional methods pursued on the logical sequencing which will set the deliverables at the earlier stage and evaluation of project development relies on the enactment. Agile methods are as follows:

- DSDM - Dynamic Systems Development Method
- XP - Extreme Programming
- SCRUM
- AM - Agile Modeling
- Crystal Clear

The outcomes of the aligning teams to work together still employs traditional methods and generates hybrid methods from diverse methods(Alqudah & Razali, 2016). The various scaling methods of agile are

- SAFe- Scaled Agile Framework
- DAD – Disciplined Agile Delivery
- LeSS – Large Scale Scrum

The scaling techniques will provide numerous beneficiaries in the software industries. DAD method is mainly utilized to extend the SCRUM lifecycle in the inception phase. It highlights on the functional and data modeling. It provides suggestion in the areas of design and transition phase. The scaling of agile in the software teams necessitates the solutions to the numerous issues such as synchronizing as well as co-ordination of the work and handling the overall

communication system. The present study deliberates the significances as well as challenging factors of scaling agile in the software industry. Subsequently, there are diverse scaling methodologies of Agile, the present study attempts to compare the frameworks and will suggest the effective strategies for the improvised software product delivery.

1.2 Research Questions

- How do software firms benefit from adopting agile scaling frameworks?
- What are the factors impacting the execution of agile scaling in the software delivery process?

1.3 Field of Sustainability

Sustainability is termed to take a holistic decision on the environmental, social and economic issues. Leveraging of scaling agile elevates the sustainability in the firms. The integration of the business people and developers resulted in the exploration of the targeted group and ensures accessibility. The sustainability is a successful factor for the firms maintaining the product quality. The software firm utilizes scaling agile technique for delivering the quality product and thereby leads to achieve the sustainability. The present research made an attempt to signify the adoption of scaling agile in the software industry for the effectual product delivery. It will aid the firms to attain sustainability in the competing environment. Scaling Agile for software delivery can appreciably impact the sustainability of organizations. By acceptance agile philosophy on a project scale, team can set up and develop the essential circumstances for a background of teamwork, honesty, and flexibility to undertake sustainability challenge. Ex: agile frameworks such as Scrum and Kanban endorse incessant development and highlight the significance of stakeholder contribution. When this approach is useful to sustainability initiatives, teams can collect contribution from various stakeholders, such as ecological experts, district legislature, and end users, to recognize opportunities to reduce ecological impacts and make the most of communal benefits all the way through the software progress life phase.

In addition, agile methods facilitate quick iteration and testing, allow organization to quickly experiment and arrange pioneering green solution, such as energy-efficient algorithms, green covering or carbon-neutral hosting services. Agile scale software

release also presents exclusive challenges in integrating aspects of sustainable improvement into difficult consistent system. As organizations inflate across different teams, departments or yet countries, the execution of the SDGs become more composite. This requires the development of all-inclusive frameworks and metrics to measure the ecological and communal impacts of software more largely. Organizations must spend in teaching so that agile team appreciate the values and practice of sustainable maturity. By mounting a civilization of sustainable increase in agile organizations and providing the compulsory support and assets, company can use the full prospective of the agile system to reach constructive environmental and group results while delivering high-class software and its various services.

2 Literature Review

Agile Scaling Framework – An Overview

The digitalization elevates the awareness of software and its significance. It also elevate the competitive factors of firms in the global market(Dingsøyr, Falessi, & Power, 2019). Agile modify the method of software development. An incorporation of scaling agile techniques in the firms should handle with the care and it also concentrates on the particular agile which provide better performance in the small firms. Recent studies have taken different frameworks, methodology to understand the agile techniques and their implications. The study (Wińska & Dąbrowski, 2020) compares the diverse agile frameworks and their implications. The prevailing study instigates on the appropriate metrics for the accurate tracking of delivery of products. The success of software projects relies on the agile scaling frameworks. Another issue is the requirements of alignment and autonomy in the software development projects in commercial platforms(Moe, Šmite, Paasivaara, & Lassenius, 2021)using multiple case researches and found out.

Challenging Factors of the Firms

The cost overruns and delayed delivery of the projects is the major issue of the software industry. It is due to deficiencies of effort calculation in the project planning. An analysis of the factors impacting the schedule deviation in the software development process revealed that the organizational politics, alignment, task dependencies and project refinement are the factors impacting the schedule

deviations(Kula, Greuter, Van Deursen, & Gousios, 2021). The implementation of scaling agile techniques in the software firms is complex. SWOT framework to evaluate the factors that impact the successful execution of agile program in the software firms identified thirteen positive factors and remaining eleven are negative factors(Sinha, Shameem, & Kumar, 2020). It is challenged by the complicated projects, and multidisciplinary groups where implementation of roles in Agile teams was identified as a challenging factor(Hukkelberg & Berntzen, 2019). Data science is significant in the agile teams as the firms have the capability to reap data and exhibit competitive services. The product owner (PO) in the huge scale agile face challenges (Bass & Haxby, 2019). The co-ordination of product owner in the huge software firms are evaluated through the theory of relational co-ordination (Berntzen, Moe, & Stray, 2019). The outcome reveals that the co-ordination alters on PO and unscheduled co-ordination leads to high value of communication. Berntzen, Hoda, Moe, & Stray (2022)recommend the TOPS (Technical, Organizational, Physical and Social) and taxonomy for the improvisation of team co-ordination among the large scale agile.

Implications of Scaled Agile

Scaled agile generates challenges in the software firms. Petit & Marnewick (2021)evaluated the mode of IT initiatives aligned with the corporate strategies in the scaled agile methodology. Using DAD and SAFe frameworks Beecham, Clear, Lal, & Noll (2021) identified risks on the scaled agile in the software firms which revealed that the frameworks aids to mitigate the risks in the global software firms. It minimizes the time and operation costs. The study used the PLS-SEM to identify the critical success criteria and its associations. Organization struggle is a crucial factor and it recommends the integration of safety factor with the agile frameworks. AGSD is a popular fact in the elevation of software as numerous firms are interested to adopt agile for the software development (Marinho, Camara, & Sampaio, 2021). The mapping aids in the fitting of SAFe practices with the AGSD. Stray, Moe, & Aasheim (2019) examined the co-ordination methodology for DevOps teams in agile and various dependencies in huge firms. 20 co-ordination mechanisms have been identified through dependency taxonomy. The challenges of RE namely implementation strategies, minimal documentation and consumer feedback has negative impact in the quality product (Rasheed et al., 2021).

3 Research Methodology

3.1 Research Design

A quantitative approach is deemed fit for this study as the objective is to study the causation to identify the linkage of scaling agile to software delivery. The study will use survey using questionnaire. A questionnaire will be developed using the constructs from the previous studies. The survey will be administered to software project professionals who are practicing agile methodologies. Using a purposive sampling, project professionals will be identified from the IT firms who have 4- 10 years of project management experience including agile methodologies. The foremost reason for utilising purposive sampling approach is due to the declaration is created based on the goals of the study that particular people might provide considerable opinions required for the questions of the research and so necessary to be joint into the sample model (Denieffe, 2020)

3.2 Data analysis Technique

The data analysis process describes the association of empirical and theoretical data. The technique of data analysis explains the procedure of generating results of the research (Cohen, Manion, & Morrison, 2017). Quantitative analysis is selected as a systematic phenomenon by the collected data through implementing the statistical, mathematical and computational techniques. SPSS AMOS 24 statistical package will be used to analyses the relationship among variables.

3.2 Research Hypothesis

H1: The agile framework is significant for software firms
H2: The firms face challenges in adopting the scaling agile in the software industry
H3: There is a significant association of scaling agile type and quality product delivery

4 Research Analysis

Currently the research is in progress and this study will fulfill the gap in literature and will be beneficial for the software industry, which will help the firms to adopt appropriate scaling agile framework in delivering the quality products. The agile techniques aid software industries in delivering the quality products. Therefore, scaling agile is significant for the software firms to deliver the quality product. Most of the researches are conducted in the qualitative methodology and lack accuracy in findings. Therefore, the present study utilizes quantitative methodology and we will be gathering data through survey. Quantitative study is utilized in the present study to analyses the role of scaling agile framework in generating quality software product. The technology advancement leads to the success of the software firms and focus in successful software product. One such technology is agile methodology. It accommodate the variation in the future requirements and provide flexibility as per the consumer needs(Hayat, Rehman, Arif, Wahab, & Abbas, 2019). In the software product industry, imaginative systems are fundamental for assessing Protected and elective elegant structures in a forward-looking way. State-of-the-art systems are essential to upgrade the viability of senior administration in guaranteeing the effective conveyance of tasks inside software development organizations. Examinations can zero in on refining the harmony approach to adjust and upgrade the effect inside productive settings. Analysts might display curious behaviour that could go through changes in resultant gatherings.

5 Discussion

The chief objectives of the present study are as follows and my research is in progress for:

1. To evaluate the significance of implementing scaling agile frameworks in the software industry.
2. To analyse the factors impacting the implementation of scaling agile techniques for software delivery process.
3. To compare the various scaling agile methodologies for achieving the product quality.
4. To recommend the frameworks for resolving the challenges and enhancing the quality product delivery in the software firms.

6 Conclusion

In summary, this study looks into the fundamental confluence of agile strategies and indoctrination delivery, addressing the necessary need for executives to make resonance production decisions in an economic atmosphere that generates trillions of dollars. Agile entry into the product industry disrupted venture techniques by emphasizing flexibility, mutual team components, and an iterative practice. As a result, systems like 'SAFe', 'DAD', and 'LeSS' commitment were scaled up with better effectiveness, delayed lifecycles, and superior group cooperation. Here we will analyze the junction between agile and project delivery, emphasize the novel need for well-informed performance in the monetary segment, where huge funds are made yearly. Conversely, these reimbursements are accompanied by so many challenges, such as communal movements and industrial advancements etc. The analysis underscores how significant it is for associations to make out and pact with these issues to make the development toward guided programming distribution. By delving into the nuances of scaling lithe methods, the review provides more helpful familiarity into examining the complexity of the high-quality or service trade and challenge organizations to draw near challenges imaginatively to evolution task outcome. Even though these scaling strategies have much compensation, they also feature challenges, including societal movements and the progression of modernization. This study encourages relatives to understand and look into the challenges for supported achievement by providing imminent into the nuances of rising harmonized in the software product IT sector. This study also offers essential acquaintance into the particulars of nimble scaling, emphasizing the call for of businesses to deal with these challenges to advance encoding delivering outcomes artistically.

References

Alqudah, M., & Razali, R. (2016). A review of scaling agile methods in large software development. *International Journal on Advanced Science, Engineering and Information Technology, 6*(6), 828-837. DOI 10.18517/ijaseit.6.6.1374

Bass, J. M., & Haxby, A. (2019). Tailoring product ownership in large-scale agile projects: managing scale, distance, and governance. *IEEE software, 36*(2), 58-63. DOI 10.1109/MS.2018.2885524

Beecham, S., Clear, T., Lal, R., & Noll, J. (2021). Do scaling agile frameworks address global software development risks? An empirical study. *Journal of Systems and Software, 171*, 110823. DOI 10.1016/j.jss.2020.110823

Berntzen, M., Hoda, R., Moe, N. B., & Stray, V. (2022). A taxonomy of inter-team coordination mechanisms in large-scale agile. *IEEE Transactions on Software Engineering, 49*(2), 699-718. DOI 10.1109/TSE.2022.3160873

Berntzen, M., Moe, N. B., & Stray, V. (2019). *The product owner in large-scale agile: an empirical study through the lens of relational coordination theory.* Paper presented at the Agile Processes in Software Engineering and Extreme Programming: 20th International Conference, XP 2019, Montréal, QC, Canada, May 21–25, 2019, Proceedings 20. DOI 10.1007/978-3-030-19034-7_8

Cohen, L., Manion, L., & Morrison, K. (2017). Validity and reliability. In *Research methods in education* (pp. 245-284): Routledge.DOI 10.4324/9781315456539

Denieffe, S. (2020). Commentary: Purposive sampling: complex or simple? Research case examples. *Journal of Research in Nursing: JRN, 25*(8), 662. DOI 10.1177/1744987120928156

Dingsøyr, T., Falessi, D., & Power, K. (2019). Agile development at scale: the next frontier. *IEEE software, 36*(2), 30-38. DOI 10.1109/MS.2018.2884884

Hayat, F., Rehman, A. U., Arif, K. S., Wahab, K., & Abbas, M. (2019). *The influence of agile methodology (Scrum) on software project management.* Paper presented at the 2019 20th IEEE/ACIS International Conference on Software Engineering, Artificial Intelligence, Networking and Parallel/Distributed Computing (SNPD). DOI 10.1109/SNPD.2019.8935813

Hukkelberg, I., & Berntzen, M. (2019). *Exploring the challenges of integrating data science roles in agile autonomous teams.* Paper presented at the Agile Processes in Software Engineering and Extreme Programming–Workshops: XP 2019 Workshops, Montréal, QC, Canada, May 21–25, 2019, Proceedings 20. DOI 10.1007/978-3-030-30126-2_5

Kula, E., Greuter, E., Van Deursen, A., & Gousios, G. (2021). Factors affecting on-time delivery in large-scale agile software development. *IEEE Transactions on Software Engineering, 48*(9), 3573-3592. DOI 10.1109/TSE.2021.3101192

Marinho, M., Camara, R., & Sampaio, S. (2021). Toward unveiling how safe framework supports agile in global software development. *IEEE Access, 9*, 109671-109692. DOI 10.1109/ACCESS.2021.3101963

Moe, N. B., Šmite, D., Paasivaara, M., & Lassenius, C. (2021). Finding the sweet spot for organizational control and team autonomy in large-scale agile software development. *Empirical Software Engineering, 26*(5), 101. DOI 10.1007/s10664-021-09967-3

Petit, Y., & Marnewick, C. (2021). Strategic alignment of information technology initiatives in a scaled agile environment. *The Journal of Modern Project Management, 8*(3). DOI 10.19255/JMPM02501

Rasheed, A., Zafar, B., Shehryar, T., Aslam, N. A., Sajid, M., Ali, N., . . . Khalid, S. (2021). Requirement engineering challenges in agile software development. *Mathematical Problems in Engineering, 2021*, 1-18. DOI 10.1155/2021/6696695

Ross, A., & Willson, V. L. (2017). Independent samples T-test. In *Basic and advanced statistical tests* (pp. 13-16): Brill. DOI 10.1007/978-94-6351-086-8_3

Serrador, P., & Pinto, J. K. (2015). Does Agile work?—A quantitative analysis of agile project success. *International journal of project management, 33*(5), 1040-1051. DOI 10.1016/j.ijproman.2015.01.006

Sinha, R., Shameem, M., & Kumar, C. (2020). *SWOT: Strength, weaknesses, opportunities, and threats for scaling agile methods in global software development.* Paper presented at the Proceedings of the 13th innovations in software engineering conference on formerly known as India software engineering conference. DOI 10.1145/3385032.3385037

Stray, V., Moe, N. B., & Aasheim, A. (2019). *Dependency management in large-scale agile: a case study of DevOps teams.* Paper presented at the Proceeding of the 52nd Hawaii International Conference on System Sciences (HICSS 2019). DOI 10.24251/HICSS.2019.840

Wińska, E., & Dąbrowski, W. (2020). Software development artifacts in large agile organizations: a comparison of scaling agile methods. *Data-Centric Business and Applications: Towards Software Development (Volume 4)*, 101-116. DOI 10.1007/978-3-030-34706-2_6