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Agile Methodology: A Comprehensive Impact on Modern Business Operations

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Abstract: ***Painting the picture of the future of a business is determined by understanding and answering three basic questions -The Why, The How, and The What, a common denominator here is business agility. This article delves into the pervasive influence of agility in contemporary business, extending beyond use in software development to reshape operations in sectors such as cleantech, health tech, consulting, Pharma etc. The discussion tells the story of the evolution of agile methodologies, examining their impact on enterprises and their applicability across diverse industries. From a theoretical exploration to real-world application, the article investigates how agile methodologies enhance customer satisfaction in today's fast-paced environment. Furthermore, in the dynamic realm of project management (every business is a project), Agile methodology unfolds as a revolutionary lens, shifting focus from rigid plans to adaptive collaboration. It introduces a perspective where change is embraced, and iterative progress takes precedence over exhaustive upfront planning. Agile aims to grow a culture of continuous improvement, empowering teams to respond quickly to evolving requirements and deliver value incrementally, thus, projects become an exciting process, with flexibility, collaboration, and client satisfaction on the front burner.***

Keywords: Agile Methodology, Business Agility, Software Development, Business Formation, Cleantech, Health tech, Scrum, Business Requirement, Product Backlog, Sprints, Incremental Value, User Story, Daily Stand-up, Agile Values and Principles, Scrum Master.

1. Introduction

Agility is no longer just a buzzword in the realm of contemporary business; it has evolved into a transformative influence that is restructuring the way companies operate and adapt to change. Although agility was only previously applied to software development, recently, it has crossed industry boundaries and is indispensable for achieving success in different fields like cleantech and health tech. Agility in this article is therefore discussed in the light of both software and business process methodologies.

This article reviews the concept of agile methodologies, the emergence of agile methodologies and the concept highlighting its impression on enterprises and examining its applicability beyond conventional areas. It further explores the intricacies of various concepts of agile and its infusion into organisational processes.

Progressing from a theoretical standpoint to real-time application in the business realms, this explores the introduction of agile methodologies into the running of business activities, which involves the satisfaction of customers in a fast-paced world. The discussion is concluded by synthesising the major insights provided and highlighting how agile methodologies have helped businesses remain sustainable in this ever-changing world.

2. Defining Agile Methodology

The current business world is characterised by rapid changes, necessitating swift responses to demands that are always changing. Since the onset of globalisation, organisations are no longer restricted to a specific region and have broadened their scope to encompass an endless number of opportunities [1].

Factors such as globalisation, large-scale production, and adapting demands realise several issues such as an organisation's incapacity to meet increasing expectations that are evolving rapidly. This shortcoming arises from the incapacity of traditional software development approaches and organisational processes to fulfil these capabilities.

The conditions that resulted in the formation of the "Agile Process Model" (Agile Business Management or Agile Project Management) and the advent of agile process software development, were brought about by the incapacity of previous process models.

Agile development is currently one of the most prominent software development approach or strategy [2]. In contrast, traditional software development and process models confine requirement analysis and product design to the first phase or stage of the process, typically occurring sequentially. An exponential rise in project costs can result from adding new requirements at a subsequent phase of development. For this reason, it is nearly always necessary for the customer to indicate their needs in the first phase before development begins in traditional models such as the waterfall (see Figure 1) or incremental process model. This means that the model is not adaptable to changes in the requirements and cannot sustain the ever-changing demands in the business arena.

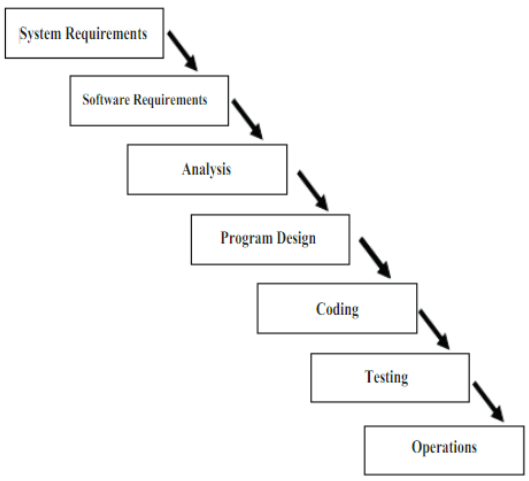

Figure 1: The Waterfall Approach [3]

However, Agile, on the other hand, uses an incremental delivery method and a short-cycled iterative improvement methodology. Agile software developers can increase customer satisfaction and deliver products rapidly due to this incremental and iterative methodology. Agile underscores prioritising the customer's needs and desires, delivering work frequently in brief iterations, involving the customer and working together as a team, responding quickly to changes, creating flexible short-term plans, finding simple solutions to problems, in-person meetings, and having "self-organising-cross-functional" teams.

Additionally, as opposed to being sequential, tasks like planning, design/modelling, building, and software testing are continuous in agile. Agile processes are suitable for usage in rapid-changing, sustainable development because of all these characteristics and tenets [4].

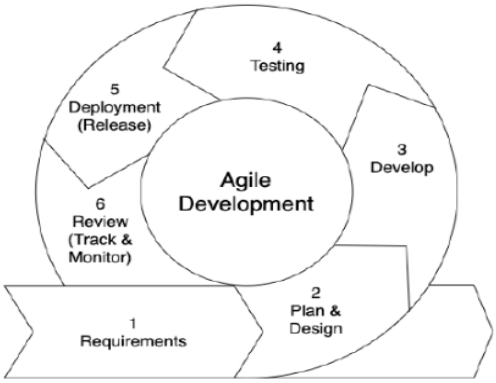

Figure 2: Agile Methodology [5]

This is precisely what the evolving business sector desires, as organisations strive to provide 24/7 services to their customers without having to go through longer processes or delays in time delivery. These cravings are what the traditional software system could not afford in that it was insufficient to carry out various tasks without infiltrating the system. This insufficiency in service delivery gave rise to the emergence of agile software.

Agile encompasses various aspects, yet it is not entirely novel, disorganised, nor even trendy. Agile, to put it simply, is a set of principles that enables teams, executives, and whole organisations to foresee change and adjust to it. Because of its exquisite simplicity, this operational model is both extraordinarily powerful and challenging to understand, especially for those used to today's intricate, matrixed organisations.

However, the speed at which our digitally connected and ever more interconnected world operates has caused changes that affect every firm. All of which require a new method of functioning to endure and prosper in this setting. These changing demands are aligned with the development of agile software.

The evolution of agile is not solely influenced by the shifting demands of the business sector; the progress in automation, artificial intelligence, and machine learning is also altering the nature of generated work, the types of products and services provided, and the way businesses engage with their stakeholders and customers.

Also, a new generation of workers with quite different demands and expectations at the same time emerged [6]. This new method of working is not only promised by organisational agility but it is also achieved by it. The "rules of the game" are established by non-negotiable core procedures, and technology is used to promote extreme transparency and cooperation. Agile companies can blend stability and efficiency with agility and speed in this way.

Agile organisations function as a network of teams that operate in quick decision-making cycles and rapid learning, in contrast to "traditional" organisations which are hierarchical, stagnant, and divided. Agile organisations instil a strong sense of common purpose and use new data and insights to assign decision-making authority to teams closest to the information. Traditional organisations place the most powerful governing bodies at the top, with goals and decision-making rights flowing down the hierarchy [7].

Agile methods are genuinely unique. Instead of emphasising process optimisation, agile methodologies focus on adaptation [8]. Adaptation is far more crucial than optimisation in the networked knowledge-based economy. These methodologies have emerged and become established.

Agile methodologies consist of a set of frameworks designed in alignment with the principles laid out in the 2001 Agile Manifesto, for use by software development teams and organisations. Given this, agile processes encompass a wide range of manifestos or tenets that can be achieved through the application of agile methodology. These principles encompass swift adjustment to changes, adaptable planning, utmost customer satisfaction, early delivery, and continual enhancement through diverse increments and iterations. These constitute the fundamental components of agile methodologies [9].

Nevertheless, agile methodologies can be applied using different concepts of agile: Scrum, Extreme Programming, Kanban, Lean, Scrumban (combination of Scrum and Kanban), and APF (Agile PeopleOps Framework). Although it has been observed that at the heart of agile methodologies, there exist four fundamental values identified by the Agile Alliance group in 2003 [10], they are:

- People and relationships are more important than procedures and equipment.
- Functional software is more crucial than extensive documentation.
- Working together with customers is valued more than negotiating contracts.
- Adapting to change is more vital than adhering to a plan.

Concept of Agile Methodologies

Businesses are of different types, aims, structures, and processes. For this reason, agile methodologies are of different types for different agility functions.

- **Scrum**

Scrum is a simple, but very popular agile framework. It offers guidelines for managing and overseeing the software

and product development procedure. In the 1990s, Jeff Sutherland and his colleagues introduced the Scrum concept, defining it as a method "to energise, focus, and add clarity to project developing systems" [11].

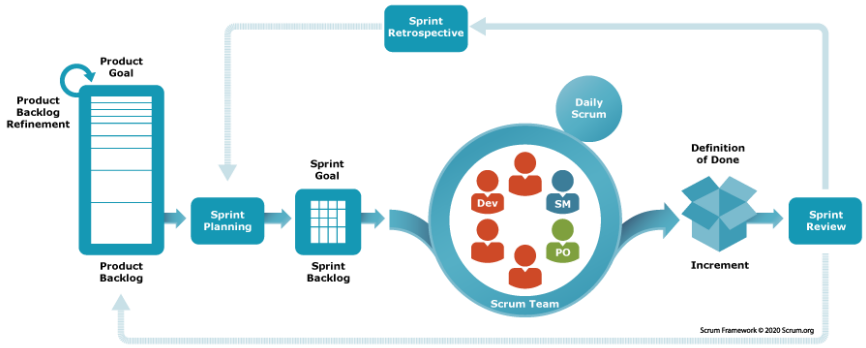

Figure 3: The Scrum Framework [12]

Three major elements make up Scrum: ***roles, ceremonies, and artefacts***. The product/project development team, the scrum master, and the product/project owner/stakeholder are the positions that make up the Scrum Process. The individual who determines the project's features, money, and priority is the project owner.

Maintaining the Scrum principles and practices falls within the purview of the Scrum master, who serves as the manager or leader. The group of self-organising, cross-functional individuals that work on the product is made up of four to seven members. Sprint Planning is one of the ceremonies when the objectives and the Sprint Backlog are selected from the Product Backlog.

The product backlog is an organised collection of the necessary features and functionality that have been identified and ranked by the product owner and stakeholders based on their relative importance. It takes the form of user stories. At the same time, user stories that have been selected and prioritised by the team for the upcoming sprint are contained in the sprint backlog.

The artefacts provide burnout charts in addition to the sprint and product backlogs. Additional rituals include the daily scrum meeting which is a brief stand-up that involves participation by stakeholders and team members. Sprint Review is a survey meeting that involves the customer and team members and includes a product demo that was built during the sprint. During a Sprint Retrospective, colleagues talk about the issues they ran across in the previous sprint and how to prevent them in future ones [13].

- **Extreme Programming**

Extreme Programming, commonly shortened as XP, is an agile methodology that enables the software development process by managing code changes. Extreme Programming mostly focuses on proactive and automated testing. Testing constitutes a fundamental element of Extreme Programming and commences at a foundational stage of development.

Instant and succinct development cycles with incremental design and planning are a feature of the XP methodology. High levels of client interaction are required at every phase of project/product development, which is another essential component of XP. In addition, the code in XP is daily deployed and integrated continuously [14]

It makes use of a lightweight methodology that is adaptable to any size of software. XP is built around the ideas of partnered programming, thorough code reviews, and clear code. Furthermore, it enables flexibility to modifications made to the project's specifications later on, improving software quality and responsiveness to client requests for modifications. It also mandates "Open-Workspace" and "Small-Release," which are development processes carried out in customer presence on-site and the incremental release of validated outcomes following testing [15].

- **Kanban**

The goal of the Kanban work-management system is to prevent the team from promptly completing administratively assigned tasks while also improving the work environment. Kanban makes it possible to visualise tasks that are typically hard to justify in concrete terms. This approach breaks down the tasks into manageable parts and uses the Kanban board to visualise them, giving the team an enhanced comprehension of the ongoing project. As opposed to Scrum, which has time constraints [16]

Kanban limits the quantity of work completed at any one time, commonly referred to as limiting the work-in-progress (WIP) metric. Additionally, members of Scrum are allocated set duties, whereas members of Kanban work according to their preferences because there are no specialised jobs or obligations assigned to Kanban members [17]. In Kanban, the product owner handles project administration, as opposed to scrum, where the scrum master manages the project.

The primary ideas of Kanban are:

1) Process visualisation with a Kanban board.
2) Limiting work being done at any one time to maintain the team's focus on one task at a time.
3) Controlling the workflow by estimating the amount of time needed to avoid wasting time.
4) Constant feedback is needed to raise the calibre of the product.
5) Software and project development that is iterative and continuous.

- **Lean**

Compared to Scrum or XP, lean agile software development has fewer restrictions on principles, procedures, or regulations, which gives it a more flexible technique. Lean is mostly made up of seven values. Other agile methodologies complement these ideals because lean focuses primarily on reducing waste in the software development process [18].

Removing pointless operations from the software/project development process is another goal of lean, which aims to deliver more value in a shorter amount of time. Because Lean has few guidelines, using specialised tools is the major way to optimise the development process. In opposition to XP, which prioritises the customer and developer by attempting to reduce any tension that may occur from competing goals.

Following a top-down methodology, lean establishes ideals and principles for senior management inside a company or organisation and is utilised to optimise the entire organisation [19]. The fundamental seven values of Lean are as follows:

Firstly, eliminate anything that doesn't provide value to the product that needs to be built. Second, use the user's input to inform every iteration that you learn from. Third, wait to make critical decisions on software development until you have access to as much information as feasible, which is typically later in the project. Fourth, get delivery out as soon as you can. Fifth, create a setting that will support the developers' success. Sixth, the consumer ought to be the main priority. Finally, adopt a comprehensive perspective and strive to grasp the business's flow and how the product fits into it [20].

Conclusively, in the modern world, the business arena faces several shifting needs. The four pillars of agile methodologies are customer collaboration, working software, interactive teams, and change-responsiveness, according to the Agile Manifesto. As a result, adopting agile development has become essential for numerous organisations. As agile is an iterative process, errors are rectified and enhancements are implemented as the process advances. Rapid delivery and client satisfaction are the main advantages of an agile approach. Thus, to reap this benefit, agile needs to be implemented throughout the various stages that have been covered, such as conception, construction, and so on.

Agile Methodology in Business Processes

Why Agile Methodology?

To understand the application of agile methodology in business process is to first understand its antecedent – that is, VUCA. VUCA is a concept which is arguably as popular as agile in the business lexicon. The concept has permeated the literature on project management and is being considered by numerous business experts as the precursor or causal factor of agile. A group of researcher, in their study in 2012, made this profound statement:

> ‘‘Across many industries, a rising tide of volatility, uncertainty, and business complexity is roiling markets and changing the nature of competition.’’ [21]

This was years before the COVID-19 pandemic that halted activities globally and handicapped business operations. But consider also, for instance, the Russia-Ukraine war which is based in the warring countries, but whose effects were felt beyond those shores. Business owners and leaders, whether enterprises or SMEs, attested to the war’s impact on business processes due to increased or fluctuating oil prices and materials. [22]

Imagine drawing a project plan before these large-scale VUCA occurrences and what areas such a project will suffer. However, these challenges may not always be globally sweeping, and can be as localised as happening within the walls of an organisation.

But what is VUCA? And how does this relate to business processes?

VUCA is an acronym that represents volatility, uncertainty, complexity, and ambiguity. Think about all the possible scenarios that can play out in the execution of a project. Consider all the things that can fold up or flop as a result of unforeseen circumstances – internal factors such as time factors, cost estimation and budgetary factors or external factors like government regulations or policy changes. Imagine building an A-team of sound project managers that generate a problem-proof project plan, then an act of terrorism emerges as a major disruptor.

Volatility can be defined as the state of instability and unpredictability that impacts business operations. It is associated with turbulence and fluctuations and may materialise as sudden changes in a market, industry, or the world generally [23]. *Uncertainty* implies the degree of speculation or unawareness about industry trends and external happenings. Uncertainty is founded on information availability and accessibility and how these can be used in predicting the nearest future.

Complexity is indicative of systems. Systems are made up of interconnected parts and complexity sets in when this network become difficulty to handle individually and as a whole. Think about a pharmaceutical company trying to break into a new clime where typical business systems (such as logistics, procurement, and manufacturing) are difficult to come by, set up, and manage. Complexities of these sorts have led many businesses to close and exit certain business climes globally. As such, complexity usually requires that they are uniquely addressed when compared with volatility, uncertainty, and ambiguity. [24, 25]

Sometimes, the rules of the business process and the cause-effect of the chain might become overly unclear or ambiguous to comprehend and adopt/adapt. This is where *ambiguity* is situated. With ambiguity, leaders are left perplexed by the process of input and output as there are no precedents to the situation. [26]

Take the healthcare and cleantech industries, for instance, whose operations are defined on a day-to-day basis due to the elements of VUCA. These industries, particularly the

healthcare sector, are ruled by factors such as internal/local and external/international regulations that leave them unstable. The COVID-19 pandemic exposed the susceptibility and volatility of this sector, revealing its generally unpredictable nature.

However, this should not be the situation always. In fact, businesses can leverage agile methods in addressing these challenges and perhaps, turn challenges in their favour. Businesses can attain the agility the current world demands.

Implementing Agile in your Business Processes

Adopting agile software development is beneficial irrespective of the uniqueness of your business process. With the software development lifecycle, each project can be broken into six phases: conception, inception, iteration, release, maintenance, and retirement. While the lifecycle may differ based on the particular methodology used, this difference is not beyond the agile scope. Take the Scrum framework as an example; it ensures that roles are clearly defined and the team within this framework operates in sprints (2-4 weeks). Extreme programming, in this regard, emphasises engineering practices.

Additionally, and very importantly, agile methodology can be adopted or adapted (that is, modified) beyond the frames of software development. Subsequent paragraphs amplify how businesses can attain agility:

1) The first step to adopting and implementing agile within the business process is to *choose the most appropriate agile framework* for your team and project. There is a group of criteria with which a project manager can decide on the framework:

- Project requirement
- Product portfolio
- Available resources
- Team size
- Team's proficiency in method types
- Stakeholders' requirement

How are these important?

Well, two projects can be similar but no two projects are the same. Accounting for these questions ensures you select the right methodology for not just your business, but each individual project.

2) When you decide what framework can best handle the project expectations, then it is appropriate to *assemble your agile team.* Think about the agile team like the Justice League or Avengers, all members with their roles clearly defined but bound by the imperative of collaboration.

Regarding their characteristics, it is expected that agile teams are self-organising teams such that output is organised. Each member of the team must have the initiative towards self-organisation. An agile team must also understand iteration planning. This factor is particularly imperative not just for select members, but for all members.

Cross-functional collaboration is yet another feature of an agile team and is technically interconnected with self-organisation. In adopting agile methodology, the function of collaboration is indispensable because of the nature of the framework.

3) Thereafter, it is time to put your agile team and chosen framework to work. *This is commenced through project planning*. Planning a project is dependent on the particular agile method you have chosen. However, it is more general knowledge of agile teams that the scope and objectives of the project need to be distinctly outlined. This is not to negate the possibility of redefining aspects of the project (although the overarching goal remains). Redefinition of project objectives in the course of execution can be catered to during, for instance, sprint sessions if using Scrum. You should utilise agile software development for its product backlog to prioritise tasks. This is resourceful for time and output management.
4) In 2021, a study was conducted where the researchers adopted the Scrum framework in the health tech industry. The study intended to reveal the management and results of a health-based technology [27]. The study involved people, artefacts (comprising sprint, sprint backlog, product backlog, ready concept, time-box, and release burn-down), and ceremonies. The researchers found that the Scrum methodology ensured the efficient management of the activities within the business framework concerning quality and implementation.
5) Remember that agile is a customer/client-centric methodology? So it is essential to *keep stakeholders updated* on the defined output and modes of execution. This is not foreign to the healthcare/health-tech industry that is patient-centric. Therefore, feedback loops should be integrated throughout the project lifecycle to manage stakeholders' expectations and eliminate uncertainty or ambiguity.
6) Lastly, adopting an agile method makes *measuring success* crucial. However, before we outline how this can be handled, consider how it will be advantageous: measuring success provides the agile team with insights as to what was successful and what was unsuccessful. When properly documented, these insights will inform future endeavours and actualise goals swiftly.

Now, measuring success is defined by the framework adopted; nonetheless, based on the scope and objectives of the project, key performance indicators should be outlined and employed in tracking progress. The agile team can use sprint reviews, daily stand-ups, or retrospectives to outline challenges and solutions, receive and deliberate on feedback, and contemplate previous projects. You can employ KPIs metrics such as cumulative flow on the Kanban board, Sprint burn-down chart, and velocity.

The decision to adopt an agile methodology should redirect your mind to factors that should be your major concerns. In other words, as the leader or manager of an agile team, there should be a realignment of focus for your business processes. Firstly, focus on the task queue rather than on chronology or timelines. This does not mean the latter is less important; the idea instead is that shifting focus to the former ultimately achieves the timelines.

Secondly, shift your focus to efficiency and emphasise less on competence usage. Again, this may seem counterproductive but think about it: if you can optimise an efficient chain or flow of execution, you will see how competence is deployed in the right direction and used in effective ways.

In addition, make tasks in bite-size. In the traditional approach to business processes, tasks are usually given in chunks or large portions. To successfully implement agile, you should discard this conventional approach and split work sizes. This is also advantageous in reducing risks in the business landscape. Leaders can adopt the WIP Constraints (Work in Progress) that the Kanban board provides.

Another mindset shift would be to allow a decentralised system. This can be especially evident in decision-making which is one activity that slows down business process or project management. Think about the bureaucracy and all the tables where decisions must go through for approval before finally being accepted or rejected. Instead of time and productivity delays, a more collaborative system will speed up execution.

It is important to add that agile methodology is a distant approach to running a business from its traditional counterpart. The implication of this is that to maximise the methodology, you must remain up-to-date in digital trends and technological innovations where it concerns your business. Making your business agile will be impeded if the process is not mechanised. So now is the time to go automatic.

3. Conclusion

The world is such a fast-paced and unpredictable place to run a business using conventional methodology. For that reason, business managers and leaders are encouraged to transition agile methodology to overcome the shortcomings of previous approaches.

This has been our point all along. This article has guided you in comprehending that agile goes beyond mere jargon. We've explored what agile is and its potential; we examined the different types of agile methods. why you should adopt it, and how you can implement it.

Nevertheless, we can argue that agile is first a mindset; that is, you must first embrace agile as a business manager, or as experts phrase it, you should develop agile habits. [28]

References

[1] Gonen, B. and Sawant, D. (2020). Significance of agile software development and SQA Powered by Automation. In 2020 3rd International Conference on Information and Computer Technologies (ICICT) (pp. 7-11).
[2] Ibid (1)
[3] Van Casteren, W. (2017). The Waterfall model and the agile methodologies: A comparison by project characteristics. *Research Gate*, *2*, 1-6.
[4] Ibid (4)
[5] Trivedi, D. (2021). Agile methodologies. *International Journal of Computer Science & Communication*, *12*(2), 91-100.
[6] Ruk S., Khan M., Khan S., and Zia S. (2019). A survey on Adopting Agile Software Development: Issues Its impact on Software Quality. In 2019 IEEE 6th International Conference on Engineering Technologies and Applied Sciences (ICETAS) (pp. 1-5)
[7] Ibid (7)
[8] Highsmith, J. 1998, Adaptive software development: An evolutionary approach to managing complex systems, Dorset House Publishing.
[9] Jain P., Sharma A., and Ahuja L. (2018). The impact of agile software development process on the quality of software product. In 2018 7th International Conference on Reliability, Infocom Technologies and Optimization (Trends and Future Directions) (ICRITO) (pp. 812-815).
[10] Khong Loo, Yu Beng Leau, Yip Tham and Fun Tan. (2012). Software development life cycle agile vs traditional approaches. In 2012 International Proceedings of Computer Science and Information Technology (IPCSIT Volume 37) (pp. 162-167).
[11] Faniran V., Badru A., and Ajayi N. (2017). Adopting Scrum as an agile approach in distributed software development: A review of literature. In 2017 1st International Conference on Next Generation Computing Applications (NextComp) (pp. 36-40).
[12] https://www.scrum.org/resources/what-scrum-module
[13] Saleh S., Huq S., and Rahman M. (2019). Comparative study within Scrum, Kanban, XP focused on their practices. In 2019 International Conference on Electrical, Computer and Communication Engineering (ECCE) (pp. 1-6).
[14] Sharma P, and Hasteer N. (2016). Analysis of linear sequential and extreme programming development methodology for a gaming application. In 2016 International Conference on Communication and Signal Processing (ICCSP) (pp. 1916-1920).
[15] Herdika H., and Budiardjo E. (2020). Variability and commonality requirement specification on agile software development: Scrum, XP, Lean, and Kanban. In 2020 3rd International Conference on Computer and Informatics Engineering (IC2IE) (pp. 323-329)
[16] Ibid (14)
[17] Ibid (14)
[18] Ibid (17)
[19] Wang X. (2011). The combination of agile and lean in software development: an experience report analysis. In 2011 Agile Conference (pp. 1-9).
[20] Ibid (17)
[21] Doheny, M., Nagali, V., and Weig, F. (2012). Agile operations for volatile times. *McKinsey Quarterly*, *3*, 126-131.
[22] Martins, A. M., Correia, P., & Gouveia, R. (2023). The impact of the Russia–Ukraine war on the world's largest listed insurance firms. *The Geneva Papers on Risk and Insurance-Issues and Practice*, 1-25.
[23] Aimar, C., and Smith, D. K. (2021). VUCA: A management tool for dealing with challenges in changing environments. *Global Journal of Entrepreneurship (GJE)*, *5*.

[24] Bennett, N., and Lemoine, G. J. (2014). What a difference a word makes: Understanding threats to performance in a VUCA world. *Business Horizons*, *57*(3), 311-317.
[25] Prohorovs, A. (2022). Russia's war in Ukraine: Consequences for European countries' businesses and economies. *Journal of Risk and Financial Management*, *15*(7), 295.
[26] Ruksana, S., and Ahmed, B. (2019). Developing leaders in VUCA: a case study. *International Journal of Advanced and Innovative Research*, *6*(1), 16-18.
[27] Torrente, G., de Souza, T.Q., Tonaki, L., Paula, A., Cardosoa, L., Juniora, Manickchand. and da Silva, G.O., 2021. Scrum framework and health solutions: management and results. *Studies in Health Technology and Informatics*, *284*, pp.290-294.
[28] McKinsey Digital (2017). A business leader's guide to agile. Retrieved from: https://www.mckinsey.com/capabilities/mckinsey-digital/our-insights/a-business-leaders-guide-to-agile