Czech University of Life Sciences Prague

Faculty of Economics and Management

System Engineering and Informatics

Diploma Thesis Value Addition of Agile Methodology in Project Management (Information Technology)

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CZECH UNIVERSITY OF LIFE SCIENCES PRAGUE

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Faculty of Economics and Management

DIPLOMA THESIS ASSIGNMENT

Meet Prabodhkumar Parikh

Systems Engineering and Informatics
Informatics

Thesis title

Value Addition of Agile Methodology in Project Management

Objectives of thesis

The major objective for the overall thesis is to map as well as describe the role of the project manager along with the product owner.

The next goals are:
– to align the role of the PO and PM to define the appropriate responsibilities between them in the selected company,
– understand general Red Hat or SP CLOUD project management,
– define the boundaries between strategies and tactics,
– objective to program management dealing with a set of objectives aligned with a bigger product (and its lifecycle),
– enhance that project management focused on execution of specific,
– scale that up to portfolio management aiming to control multiple programs (with potentially multiple product lines),
– help Red Hat properly align the PO and PjM functions and define appropriate interfaces between them,
– form a recommendation for design and deployment of a PrMP – Product Management Process providing a guidance for product management through all phases of its life cycle and realization of individual changes through execution of project activities.

Methodology

When the project management is executed, there is a load on both the project manager(PjM) and the product owner(PO). So considering the research methodology, it will try to divert the load with the Agile method incorporating MS project with the concept of project management where the product owner and especially the project manager at the time of workload can make a team their management in a better way and get the desired results.

The proposed extent of the thesis

80

Keywords

Agile Methodology, Project Management, Software Development, Innovation Method, SCRUM, MS Project, Product Owner, Active Stakeholders

Recommended information sources

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Expected date of thesis defence

2022/23 WS – FEM

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Dean

Declaration

I declare that I have worked on my diploma thesis titled " Value Addition of Agile Methodology in Project Management (Information Technology)" by myself, and I have used only the sources mentioned at the end of the thesis. As the author of the diploma thesis, I declare that the thesis does not break the copyrights of any person.

In Prague on 30.03.2023   _____

                                                                                        Meet Parikh

Acknowledgment

I want to thank first the almighty God; then, I would like to express my thankfulness to my supervisor Ing. Petra Pavlíčková, Ph.D. for the advice and support during my work on this thesis also, RedHat Consultants (Anton Boyko and Lindsey Rae) who guided me throughout the process and acknowledge me with practical working experiences. It is a pleasurable task to present the study about Value Addition of Agile Methodology in Project Management of IT (Information Technology)

Abstract

In today's competitive world, the importance of Software project management needs to be understood by the project managers to ensure the successful growth of the business. And for this reason, the project managers must take on many responsibilities. Thus, they can manage the software projects effectively. There are three constraints of the software projects that are time, cost and scope, which should be considered during the project management. Here the agile methodology can play a critical role to manage the software projects successfully, and it also can help to adopt any changes required in the project management. Adoption of agile methodology can influence the software project by reducing the risk factors and can ensure faster delivery and can impact the project in various knowledge areas. In this following study, the role of agile methodology in software project management has been provided with an understanding of the value added by the agile methodology.

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1. Introduction

In this thesis, the primary objective is to understand the value of agile project management. As per the analysis on this chosen topic, it is understood that agile project management is one type of value-driven approach that develops the project management to deliver high-priority and top-quality work for their stakeholders. An Agile methodology is indeed a cross-functional approach to developing the project in a more flexible as well as responsive manner. The researchers said that most common environments use the agile project management approach to develop software development projects. The agile project management instructs all the project management to test the methodology, which instructs all the separate projects to maintain a sequential cycle. In the agile project, there is a need to fix the five different stages: planning, initiation, monitoring and execution, and closure. The central pillar of agile project management is to handle the approach of the process to manage the timing (Bastarrica et al., 2018). In the case of agile methodology, the agile manifesto follows the four different values which are used to follow the principle of project management. The leaders of the agile project add to develop the project. There are different types of factors that are required to add value to the agile project: client satisfaction, acceptance requirements, and a trusting environment (Bastarrica et al., 2018). In some research papers, it is mentioned that agile project management helps to develop the concept of project management features. There are some issues that occur in agile project management that need to be mitigated through the intelligent technique of the project manager. The different research papers show that it can be understood that agile project management is not only a statement; it adds a considerable amount of advantages to successfully achieve the project manager's goal that is needed for the organization's needs.

Here, in this case, it becomes necessary to understand the importance of software project management properly in this competitive international market. Thus they can meet more

customer needs by continuing the company's growth. Understanding the software project management and related needs and goals is necessary in this case. Along with that, for successful completion of this software project management, understanding the project methodology is also essential, which can be able to manage the software project effectively. From the study regarding the management of a software project, the importance of agile project management has been considered, as from the collected data, it has been known that the adoption of agile methodology in the case of software projects can add value and benefits. This also can help the project manager and the company to achieve success. Hence, the reason behind conducting this thesis is to understand the roles and responsibilities of the project owner and project manager on a theoretical basis. And to explore the agile-based process and software project management by mutual interaction of the Product Owner and Project Manager. for a better understanding of this topic, in this thesis, a case study of a software company has been chosen, which is named as RedHat company.

This dynamic business environment creates more challenges for the software companies to grow their business, and for the project managers, it becomes more critical to manage the project with the increasing needs of the international market; also, sometimes, they must change their business objectives within a shorter time. This also can create difficulties and risks which need to be reduced, and thus, most of the existing research papers and articles suggest adopting the agile methodology to mitigate the risk factor of the agile software project management, and the scrum master of the project methodology can help to the project manager and the product owner to manage the self-organized team by reducing the obstacles of the software project management. By understanding these factors regarding software project management by adopting the agile methodology, the chosen company for this thesis is RedHat can be able to manage its project effectively by managing the role of the Product Owner and Project Manager and reducing the challenges that they have faced.

In this thesis paper, the primary objective is to understand the role of the Product Owner and Project Manager and align their responsibilities so that the outcome of the project must satisfy the clients. After analyzing the research papers, it is understood that there are different types of scenarios through which it is easy to mitigate the overlapping problem between the product owner (PO) and project manager (PM). The agile base approach helps to develop the mutual understanding between Product Owner and Project Manager in Red Hat Company. In the literature review section, the thesis paper discusses the SCRAM; KANBAN is to understand the internal structure of the project management. Project management follows several techniques that need to be understood to develop this thesis paper to add value. In the first section, the manager focuses on the client, which is the basic need to add value to the agile project because it is true that the clients play an essential role in developing the project's financial strength. On the other hand, it is said that the manager adds value to the project they build the team, which helps to develop the project life cycle. For the success of the project, there is a need to develop the confidence of the team members, which is the nature of a highly successful project manager. The stakeholders simply are not interested in the planning of the project, and they are interested in adding value to the project. In this thesis paper, the main objective is to understand the basic objective of adding value to the agile project and how each aspect of the agile methodology works accordingly to add value to the project management work. The challenges which occurred in the project management then the agile project management solve the issues. In this thesis paper, the author adds the concept of the literature review to understand each aspect of the agile method and also the basics of the project management and the methodology of the project management, which is the important part of this paper (Alahyari et al., 2017). Along with this, this thesis has been completed using primary and secondary data about the application of the agile methodology in software project management.

1.1 Statement of the Problem

There are different types of problems that occur in project management. To mitigate the risk, the researchers apply different types of procedures. However, each mitigation procedure can not be accepted by all project managers, but it is true that to mitigate the problems, there is a need to apply some effective procedure that is effective for the project manager. A problem that has occurred recently is the project stakeholders who are not satisfied with the output of the project (Alahyari et al., 2017). In this situation, it is required to develop the project to grab the attention of the stakeholders. On the other hand, the major problem is to handle the Product Owner and Project Manager and technically connect with "what needs to be done" and "how it needs to be done". The major problem in the organization is they are confused about the responsibility of the Product Owner and Project Manager. Also, they overlap in an organization. In this situation, it is crucial to add a practical methodology that is helpful to mitigate the risk of the project management concept. Agile methodology is the perfect concept for the mitigation procedure. After analyzing different research papers, it is understood that agile methodology is not a term; it is an effective solution to handle the problem. The agile methodology has different levels, but in this thesis, the author only follows the procedure of the agile methodology and how the topic is effective for the project methodology (Alahyari et al., 2017). An M.S. project-based project management system would assist organizations in managing their time and resources more effectively, increasing the amount of work that can be accomplished.

1.2 Significance

The major significance of this thesis paper is to understand the Product Owner and Project Manager responsibilities of the RED HAT company. Through this, they mitigate the overlapping problem. The agile methodologies approach is an effective procedure that can

easily mitigate the complex situation between PRODUCT OWNER and Project Manager. Students will explore modern approaches to business analysis, share the latest standard of modern project management, and recommend a set of components that are effectively used in the organization. Whenever discussing the agile methodology, it is true that it is not a short topic. Moreover, agile methodology is the most significant topic. As per the analysis of the different research papers, it is understood that the agile methodology shares a considerable amount of advantages for project management (Buganová & Šimíčková, 2019). Through this procedure, it is easy to mitigate the risk of the development of the project. First of all, the first signs of the agile methodology are that the project developer, clients and the owner of the product interact effectively regularly to understand the basic concept of the project (Buganová & Šimíčková, 2019). On the other hand, it is true that regular changes are an essential part of the project. For this reason, the agile methodology adds this flexibility into the project to deliver a better outcome. Teachers and students are learning independently for the project management procedures. If agile project management shares the accurate data for the project, then the shape of the project grabs the attention of the outsiders (Buganová & Šimíčková, 2019).

2. Objective and Methodology

2.1 Objectives

The major objective for the overall thesis is to map as well as describe the role of the project manager along with the product owner. The objectives for this task have been provided as follows, which can help to conduct this task effectively.

- To comprehend and evaluate cloud project management for a existing company

- To define the boundaries between the strategies and the tactics regarding the project management.

- To evaluate the status of project management practices at the moment and to pinpoint the drawbacks and difficulties of conventional methods.

- To provide help to the RedHat company by aligning the functions of the Product Owner and Project Manager.

- To design a project plan for a new product launch using MS Project, and apply Agile methodology principles to the project.

- To monitor and control project progress using MS Project, and evaluate the effectiveness of Agile methodology in managing project risks and changes.

- To provide recommendations for organizations that are considering using MS Project for Agile project management based on the practical insights gained from the new product launch project.

2.2 Methodology

Based on the analysis research paper, it is identified that a methodology is one type of concept as well as analysis that plays an essential role in carrying out complex data and organizing the overall thesis. In other words, it is said that the approach of the methodology is separate in different sections; however, for this thesis paper, the author chose a mixed methodology to gather qualitative data (Wallengren et al., 2020). To develop this, the author generally studies different types of approaches and, after that, chooses the mixed methodology to support every factor of the agile methodology. Secondary and primary methodology approaches take part in this thesis paper. The "secondary research" methodology helps to grab the effective data from the "previously published" research paper, and also primary research methodology grabs the data from the effective survey or the practical implication (Wallengren et al., 2020).

This section will help to determine the most logical paths for the completion of this particular study. Random sampling will help to gather real-time data, while the selected paper will provide notions based on previous research to make this study informative and attractive to the readers. The following parts will show the progression of the research methodology by evaluating certain aspects.

2.2.1 Research design

For this thesis, the author chose an explanatory research design because it describes the exact situation of the agile method and its value. The explanatory research design works on the constructivist principle. It designs the study in sequential phases, which allows exploration of in-depth issues, then application of post-positivist principles, and lastly, identification and measurement of variables. The explanatory research design at first allows analysis of collected secondary data. After that, the test of variables was conducted to identify and interpret the qualitative findings. It helps to identify the most potential variables which actively took part to promote the use of agile methods in project management. This particular research design is applied to check the availability of those variables. The importance of the explanatory research design for this thesis paper is to find out the reason and also analyze why this topic is effective. The problems which are organized through this research easily mitigate explanatory research methodology. The explanatory research design analyses each data to successfully meet the goal (Ojewale, 2021).

2.2.2 Research philosophy

Research philosophy is known to have located at the outermost layer of the research framework, which helps in conveying the steps to be implemented while conducting research work. Conducting research involves gathering and assimilating ideas and concepts, and research philosophy helps in organizing those thoughts. For this particular thesis, interpretivism

philosophy has been followed for bringing further insights into the ongoing study of agile methodology in project management. This particular approach of project management involves managing multiple tasks at once. On the one hand, it is about developing software projects and consolidating customers that get released with every iteration. Agile methodology is considered a rational way of project management, as it involves constant collaboration with stakeholders, along with close observation of different phases of development. Interpretivism philosophy is based on a naturalistic approach to information gathering, which solely depends on real-life experiences. Thus, it provides enough justification for choosing interpretivism research philosophy for this specific context. The implementation of agile methodology has been found somewhat increased in modern-day organizations, as it is known to have provided much better results than other strategic approaches. This overall research work, although following a qualitative methodology. It has nowadays become easier for project managers to analyze and evaluate the overall activities in a systematic way. The process breaks a whole task into small tasks, known as phases and concentrates on making each phase successful on its own. The researcher wanted to collaborate theoretical concepts with real-life facts; thus, the interpretivism philosophy was chosen.

2.2.3 Research approach

The research approach is basically a research process and plan that mainly helps collect and analyze the required data for this research purpose and can help conduct research effectively. As the research has been conducted by mixed types of data collection hence in this case, qualitative data has been collected, and both deductive and inductive approaches have analyzed the gathered data. These research approaches can provide a credible research paper to the readers with the worth finding of this research area of knowledge (Maarouf, 2019).
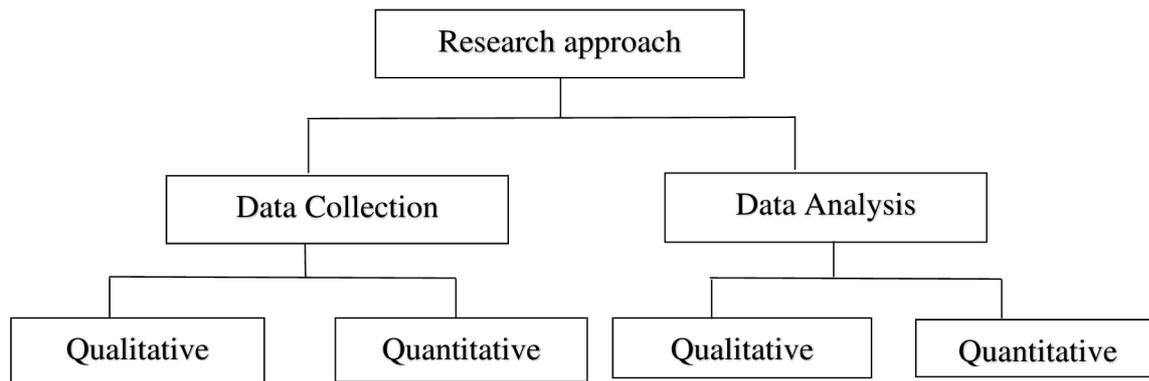
Figure 1: Components of research approach

Image Source: (Maarouf, 2019)

2.2.4 Investigation Type

The aim and objective of this research activity have been set at the beginning by the researcher. All data and information collected on agile methodology and its role in project management have been deeply analysed for squeezing more facts into the research work. As it is conducted by taking the help of qualitative approaches, it holds both theoretical concepts and factual knowledge in it. Implementing a qualitative approach helped in the detailed analysis of the problems that arose while conducting the research. The research objectives remain associated with the overall research outcome with applying the data triangulation method.

2.2.5 Data types

This research study accepted secondary types of data. The data are categorized into two types such as qualitative and quantitative. The vast amount of data collected from previous relevant studies is concerned with qualitative data. In comparison, the information collected from the participants or sample is considered quantitative data. To collect overall data, both the external and internal sources are concerned with maintaining research integrity (Jaleel et al., 2019).

2.2.6 Data collection

Data collection is a procedure for calculating, measuring, and analyzing accurate data using the validated technique. Whenever discussing the data collection procedure, it is understood that the author mainly has two separate data collection procedures; those are primary and secondary methodology. The author uses qualitative of data collection approach because it collects the high quality of the data and the procedure mitigates the time complexity to develop this thesis paper. This data collection approach is very effective (Ojewale, 2021). To collect the most relevant and authentic data, reliable secondary sources have been used. The secondary data is collected from previously published research papers of different authors, relevant articles, journals from Google Scholar, or reliable governmental sources from the internet (Jaleel et al., 2019).

2.2.9 Data analysis

For this research paper, and qualitative data have been collected to find the solution to the above-mentioned research question. But the gathered data need to be analyzed before the usage of these data. Only the true data need to be used in the case, as this paper can provide truth and real-time data to the readers. The collected secondary data has been analyzed by using qualitative analysis and methods to understand and get only authentic and useful data for this research process. The data analysis also ensures the validity and reliability of the data.

2.2.5 Ethical consideration

While collecting and using the secondary data in conducting this research paper, maintaining ethical consideration is much needed. As in this case, the secondary has been collected from various articles and journals written by the scholar. These all types of data need to be stored carefully and maintain data privacy. And the secondary data should be used in the paper by

giving them proper credentials. This can give this research paper reality and shows as valued (Suri, 2020).

2.2.6 Time schedule

Table 1: Time schedule

Activities	**Week 1**	**Week 2**	**Week 3**	**Week 4**	**Week 5**	**Week 6**	**Week 7**
Selecting the topic and introducing it							
Aim							
Set objectives and design research methodology							
Data collection							
Data analysis							
Literature review							

Discussion							
Conclusion							

Data Source: Self-made

2.2.7 Research limitation

Qualitative data often produce difficulties in conducting research. Integrating methods in the studies has created challenges in sts collection and data analysis. It slightly increases the expenses on time and cost. The research competition timeframe has been affected due to complications. It has been seen that fluctuating timeframes lead to an increase in the project budget. It became quite difficult to merge both types of data into one thread (Ciric et al., 2018). This research paper has some limitations after managing proper steps for conducting this research. As in this case, the secondary data collected from the scholar's articles lacks real-time data. In the collected data, the scholars do not provide any industry experiences. Hence, this research case creates a lack of real-time data in this paper. Along with this, here in this research case, that faced challenges with lack of time to provide quality deliverables.

3. Literature Review

3.1 Project management methodologies

In every organization, the management should maintain the project by following some steps to ensure success and improve organizational productivity. Project management is all about combining some factors such as tools, templates, and techniques that should be maintained properly. Basically, the project success depends on how the project is managed and how all the related activities are completed. According to (Pace, 2019), In this case, it has been seen that the project manager has to follow any methodologies that can guide the project manager of the

organization to understand the project needs and accordingly they can plan the project activities and can schedule-timeline the budget. But before applying any of the methodologies, the project manager should understand what the methodology could be the better option for that particular project; along with that, they have to understand the organizational cultures. As the primary purpose of applying the project management methodology (PMM) is to ensure the project's success, hence the methodology should be chosen in this way so that it can be aligned with the organizational structures and the project needs. The intent reason for the project management is to manage the project budget required resources and also help to identify and overcome the constraints that can be the reason for the failure of the project (Pace, 2019).

But there are some features of the project management methodologies as it cannot ensure the project success without the right approaches; over this, the wrong chosen methodology can be the reason for the loss of the project. There are no perfect project methodologies for project management; in this case, the project manager needs some qualities so that they can be able to choose the right methodology for that particular project. The efficiency of the project management mostly depends on the organizational context, and it can affect organizational productivity and growth (Pace, 2019).

3.2 Project success

According to (Pace, 2019), there are various methodologies that can control the project outcome and the traditional methodology, which is the waterfall methodology which was introduced in the year 1970, is highly structured and can control project phases from the initial phase to the completion of the project. This traditional project approach can manage the project by establishing the project scope and the requirements that can ensure a successful project deliverable. In This case, the execution needs to be done by following the project initiation phase and can achieve the project goals with a frock closure. Controlling the project scope can

manage the project's success. According to the experts in this research area, they think that this traditional project management methodology can't be much effective to control the project deliverables. As in this case, some challenges can be faced by the project management, such as this waterfall approach cannot provide effective guidance in the case of the variable requirements of the project. Also, this can create complexity in the case of controlling the project for the project managers of the organization. As in this case, it has been seen that if any changes are required in a larger project, then it can be costly, and this larger amount of wastage can be the reason for the financial loss. Hence while choosing these project management methodologies, the project manager should be qualified enough that they can chase the right approach for managing the project and can achieve success to achieve the project deliverables (Swanepoel, 2021).

A project success mainly depends on managing the project budget, project timelines, project scope and other factors, and while managing the project, the management should consider the project quality to ensure the project success. To understand the project success factors, the following areas need to be clearly defined: the affecting factors of the project success, the leading factors of project success, and the contribution of the factors that can be the reason for a successful project. Risk management, stakeholder engagement, project and functional managers, and other strategic and human elements can directly affect project success (Takagi & Varajão, 2019).

According to the author of this paper, project management can be most affected by the chosen project management tools, and active project managers can ensure the project's success by efficient management of the project management methodology. Effective project management practices in the organization need to be controlled, which can be affected by the project management methods such as project scope, ongoing risk management, scope and budget control and monitoring. Though according to the author of this paper, the failure of the article

project can be a learning opportunity for the manager instead of a disappointment. As the management can understand their previous mistakes next time, they can avoid these mistakes to ensure a successful project deliverable, and in the new future, they can manage the project in an improved way. In recent research, it has been seen that choosing effective project management can ensure the project's success 100% (Takagi & Varajão, 2019).

3.3 Transition from the traditional approach to agile methodology

Nowadays, it has been seen that project management is a new trend in the industrialized international market, and all the organizations are participating in a competition to ensure the project success and achieve a competitive advantage by achieving the business needs and meeting the increasing customers' needs. But in this case, it has been seen that the industrialization of the organization wants to migrate their system into clouds and in these cases, they have to face complexity and cost to manage those IT projects with the traditional project management approach.
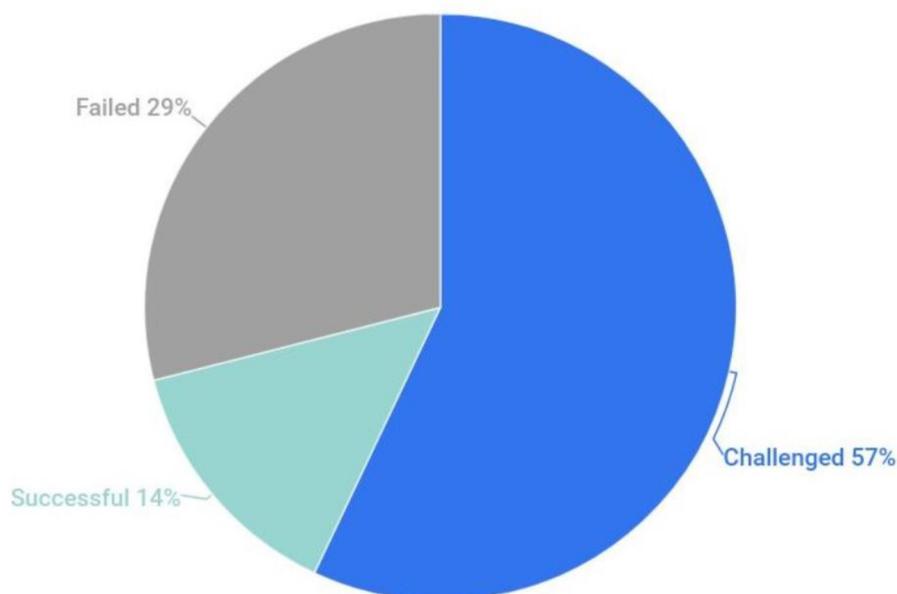
Figure 2: Traditional software development project success rate

Image Source: "Traditional Software project success rate" Zippia, 27 Nov. 2022,

[online]zippia.com. Available at:< https://www.zippia.com/advice/agile-statistics/ >

(Flynn, 2022) [Accessed 30 Nov. 2022]

According to (Todorović et al., 2018), This project management impacts the growth of the business, and hence the IT project needs to be managed as in this case, the project management may face complexity to control the project outcome. The IT industries are facing challenges for the rapid growth in the international market, and hence they have to transition the project management methodology from the traditional approach to the agile methodology. This new project management methodology has been developed with modern requirements that can allow the need of the IT projects and can consider the project constraints such as time, cost, people and others. There is another agile project methodology, Scrum, that can be useful in the case of IT project management. Scrum is a fresh methodology having some principles such as trust, empowerment, focus, respect and courage, and this helps to handle the complexity of the IT project complexity (Todorović et al., 2018). In the case of controlling the values contribution to the people-centered approach that is as follows,

- Individualism and interaction instead of the project process and tool

- Cooperation with the clients and customer negotiation

- Reaction changes instead of monitoring the plan

- Using Functional documents instead of excessive documentation

Scrum's methodology can be faced with some issues to get quality project deliverables and helps the project manager achieve the project goals (Hidalgo, 2019). Moreover, it can be able to improve customer satisfaction as it can be used to interact with the clients and can get a clear understanding of what they need. This Scrum method can be the guidance for the project

manager to control the project deliverables with quality and, in the long run, get better products and processes, which can be the reason for the increased numbers of productivity. Scrum methodology also can provide better learning and can be the reason for creating a field of knowledge for IT project management (Todorović et al., 2018).

3.4 Understand about Red Hat cloud or SP cloud

Based on analysis of the articles, it is identified that the Red Hat cloud access the program, which allows the customers to run the effective data in the public cloud providers. The organization needs to choose a better infrastructure to use the Red Hat cloud. Based on the research paper, it is understood that Red Hat shares operating system platforms, storage, applications, middleware. Red Hat maintains free software projects (Dharmaratne & Dissanayake, 2021). The Red Hat is a certified cloud service provider that includes hundreds of clouds and also manages the service provided. Cloud management is one type of concept that means that the user has control to operate everything like applications, data and platforms. These types of tools are used to ensure that cloud computing runs effectively to securely access the applications and prevent complex situations. The organization chose Red Hat because it is an open-source community that develops management technologies (Dharmaratne & Dissanayake, 2021).

3.5 The role of the project team

In this case, which is about controlling the trends of the project management, it has been seen that all the project managers are worried about managing their project to achieve the organization goals and growth in the international competitive market, and thus they have to adopt the various project management methodology approved to ensure the success. But adopting the right approach can't be able to ensure the successful deliverables of the project, but there are also some people-oriented actions that can affect project management. In that

case, according to (Todorović et al., 2018), they have to consider the role of the project team because, in project success, mostly the project team has the greater contribution to the project success. To ensure project success, the project managers want to adopt the agile methodology and scrum approach to overcome the challenges and the project complexity. But after the application of the agile methodology to the project methodology, the project team has to be engaged with project management methodologies as they need to manage the activities for the completion of the project. In this case, to adopt the project methodologies, to control the IT-based project, the project manager has to set the goals, need to choose the advanced technologies to meet the increased number of customers demand, also need to understand management needs and the organizational culture and should engage the people of that organization (Makarov, 2019).

With adopting the agile methodology in the IT project, the project managers have to play a crucial role along with the project team members, which would be the critical part of the project management approach, and by engaging the project work, they can make the project deliverables successfully, but in this case, the project management has faced some conflict station, such as the conflict in the development process with the international market, the people-oriented conflicts and the business process conflict and others, hence in the case of this management of the agile methodologies, the project manager should consider these conflicts factors and that they can face the and by taking right approaches they can overcome the challenges. The considering factors in the case of the project management methodologies are as follows,

- Trust - during the adoption and transition of the agile method in the project management case, the team members should be engaged with the activities actively, and by trusting in each other, and in this case, the cooperation between the team members can be effective to increase productivity.

- Self-organization - in the case of the transition of the agile methodology from the traditional project methodologies, a self-organized team can be an effective approach to ensure the success of the project, though this way, the project work can be done effectively with innovation and creativity of the engaged team members (Swanepoel, 2021).

- Learning approaches - the project team should be learned and knowledgeable enough that they can understand the knowledge and the skills which need to be required in the case of the transition of the methodologies from traditional project management methodology.

Hence in this paper, it has been seen that the author mainly focuses on people-oriented approaches in the case of managing the project methodology in the traditional approaches. In this case, the project team member can play a critical role through the communication-based interaction with their project manager. Also, this translation process of the project methodologies can affect the project deliverables with verbal and non-verbal communication. Based on the employee's engagement in the transformation project, the challenges of the transformation process can depend. Through the process, the "project manager" has to consider some factors that are employee empowerment, proper functioning of the agile "team members", empowering the "team members", and balancing the formal conversation by supporting the learning about the scrum methodology along with managing the conflicts in the project team (Al-Saqqa, 2020).
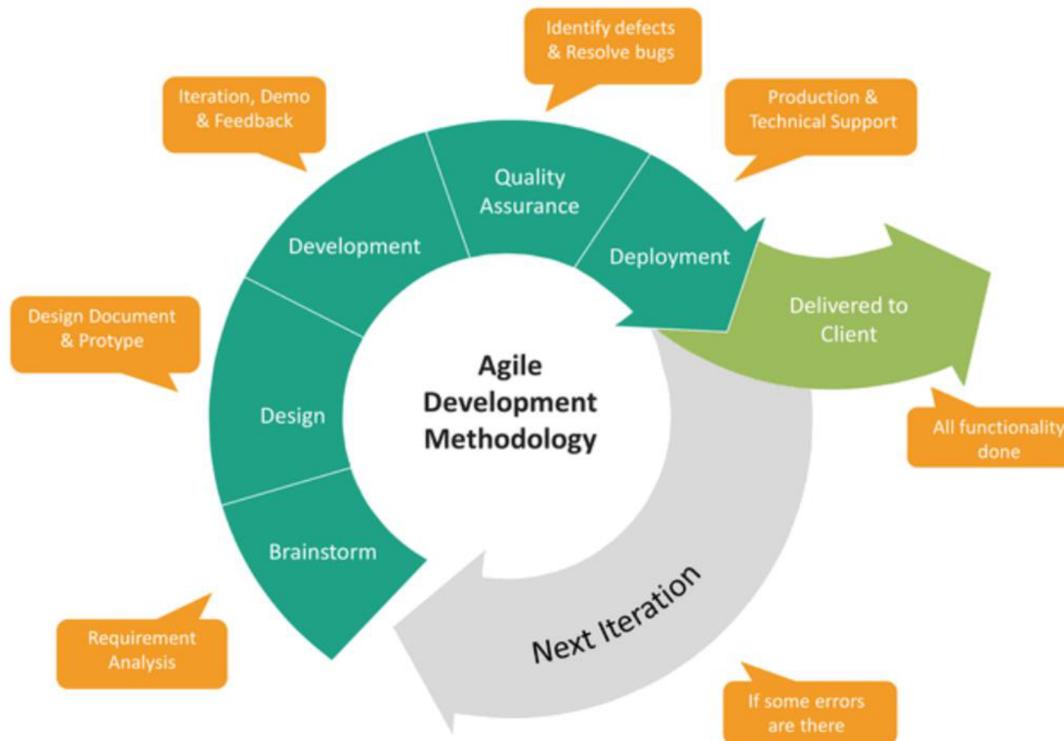
Figure 3: Agile project management methodology

Image Source : "Agile project managemenet methodology" Reactron, 04 Aug. 2022,[online] reactron.dev. Available at: <https://reactron.dev/how-do-we-work-agile-software-development-life-cycle/>
(TRAN, 2022) [Accessed 10 Dec. 2022]

3.6 Agile project management tools

In this above section, it has been seen that the project methodology is being the new trend in the internationally competitive market, and thus they need to manage the project management by choosing the right approach, the project management methodologies, which can ensure the success of the project deliverables. There are various approaches in the case of project management; hence the project management has to choose the right approach for managing the project methodologies. According to (Özkan & Mishra, 2019), This agile methodology can be beneficial as it can provide better management of the IT and software-based project management and can ensure project success by 71 %. The application of the agile methodology

can be the reason for managing the project budget, ensuring better quality by meeting the customer expectations and the market demand. By studying the other articles, it can be understood that the agile methodology is the best approach for software-based projects, and on the other side, this can be the reason for improved productivity and improved customer satisfaction. It has been understood that the reason behind choosing this agile methodology is to change the project requirement along with changing the needs of the global market. This agile methodology includes some tools which can help the software project managers to develop and plan their work, and the project management can get their desired outcomes (Özkan & Mishra, 2019). But it has been seen that project management cannot be fitted to all types of projects, this cannot be the best approach for small project management, but in the case of medium and large respect, this agile methodology can be the best approach to manage these project methodologies. These project management tools have some requirements that need care, and the project management tool should be met with all the requirements of the project and needs proper communication between the project team members. To apply the project methodology tools, the management should have the skills and engagement that they can consider the complexity of the tools and can apply them to the project to get the benefits (Akhmetshin et al., 2019).

Various agile project management tools can be used by agile project experts to manage their various types of projects. These tools need to be compared with the variable features. Thus they apply the correct project management tool. Some of the agile project management tools are as follows,

- JIRA - this is one of the project management tools and can be used for most software project management with shared environments. The feature of this is it can be used with customizable scrum boards and flexible Kanban boards.

- Agilo for Scrum - this is the most suitable tool for distributed teams, and also customization is available.

- XP - among the agile software methodologies, this is the most effective software development framework that can produce higher quality project deliverables with a maximum enlargement of the employees (Saleh et al., 2019).

3.7 Influence of agile methodology (SCRUM) on SPM

According to (Hayat et al., 2019), software companies face a huge amount of problems to choose the right method for project management. Many different organizations effectively use the agile development approach as well as enhance high-quality software systems. Whenever the required changes through the agile methodology, the project work cannot be hampered for this reason; most organizations choose this procedure to grab the biggest benefits from this methodology (Hayat et al., 2019). In this research paper, it is mentioned that the approach of the agile method highlights more people with each other to develop the working procedures. According to these research papers, it is understood that SCRUM is the part of the agile method which maintains the model initiated along with the planning process. SCRUM is one type of framework of the agile methodology that provides the flexibility to manage and control the exact requirement and also software development (Hayat et al., 2019). The SCRUM is one type of incremental and iterative base model that interactively organizes software. The reason to design SCRUM is to develop products and also support the shareholders to construct a good message. SCRUM is indeed a flexible model that can be applied to any project in any kind of industry. As per the analyst of the research papers, it is understood that the SCRUM is applicable for small and also bigger projects. The below picture shows the steps of the SCRUM to meet the actual requirements (Hayat et al., 2019).

Figure 4: SCRUM Phases

Image Source: Self-made

The examination of the studies advocates aset of understanding that the SCRUM process contains the SCRUM team, the SCRUM master and also the director of the product. Whenever SCRUM adds to the project, it usually lasts for 15 minutes to focus and answer each question that is faced during the execution of the project (Hayat et al., 2019). For the customers who change the requirements at each moment, the SCRUM is the ultimate example of the project management paradigm in every iteration. It is true that to handle the requirements, every researcher suggests the SCRUM model because, for the development of any project, there is a need to apply the concept. For this reason, SCRUM concentrates on the concept and the product quality environment. The below figure shows the SCRUM methodology procedures which are needed to understand the reader (Hayat et al., 2019)

.

Figure 5: SCRUM Methodology

Image Source: "SCRUM Methodology" pixstory, 03 Sept. 2022 [online] Available at:

<https://www.pixstory.com/story/scrum-is-a-lightweight-framework-that-helps-people-teams-and-organizations-generate-value-through-a/142347>

(Akshara2382, 2022) [Accessed 15 Dec. 2022]

In these research papers, the researchers grab the data through the survey procedure, and the Survey procedure applies to different organizations. The researchers find extraordinary data about the SCRUM and agile project management, which plays an effective role in different organizations. After analyzing survey reports in the research papers, it is understood that most organizations want the SCRUM methodology to grab the approach and develop the project with full flexibility. For this reason, the maximum result in the survey result denoted that the SCRUM is the best choice for the project methodology. After analyzing the research paper, it is concluded that SCRUM shares the positive approach to the knowledge areas and also manages the quality, cost and risk that occur in the project (Özkan & Mishra, 2019).

3.8 Kanban in Software Project Management

Analyzing the collected research paper, it is understood that Kanban is a popular framework that is used to implement DevOps and agile software development. It is true that Kanban needs

real-time communication as well as full transparency to develop the internal structure of the project. According to the analysis of the research paper, it is understood that Kanban is a project management tool that allows to grab a more visual overview of the tasks and mitigate the complicated strategies (Lei et al., 2017). The researchers mention that Kanban project management is one of the effective project management methods, and the approach of the Kanban method is suitable for all organizations. For the poor project manager, most of the project fails to deal with the complex approach. For this reason, to use the Knabna approach, the project manager easily grabs huge amounts of advantages: better tracking of projects, improving the project life cycle, and improving the process of the workflow. Kanban is suitable for projects which have clear objectives and also do small tasks. Also, it is mentioned that Kanban follows six effective rules for the application of the project (Lei et al., 2017).

Figure 6: KANBAN methodology

Image Source: "KANBAN methodology" Bordio, 14 Sep. 2022 [online]bordio.com

Available at:< https://bordio.com/blog/kanban-methodology/>

(M., 2022) [Accessed 22 Dec. 2022]

3.9 Method of implementation and adoption of Agile project management methodology

According to (Rasnacis & Berzisa, 2017), it is understood that there are 20 different types of procedures in the agile method as well as their types. Choosing the best method is an opportunity for the organization; the overall procedure depends on the type, length of the project and also the characteristics of the employees. In this research paper, the researchers share the method of the Agile PM methodology with the effective figure. The second section of the research paper describes the method. The proposed method for implementation and adoption of the agile project management methodology is based on effective practices; it is true that in change management, the methodology of agile implementation as well as uses motivation research methods. The method development process includes identification of the problem, proposed design and also evaluation. The method overview shows in the figure below (Rasnacis & Berzisa, 2017).
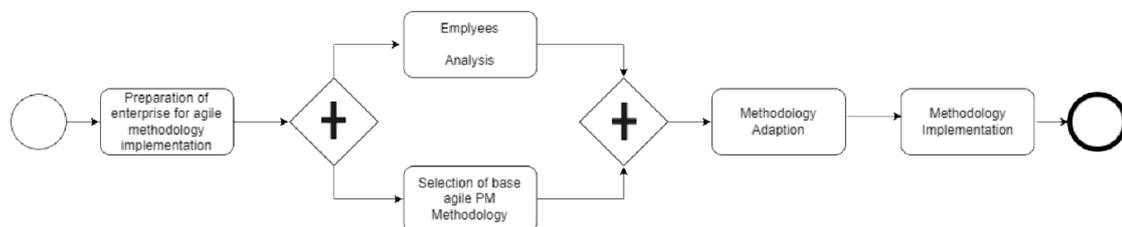
Figure 7: Overview of Method

Image Source: (Bērziša, 2017)

The preparation phase indeed helps the organization or the team of the project to organize the methodology change. The researchers in this research paper share the concept of preparing the agile implementation method. It is required to include several steps: awareness, ability, transfer and desire (Rasnacis & Berzisa, 2017). After analyzing the overall research paper thoroughly, it is concluded that the development of agile project management is directly related to the

development process of improvement. It is true that whenever discussing agile project management, it needs to be understood that choosing the accurate team who are eligible to manage the complex situation in the project. In this research paper, the method proposed by the author is easy to handle for the project team member. Also, the limitation of the proposed method contains the specific action to manage the project (Rasnacis & Berzisa, 2017).

3.10 Selection of Kanban and SCRUM

The thorough examination of the papers generates an explanation that claims that the team and Kanban only focus on minimizing the time from the project from the beginning to end. The project manager does this work through the Kanban board and also continuously develops the workflow. On the other hand, the team of the SCRUM shipping the software, which is relatable to the working, is called sprints (Pool et al., 2019). The goal of the SCRUM is to develop the learning loops to easily handle the feedback of the customers. Whenever discussing the selection of the exact methodology, it is understood that the SCRUM is the best choice for the project manager (Pool et al., 2019). Through this procedure, it is easy to gather extraordinary data through this methodology. To choose the appropriate methodology, it is essential to understand the complexity. Through this procedure, it is easy to capture effective data, which develops the planning of the methodology. The researchers in this research paper effectively explain the choosing procedure between the Kanban and SCRUM, which shares a huge amount of knowledge for the readers (Pool et al., 2019).

According to the study of Saleh et al. (2019), SCRUM is considered the original technique of Agile methodology. Organizations have widely chosen it when implementing Agile methodology for management purposes. However, Kanban is considered an instant-age technique, and its implementation is widespread by associations universally. The author also states that Kanban is unbending to a lesser extent, unlike SCRUM, and thus, is less unequivocal

up to the extent of its required norms and patterns. Regardless of its shortcomings, it is still considered one of the most effective Agile methods as it can overcome some of the challenges of the previously used methods. The necessary patterns in the engagement of the system improvement in the implementation of Kanban include the utilization of a Kanban board for imagining the procedure of work, abridging the realized amount of characteristics for confining the acts before time, evaluating and administering the stream, making unequivocal techniques, feedback completion, and readable and agreeable up-gradation. It is also subjected to self-dealt with gatherings similar to SCRUM. The Kanban board is used to enhance the development of software products by providing a visual representation of the different phases or periods of the advancement procedure of a software development project. It is not as prescriptive as to the other Agile method, but the visualization of the workflow using the board helps ensure the project goes as planned without wasting much time and effort. The essential standards of the Kanban method include representation of the workflow, limiting the highlights amount for the representation of the executed tasks for restricting entity, administration with stream estimation, arrangement clarification, input actualization, improving and circling the efforts coordinated seamlessly. The rehearsals of the Kanban include limiting all the work that is still in progress, measuring the flow and managing them, developing explicit policies, implementing feedback, and continuous development. Both have their own set of advantages and disadvantages. Still, the complex nature of the projects in the current times often require amalgamating different types of Agile methods and using them together in a single project to acquire the benefits of both worlds (Saleh et al., 2019).

3.11 The role of the Agile Methodology

According to (Clarke et al., 2018), it is understood that the role of the agile methodology is primarily responsible for setting the accurate direction of the project and the product development. The responsibility of the owner is to understand the requirements of the exact

project which is effective for the stakeholders, the project manager, and it is important to understand the communication procedures with the stakeholders so that they can easily fulfill the requirements of the stakeholders (Clarke et al., 2018). After analyzing the research papers, it is understood that the researchers mentioned three different roles in an Agile team to manage the project.

3.11.1 Team lead, Project lead, SCRUM Master

The project manager acts as a coach for facilitating and managing the team. Whenever complexity occurs, it is required to remove the errors with immediate action (Clarke et al., 2018). The role of the SCRUM master in the project is to develop the soft skills of the project management and also to develop the planning of the technical skills which are required for the team and the whole project management. The researchers provide the important note for agile project management is that whenever choosing agile project management, there is a need to develop the knowledge and responsibility of the team members (Clarke et al., 2018).

3.11.2 Product Owner, XP, Active Stakeholders

If the project is shipped, then the product owner is playing the captain role, his responsibility is to establish the order, and it is also true that the product owner contributes to the rapid improvements through defining the works and the development (Clarke et al., 2018). Through these procedures, it is easy to set the objectives of the quality and maximize the value of the product. The product owner also elaborates on the goal of the project and creates the product-related information to define the tasks (Clarke et al., 2018).

From the analysis of the research papers, it is understood that from the 3 roles (product owner, XP, Active stakeholders), these two roles (Product Owner, XP) are effective for project development. Whenever discussing the roles, it is needed to be understood that the above role

is responsible for developing the project into the basic life cycle. Whenever we understand the product owner, it is found that they provide the priority of the scope and handle the backlog of the product and also maximize the product value (Clarke et al., 2018). For the product owner, it is important to understand the nature of the stakeholders to maximize the business value. Also, during this methodology, it is important to communicate the progress of the team (Clarke et al., 2018).

3.12 Agile Development Process

According to (Al-Saqqa, 2020), it is understood that agile is a major guidance in the case of software development. Analyzing the research paper, it is understood that the agile development process is a conceptual framework that can help in the case of software engineering which begins with an initial planning phase as well as follows the road towards the implementation phase. In this research paper, the researchers mention that the primary goal of the agile methods is to mitigate the complexity of the software development process along with the ability. In the overall theory of the agile methodology, it is mentioned that it follows four values as well as twelve principles constituting and supporting the essence of the agile method (Al-Saqqa, 2020). The values and the principles share the basic guidelines in the software development process. This section discusses the four values into the agile development process:

- **Interactions and individual over tools and processes**

  The primary value in the manifesto suggested that emphasizing the formal processes of abstract as well as their surrounding technical environment is denoted as a key factor in the software development model (Al-Saqqa, 2020). The more important thing is interaction, communication as well as the degree of the "human software developers" that are advocated by these factors(Al-Saqqa, 2020).

- **Working software through comprehensive documentation**

According to the examinations and assessment of the studies, it is explained that documentation of the different types of the agile software development process is an important as well as valuable component (Al-Saqqa, 2020). However, the number of resources and time which are given to the agile documentation must be optimized and controlled in the software development process. In the research paper, it is mentioned that agile documentation is rarely used in the initial phase in the deployment stage. The documentation is less ambiguous if immediately met with the demand (Al-Saqqa, 2020).

- **Customer collaboration over contract negotiation**

The developments of agile software are invented to meet with the changes in the requirements at each stage of the project; as per the analysis of the research paper, it is understood that team development throughout the agile documentation meets the customer's requirements. But the contracts which specify the relationship among the customers and development and describe software business are still required (Al-Saqqa, 2020).

- **Responding to change the following plan**

Customer satisfaction plays an important role through agile documentation. For this reason, it is important to change the plan of the documentation to develop customer satisfaction (Al-Saqqa, 2020).
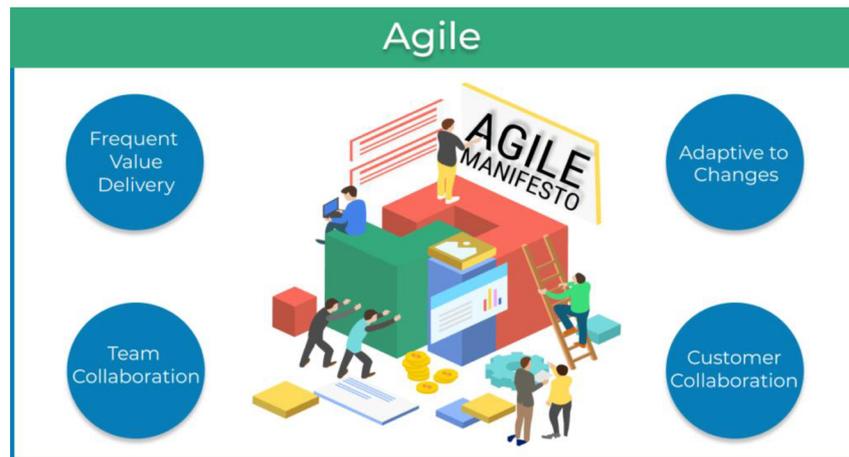
Figure 8: Agile development process

Image Source: "Agile development process" kanbanize [online] kanbanize.com. Available at:

<https://kanbanize.com/agile/transformation/enterprise>

(kanbanize) [Accessed 25 Dec. 2022]

with these four values, the "Agile manifesto" develop twelve different types of principles for the development of the agile methodologies those are:

- **Principle 1:**

  The highest priority of agile documentation is to justify the customers through continuous and quick deliverables of valuable software. The examination measure of the research paper generates understandable directives that show that continuous and early software delivery will organize a trust state as well as flexibility between the development team and customers. The development team grabs the feedback of the customers and changes the product as per the requirement (Koi-Akrof, 2019)

- **Principle 2:**

  "Welcome changing requirements", even in late development. The agile process changes the competitive advantages of the customers. The corresponding implication

of the requirements minimizes the complexity of the product requirements (Koi-Akrof, 2019).

- **Principle 3**

In principle three, the major objective is to deliver the software which is working into the present day from a "couple of weeks to a couple of months", along with a preference to the shorter scale of time. The third principle put some restrictions on the first principle; this principle more satisfied the customers than the above principles (Koi-Akrof, 2019).

- **Principle 4**

In principle 4, it is mentioned that business developers and people must work together throughout the project daily (Alahyari et al., 2019).

- **Principle 5**

Developing projects around motivated individuals gives the customers an effective environment and also develops the trust of the customers (Alahyari et al., 2019).

- **Principle 6**

As per the analysis of the research paper, it is understood that the most effective and efficient method within the development team believes in face-to-face communication. To develop human communication, the agile development team uses written plans or written specifications.

- **Principle 7**

The primary measure of the overall process is working software, breaking down the exact products into smaller parts to deliver better progress and develop an honest impact on the overall documentation (Alahyari et al., 2019).

- **Principle 8**

As per the analysis of the research paper, it is understood that the process of agile promotes sustainable development. It is true that the developer's sponsors should be able to maintain a constant part of the product (Cooper & Sommer, 2018). Based on the analysis, it is understood that sustainable development means the agile team member should maintain a constant rhythm and minimize the ultimate errors to meet the ultimate goal through the available resources.

- **Principle 9**

Continuous attention to good design and technical excellence enhances agility. In the agile methodology, there is a requirement to transfer the highest quality code to mitigate the customer's negative impact (Cooper & Sommer, 2018).

- **Principle 10**

The aim of this principle is to produce a product which is capable and simple of handling the sudden changes as well as fulfill the requirements of the customers.

- **Principle 11**

The best requirements of this agile methodology are, architectures and designs which can be enhanced by self-organization teams. The agile team members can be

responsible to achieve the optimal goal of the project by best practices of the agile method (Cooper & Sommer, 2018).

- **Principle 12**

The agile team members become more effective in developing their behaviour and adjusting the overall project accordingly.

3.13 Agile methodological approach versus Traditional methodological approach

The degree of difference between agile software progression and traditional methods is comparatively huge(Uludag et al., 2018). The differences are shown in below table:

Table 2: Agile methodological approach versus Traditional methodological approach

Subject	Traditional Method	Agile Method
Ease of Modification	Complicated	Easy
Approach of Development	Predictive	adaptive
Orientation of Development	Process-oriented	Customer-focused
Nature of the Project	Large	Small
Scale of Planning	Long Term	Short Term

Style of Management	Control and command	Collaboration and leader
Learning	Continuous learning	Learning is a secondary way
Documentation	High	Low
Budget	High	Low
Size of the Team	Medium	Small
Type of the organization	High Revenue	Low revenue

3.14 The challenges of the traditional methodology and the benefits of the agile methodology

In the case of the software and the IT-based project management, there have various approaches that can manage the projects, but the authors (Koi-Akrof, 2019) shows some disadvantages and the challenges of the traditional waterfall methodologies in software project management, which are,

- The traditional and waterfall method can be slow processes and monolithic.

- Thai waterfall methodology can also create challenges with managing the time, and multiple scheduling can occur.

- This project management approach has a lower flexibility level and takes too much time to provide productivity.

- This traditional project management has a lower ability to be flexible to the change and can be costly to manage any required change in the project management case.

- As this traditional waterfall method is resistant to change, any customer's requirement cannot be considered while managing the entire project management cycle (Koi-Akrof, 2019).
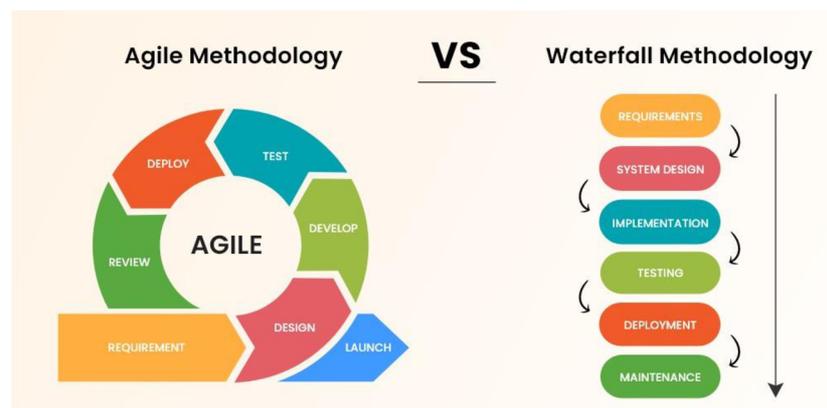
Figure 8: Agile vs Waterfall methodology

Image Source: "Agile vs Waterfall methodology" spaceo, 26 Oct. 2022, [online] spaceo.ca.

Available at:< https://www.spaceo.ca/blog/agile-vs-waterfall/>

(Patel, 2022) [Accessed 27 Dec. 2022]

Whereas the agile methodology "has" some advantages in the area of the limitation of the traditional waterfall methodology, that are,

- The instance of the agile methodology approaches in project management, the time schedule can be managed easily as the agile approach can provide better flexibility to the project manager.

- Also, it can be adapted to the latest technology in the case of agile project management and can maintain better innovation and creative productivity in their workplace.

- Along with the benefits, the agile applied projects can motivate the project team to be engaged with the project work and contribute their innovative and creative ideas to the project work, which can improve productivity (Raharjo & Purwandari, 2020).

Despite these benefits of the agile methodology in software project management, it has some challenges and disadvantages which need to be known by the project managers while adopting this agile methodology. The project managers may face some challenges with the agile practices on their project due to the following reasons,

- Lack of experience - though this agile methodology looks simpler to use, it has been witnessed that project managers need the experience to use this method in their project management to manage the agile disciplines to ensure the success of the project management in case of project management.

- Lack of skills - before playing the agile methodologies, the project managers should be knowledgeable and skilled so that they have the knowledge about the project requirements. Thus, they can apply the methodology correctly (Koi-Akrof, 2019).

- Lack of understanding of the agile principles - Organizational cultural understanding needs to be followed and considered while advocating agile methodology as if the project managers do not consider the culture, then the agile practice in the project management can be failed.

The disadvantages of this agile project management methodology are as follows,

1. Time-consuming and dedicated project management takes a lot of time. In this case, the project team has to arrange more face to face discussions and the collaboration and dedication of the project teams (Raharjo & Purwandari, 2020).

2. Lack of documentation - as in this case, the management mainly uses the software-based system for the processing; they lack documentation, which can also create lots of misunderstanding and problems among the project teams.

3. Need Greater developers - as this project methodology has to be applied in the case of the software project manager. Hence the project requires better engagement and the cooperation of the employees (Raharjo & Purwandari, 2020).
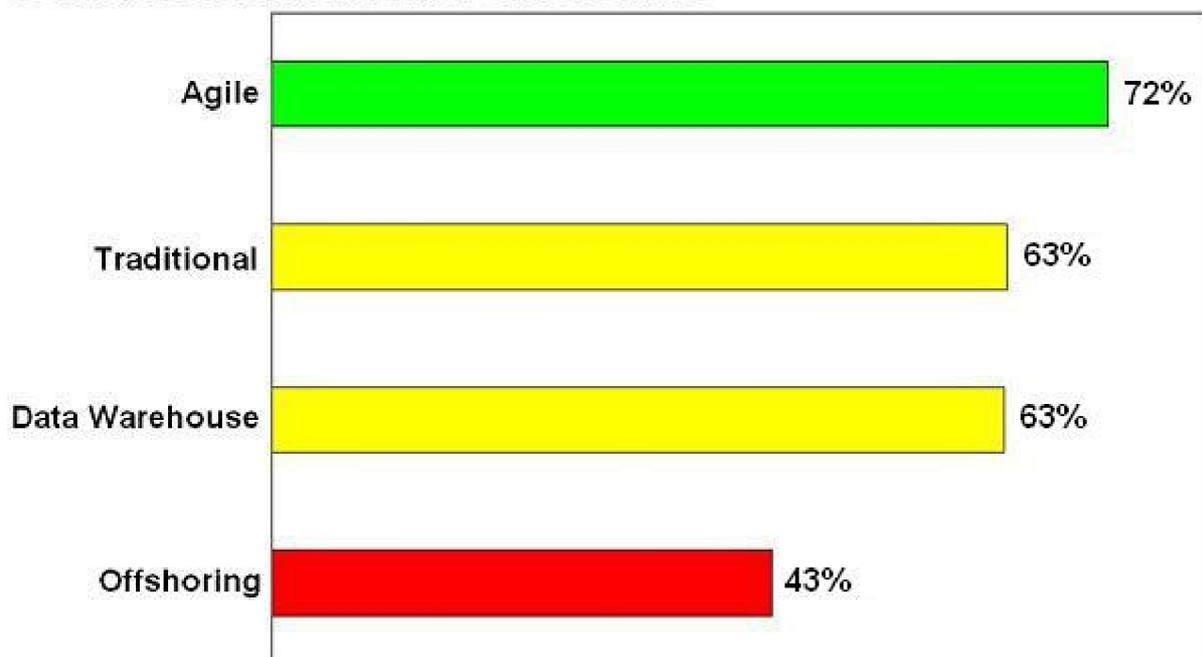
Figure 9: Software development project success rates

Image Source: "Software development project success rates" ambysoft 07 Aug. 2007

Available at: <http://www.ambysoft.com/surveys/success2007.html>

(Ambier, 2007)[Accessed 30 Dec. 2022]

In The recent study, "it" has been seen that as per the Standish 2009 Chaos report, the success rate of the software project is more or less 32%, 44% of projects faced challenges, and 24% of projects were failed. Those projects have failed mainly due to late deliverables or over budgets.

Around 24% of IT-based projects, some of which failed as those were not completed within due timelines. Whereas it has been seen, after application of the agile approach, about 83% projects small teams' projects and 55% of large teams' projects get success (Koi-Akrof, 2019).

The major limitation of agile project management is poor resource planning; as per the analyst, it is understood that agile is the base idea for the project owner, but they are facing challenges in predicting the cost of the project and also resources and time (Akbar, 2019).

3.15 Agile Methodology in Software Project Management

According to (Younus., 2021), Many decades ago, the concept of the Agile Methodology has managed to implement the concept successfully to emphasize the formation of teams by developing a conceptual model that will focus on enabling the top management, software developers to be aware of the understanding of the agile methods and technologies. This has also focused on the maintenance of high-quality standards. The Agile methodology in the software project development involves the staff and the IT tools that will enhance the overall performance of the manufacturing system.

According to (Balaban., 2021), the agile method in software project management focuses on transparency, the relationship between the customer and the feedback. This concept has boosted the productivity of IT companies worldwide. The Agile Methods in software project management have used the principle of continuous development, which is based on feedback. It has also proposed a modified software project that is used to generate the schedules for the agile development to transform the research and developments following the agile methodology in software development management.

Although the Agile methodology is implemented in the software development industry, it can be said that the agile methods also work outside the software development industry. Both

managers and employees widely recognize the benefits of applying the concept of the agile methodology. There are still some challenges that the organizations face while implementing the agile methodology, such as resistance to change in the organization, the insufficient participation of the leadership, and the practice across the teams.

3.16 Role of the project managers in the Agile methods software project management

According to (Shastri., 2021), the Agile methodological teams are not meant to have the "Project Manager" designation. But there are some agile methods such as Scrum and XP that define the roles of scrum master, product owner and coach. According to numerous studies by (Shastri et al., 2021), it is found that the project managers in these methods tend to disconnect the existence between the theory and the practice. There has been a clear description of the role of the project managers like

- mentoring, negotiating, coordinating, and protecting.

- Three management approaches; hard, moderate and soft

- Four traditional project management activities are performed reporting, budgeting and so on

3.17 Risk Management tool for agile method in software project management

According to (Tavares., 2021), In the present scenario of the IT industry, around more than 11% of software projects are cancelled before the first delivery to the customers. The reason behind it is the lack of effective risk management. It is considered the most minor project management knowledge area in the software industry. Recently, there has been an increase in attention to agile methods. They are believed to have certain advantages over the software developments, such as increasing the quality and productivity, improving the alignment of the information technology with the business. According to the scholars, it is stated that the practice

of risk management has taken the initiative to improve the chance of an agile project's success to ensure effective risk management in the agile methodology by integrating the practice from the traditional projects (Tavares et al. 2021)

According to (Tavares., 2021), agile methods in software project management do not tend to use any intentional approach to risk management. It is said to reduce the risk by implementing multiple new versions of the piece of computer hardware or software. The feedback mechanisms of the agile methodology, such as the customer's opinion about productivity, are delivered at the end of the sprint. It has also helped the teams modify the changes in risks, requirements and new opportunities.

3.17 Specific issues of the agile methods in software project management during Covid 19

According to (Butt., 2021), in the present scenario, there has been rampant development of software project management is growing dynamically. They are also indulged in altering their software development and the need to alter the new changes in the environment. The environment also demands the rapid production of the software in the market.

The agile methodology is considered a helpful development method is swiftly developing the demands and the environment. It gains considerable recognition due to the uniqueness in the features that helps to enhance the software development very efficiently by the rapid development of the product delivery, a friendly relationship with the clients, the client's satisfaction, and so on.

According to (Butt et al., 2021), In the two years of this transitory situation, The concept of the agile method in the software industry has faced many issues with meeting the objectives of the development.

The encounter of Covid 19 has complicated the whole activity and has made it time-consuming. Many team members have faced the consequence of the lack of leadership, which has resulted in the inefficiency of the developers due to less knowledge about the directions to take in software development. As a result, the team members should take the initiative to take responsibility and improve communication with the managers of their own company.

According to (Nolan et al.,2021), so far as the new way of working in the agile method in software project management is concerned, the companies need to have a structure that will aim to maintain the team efficiency as well as it will focus on the "work from home" to "not working from home" ratio.

The agile methodology aided software industries have faced many issues with meeting the deadline of the development objectives of the enormous productivity. The agile methodologies in software project management have been established in software development. There are specific plans implemented to evaluate the majority of teams tath did not experience any losses in the performance.

3.18 Develop trust for the success of Project Management

According to (Bond-Barnard et al., 2018), it is understood that to develop the success of the project, there is a need to enhance the trust and better relations with the project managers and team. The purpose of this research paper is to understand the importance of collaboration for increasing the success of the Project Manager. On the other hand, share some practical implications during the project schedule. The researchers are effective searchers and also focus on this subject, and it is found that there are some specific reasons for those reasons there is a need to develop the trust of the Project Manager. In the research paper, the researchers address several points and discuss some procedures to gain the trust of the project management. Those are:

- A strong and confident command, along with a planned approach, is one type of strength during the project. A planned process is one type of approach which effectively builds the trust of the project manager (Bond-Barnard et al., 2018).

- The purpose of trust in project management is to enhance the satisfaction of the customers to develop a good project. If the project manager effectively communicates with the team members, then there is a way to enhance the trust (Bond-Barnard et al., 2018).

Communication is a success factor based on the research paper. It is understood that Project Manager success is based on several factors, but the researchers said that communication is the based approach to understanding the relationship between the project manager and the team. The risk factors might be mitigated through effective communication (Bond-Barnard et al., 2018). In the conclusion section of this research paper, it is mentioned that Project Manager success becomes a degree of collaboration which increases the value of the project management; on the other hand, it is true that if the project manager adopts the approach of the agile methodology then effectively deals with the changes into the project management. The overall review of the researchers found the trust factor of the project manager; for this reason, the purpose of this paper effectively meets and provides quality data (Bond-Barnard et al., 2018).

3.19 Agile and Internet of things

The study conducted by Sadek (2018) states that the business, industries, society, governments and schools are all excited about the Internet of Things technologies whose application is endless and can do seemingly unimaginable things. The management and control of the high dynamic possessed by the Internet Of Things network have the potential to cause colossal ad hoc problems. The traditional infrastructure of the network will not be able to afford to perform

the task efficiently. The study points out that Software Defined Networking (SDN) will provide agile with dynamic solutions that will help cope with the requirements of diversified innovation of Internet Of Things applications (Sadek 2018). Further, it states that agile network infrastructure will be built on having a number of software to function, offering more agility than traditional network infrastructure provided across concepts of layers. The study also notes that Deep Packet Inspection (DPI) and Network Function Virtualization (NFV) can be efficient in complementing SDN functions. The study provides a long-distance vision of expanding the need to integrate Software-Defined Networking and Network Function Virtualization into a swift, self-healing, self-rotational Internet Of Things network in a heterogeneous environment. The study was conducted using secondary data collected from various sources relevant to the topic. The overall view is that the operation of the Internet of Things is challenging to handle but can be made accessible by agile technology (Sadek 2018).

4. Practical Part

4.1 The General Finding

For the purpose of finding and analyzing the role of agile methodology in the case of software project management, here a practical finding part has been provided. This part also enables, to understand the importance of the project manager and the product owner of RedHat and has analyzed how the application of agile methodology can add value to the software project management.

4.1.1 New software launch without project management

For new software launch time required is 71 days as shown in below attached figures from 1 to 4. The software introduction time has been cut significantly, as seen in the portion that was just shown below. If project management were not used in this instance, the amount of time

needed to finish the activities and release the product would be much longer. Here in figure 1 it shows project starts from 25th of August and through various activities and finally product will launch on 15th of November.

4.1.2 New software launch with project management

The technique for putting the strategy into action and putting in place the business procedures is called project management. It is beneficial to be specific about what activities would be completed, who will be engaged in the completion of the duties, and when the tasks must start and conclude. These are the preliminary actions involved in the process of developing organisations for the lengthy period.

To better comprehend agile methodology in relation to project management, one software application is being developed here. Everyone in the business is aware of what they do. Most of them are also proficient at doing their duties. But most people are unaware of their motivations. The objective of each of their job responsibilities. For the purpose of completing a variety of responsibilities, the project manager separated the engineers into the following categories: research and development; designing; programming; testing; quality assurance; and software launching. The engineering labour force was broken up by the project manager into several different resources so that they could work on several different jobs. However, the project manager ensures that the individuals divided into each category have their respective areas of expertise. It is essential to have programmers on the programming team. Data collected to establish project requirements has to fall within the R&D category. To reduce the total amount of time required for the introduction of a new software product, the designing of the software must be carried out by software designers who specialise in the field. These tasks included research and development, designing, programming, testing, quality assurance, and the launch of software.

The collection of data and the aggregation of information on the requirements of the market should be the first step in the development of any programme. During the process of brainstorming, the facts that were analysed on a more comprehensive scale will need to be interpreted once the process has been completed. The most qualified individual to carry out this responsibility is a research and development engineer. Within the bounds of the agile approach, the project management of Microsoft needs an R&D engineer to commit 16 days to the process of brainstorming. After the data collecting and interpretation stages have been finished, testing engineers will begin working on the creation of software. The very first thing that the engineer is tasked with doing is figuring out the prerequisites for developing brand new software. Testing will begin as soon as the prototype has been established, and the testing engineer will collect input throughout the process. After that, a design engineer is able to produce software designs; in addition, it will be their responsibility to conceptualise the product and write its requirements. When software was being designed, the first step for the programmers involved was to write the code for the software. One of the things that may be done is the configuration of the coding and the setting of the coding entries. Following the completion of the building process, the integration section is responsible for performing quick tests and establishing connections between components. Testing engineers will detect any potential issues that may have been triggered during the trial runs. The testing engine is in charge of performing manipulations on the integration, as well as automatic compilation. After ensuring that the programme codes have passed all the necessary tests, it transfers them to the quality assurance engineers so that they may test quality coding and test cases, report any flaws that need to be corrected, and ultimately construct a quality product. After the product has been through all of the necessary quality assurance testing and is ready for release, it is then sent to senior management for any further testing that needs to be done before it is put into production. After the product has been made available to the public, the engineering team is obligated to

take into consideration customer comments and, in the event that they find any faults, to work diligently to fix such problems before releasing the software. In this implementation of the approach, engineers are segmented into a number of departments, each of which allows them to concentrate entirely on the tasks that are specific to that department, such as data collection, designing, brainstorming, and programming.

It is generally known that the responsibilities of a project manager include the creation of plans, the coordination of operations, and the achievement of successful completion of a project. As a result, to construct new software utilising an agile methodology, it is required to categorise engineers into various groups. A project manager is accountable for determining an accurate estimate of the project's expenditures and the completion date. It is anticipated that around fifty-six days will be required to develop this brand-new programming system. The brainstorming phase lasts for about a week and a half on average, and during that period, prototyping may be carried out simultaneously. A software prototype is put through several testing procedures during the design process. Following the completion of the construction of every structure, programmers can start the process of programming.

Comparison between with and without project management
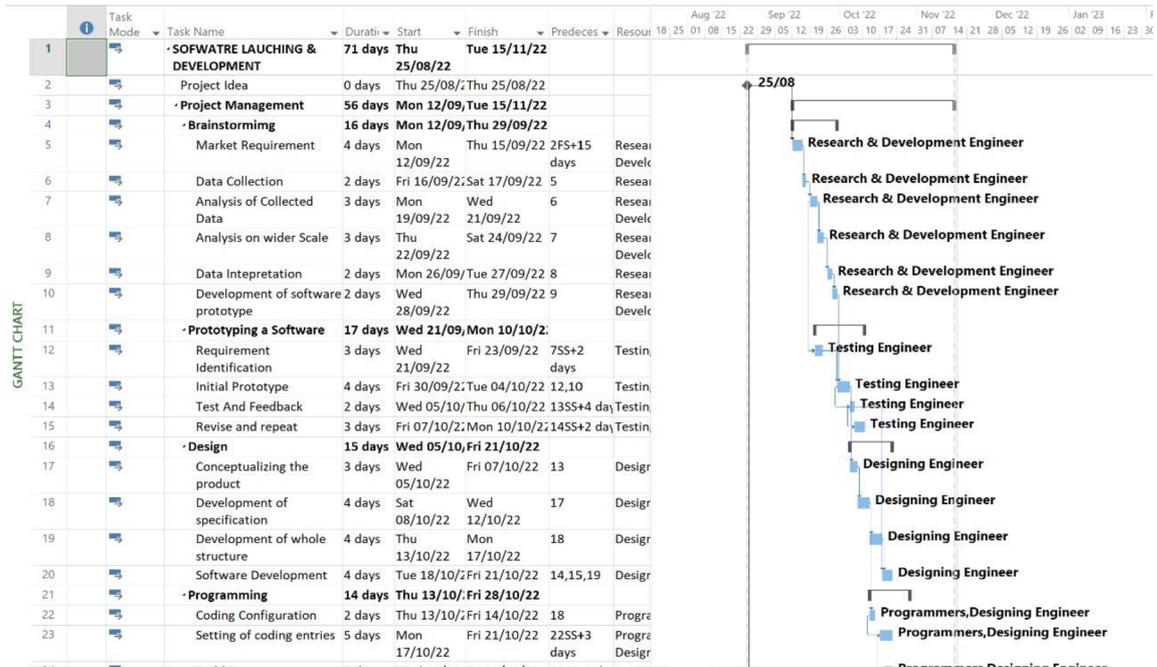
Figure 2 Software Launch activities with and without project management

Image Source: Self-made
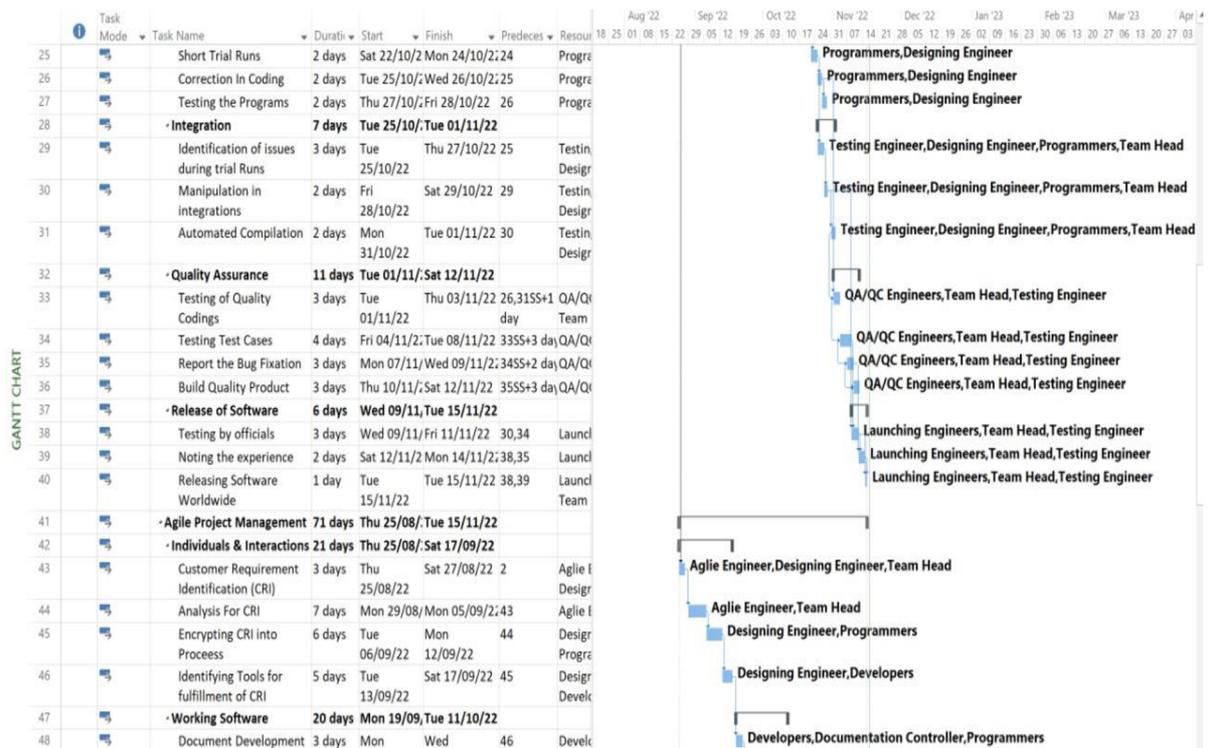
Figure 3 Software Launch activities with and without project management

Image Source: Self-made
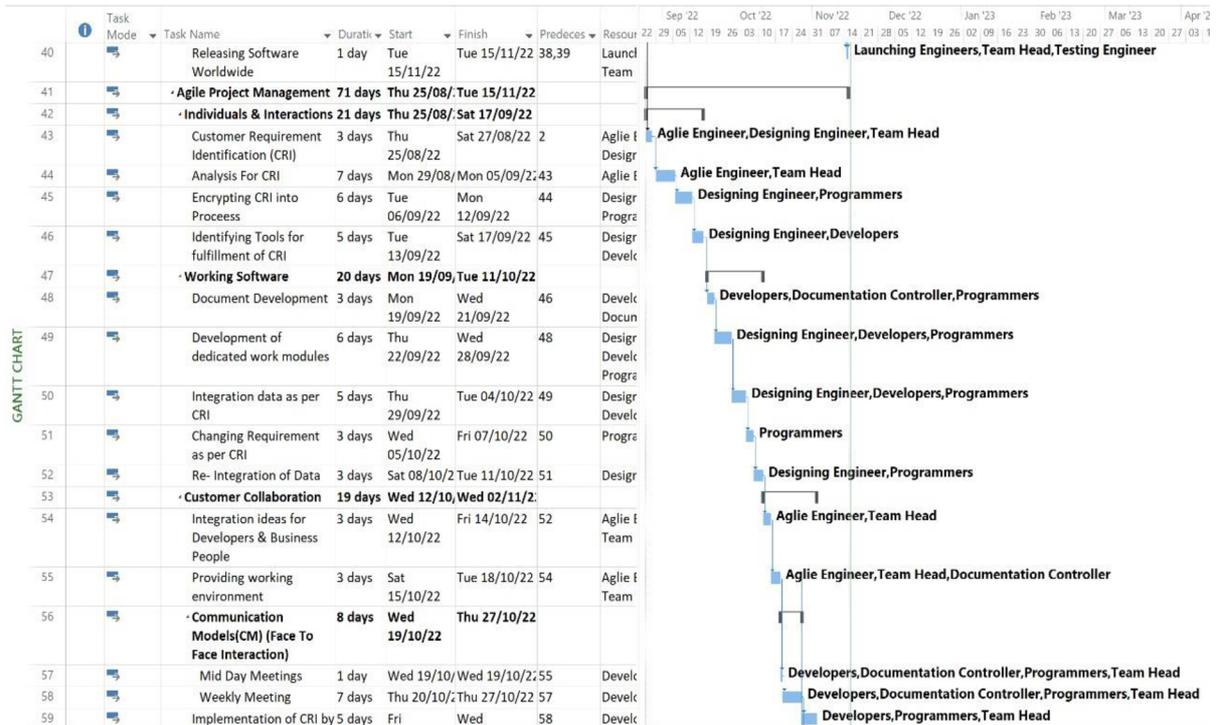
Figure 4 Software Launch activities with and without project management

Image Source: Self-made
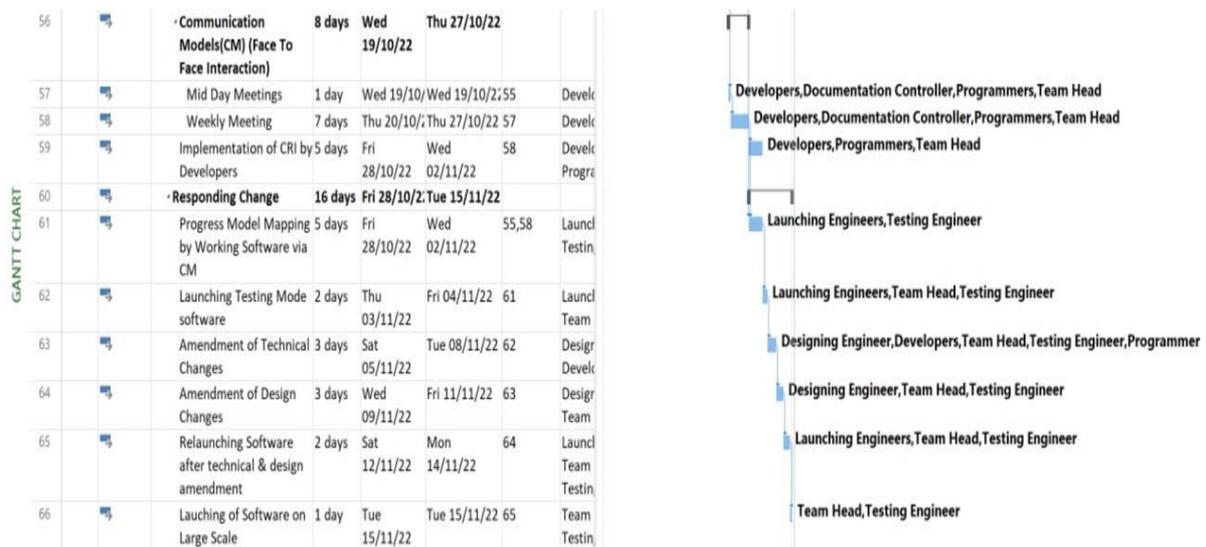
Figure 5 Software Launch activities with and without project management

Image Source: Self-made

It is evident from the tables that have been provided that the agile methodology is beneficial

for the process of software development. It distributed the effort over several engineers, and

placing compilation in the last step may have shortened the overall time required for the software development cycle.

Project manager and Product owner responsibilities

The Agile framework allows the product manager's function. The release requirements and backlog are both created and maintained by product manager. Involvement from the product manager, who answers questions as they come up and provides feedback throughout.

Agile places an emphasis on regular, in-person communication and test cases to foster cooperation and maintain team unity. Like the earlier approach, this one places an emphasis on observable characteristics as the key yardstick for monitoring development. Due to these reasons, Agile results in less paperwork than traditional approaches to product development.

The product owner is responsible for providing the development team with assistance by assigning priorities to the product backlog and writing user stories. They answer queries from the technical and professional developers and act as an internal marketing expert, elaborating on needs and providing clarification.

The project manager is responsible for supervising the work on the project and ensuring that all deadlines are adhered to. They oversee managing all the work that takes place across functional lines in order to provide a Complete Product Experience. This role's primary emphasis is on the organization's internal operations, including the coordination of complicated tasks across many teams and several dependents.

Network Diagram

A network diagram is a graphical depiction of a project that consists of a sequence of linked arrows and boxes to illustrate the inter-relationship amongst some of the operations that are engaged in the project. This type of diagram is also known as a flowchart. This inter-

relationship may be seen by looking at the network diagram. The term "flowchart" may also be used to refer to a network diagram. Boxes or nodes may be used to represent the activity description, and arrows can be used to show how the different activities are connected to one another.

Each action is required to have a beginning and an end, and the remaining activities may be accommodated within these boundaries. There are several techniques to designing a network diagram; however, the precedence diagramming technique (PDM) and the arrow diagramming method are the two most often utilised (ADM). In today's environment, the bulk of project managers create network diagrams utilising a technique known as precedence diagramming.

Precedence Diagram Method (PDM)

The Precedence Diagram Method, which is a more effective approach for ADMs, is now seeing widespread use in history's project management organizations. Each node, also known as a box, symbolises a separate activity, and the arrows reflect the connections that exist between the various activities. As a result, the arrows in the figure represent the following four categories of logical relationships:

Finish to Start (FS): This is the most common kind of dependence that exists between the activities. It signifies that they must wait until the action that came before it has been completed before beginning the activity that will come after it. Unless the project uses a method known as project delivery, it cannot begin the activity of succession even before the operation of the predecessor has concluded. Nevertheless, the quality will suffer if they continue in this manner. In most situations, one will not be able to go on to the following step if any of the conditions mentioned above apply.

Start to Start (SS): Dependencies are another highly significant component that should be included in network designs. The action of a predecessor may begin, and then, after a certain amount of time has passed, the activity of a successor might start without being required to wait for the activities of the predecessor to be finished. You may argue that the activities have some degree of mutual dependence on one another.

Finish to Finish (FF): First before activity of the successor may conclude, the activity of its predecessor must be completed. This kind of diagram is used in project management rather frequently these days.

Start to Finish (SF): Also utilized extremely frequently these days. As soon as the activity that comes after it is finished, the action that came before it will start.
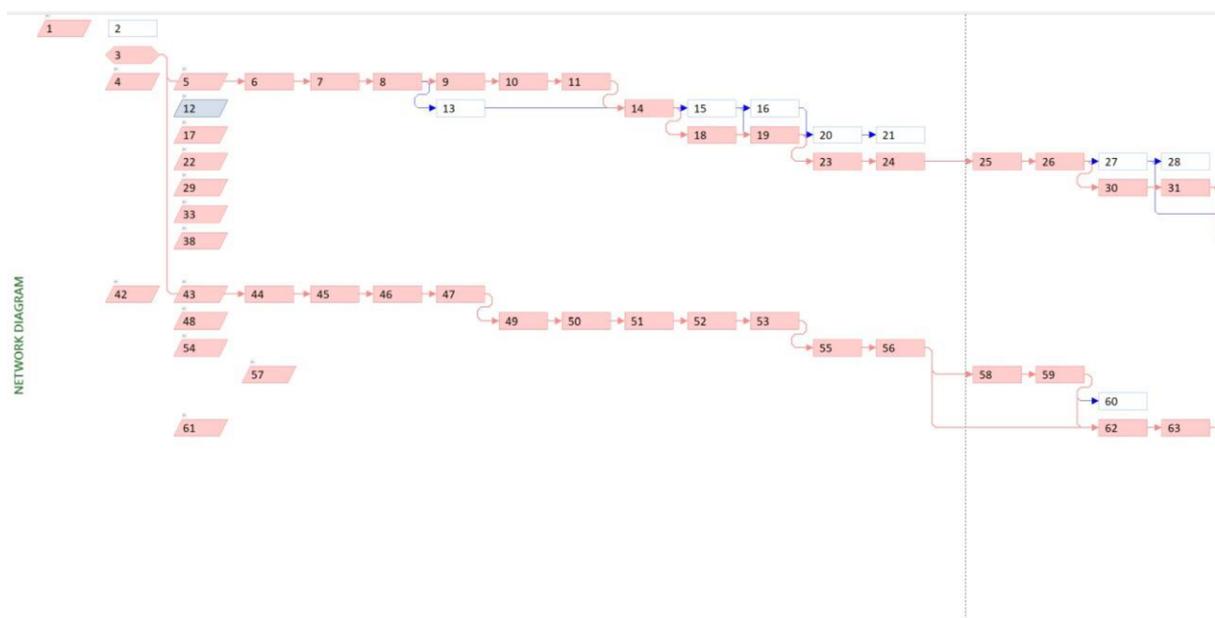
Figure 6 Network Diagram for new software launch

Data Source: Self-made
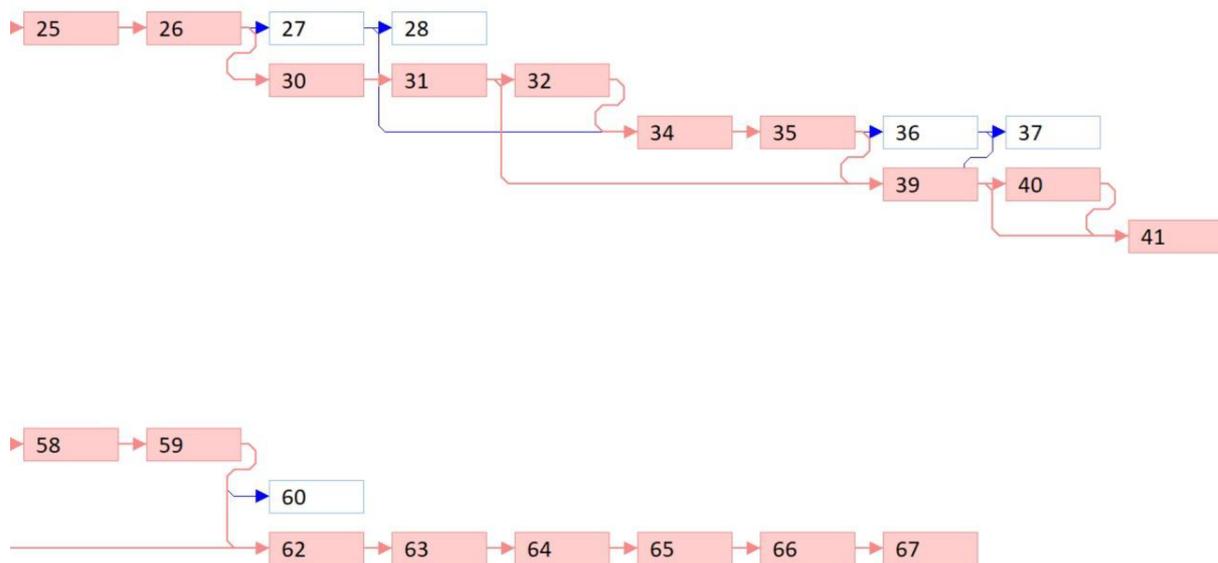
Figure 7 Network Diagram for new software launch

Data Source: Self-made

All the actions are shown in the network diagram, as can be seen above. ID assigned to the primary task as a single unit. After information has been gathered, the next step is to begin brainstorming. However, before that can happen, market requirements must be gathered, and the data that has been gathered needs to be properly evaluated and interpreted. The actions of collecting market needs and data are the responsibility of research and development engineers. The process of prototyping a programme is part of the ideation phase for developing software. While the prototype was being developed, designers and programmers continued the process of developing and creating software.

As seen in the project management I have analysed that 1st block consists of the software launching and development which includes 2nd block consisting of the Project Idea. The Research and Development Engineer includes 3rd block which consists of Project Management and 4th block includes the Brainstorming and 3rd block also includes 5th block which consists of Market Requirement and 43rd block consists of Customer Requirement Identification (CRI).

The 5th block involves the 12th block consists of Requirement Identification, 17th block consists of Conceptualizing the product, 22nd block consists of Coding Configuration, 29th block consists of Identification of issues during trial Runs, 33rd block consists of Testing of Quality Codings and 38th block consists of Testing by officials. The next block is 6th block which includes the Research and Development Engineer and in that it involves the Data Collection. The 7th block consists of Analysis of Collected Data. The 8th block consists of Analysis on wider Scale and it also includes the 13th block which consists of the Initial Prototype and it connects the 14th block which consists of Test and Feedback. The 9th block consists of the Data Interpretation. The 10th block consists of the Development of software prototype. Now, the 11th block consists of Prototyping a Software which connects with the 14th block which includes Test and Feedback and it also includes the 18th block which consists of the Development of specification. The 15th block consists of Revise and repeat and it connects the 19th block which includes Development of whole structure. The 19th block connects the 23rd block which includes Setting of coding entries. Again going to the 16th block it includes the Designing Engineer which consists of Design and it connects the 20th block which consists of Software Development. Furthermore, the 21st block consists of the Programming. Going to the 25th block it consists of the Short Trial Runs and the 26th block consists of the Correction in Coding. The 26th block includes the 30th block which consists of Manipulation in integrations. The 27th block includes Testing the Programs. Further, the 28th block consists of Integration and 31st block consists of the Automated Compilation. Now, the 42nd block shows the Individuals and Interactions. The 43rd block which is Customer Requirement identification. It includes the 48th block which consists of Document Development and the 54th block includes the Integration ideas for Developers and Business People. The 57th block consists of the Mid Day Meetings and the 61st block includes the Progress Model Mapping by Working Software via CM. The 44th block consists of the

Analysis for CRI. The 45th block consists the Encrypting CRI into Process. Going further with the 46th block which includes the Identification tools for fulfillment of CRI and the 47th block includes the Working Software. Further with the 49th block which consists of the Development of dedicated work modules. The 50th block includes the Integration data as per CRI. The 51st block includes the Changing Requirement as per CRI. The 52nd block includes the Re-Integration of Data. The 53rd block includes the Customer Collaboration and 55th block includes providing working environment. The 56th block involves the Communication Models (CM) (Face to Face Interaction) which also includes the 58th block consists of the Weekly meeting and 62nd block consists of the Launching Testing Mode Software. Further the 59th block includes the Implementation of CRI by Developers that connects both the blocks that is 60th block includes Responding Change and 62nd block includes Lauching Testing Mode Software.The 63rd block consists of the Amendment of Technical Changes.

As shown in the second image, the 25th block includes the Short Trial Runs. The 26th block consists the Correction in Coding and it also includes the 30th block which consists of the Manipulation in Integrations. The 27th block includes Testing the programs and connects with the 34th block consists of the Testing Test Cases. The 28th block consists of the Integration. Further, the 31st block includes the Automated Compilation. The 32nd block includes the Quality Assurance and it connects the 34th block which consists of the Testing Test Cases. The 35th block includes the Report the Bug Fixation and connects the 39th block which consists of the Noting the experience. It also connects the 41st block which consists of the Agile project management. The 37th block includes the Release of Software.

Furthermore,the 58th block includes the Weekly Meeting. The 59th block consists of the Implementation of CRI by Developers and it also includes the 60th block which consists the Responding Change and the 62nd block which consists the Launching testing mode software. The 63rd block consists the Amendment of technical changes and 64th block consists the

Amendment of Design Changes. Further, the 65th block includes the Relaunching software after Technical and Design and 66th block consists the Launching of software on Large Scale.

Flow diagram

```
┌──────────────────┐
│     Software     │
│ Launching And    │
│   Development    │
└──────────────────┘
         │
         ▼
┌──────────────────┐
│   Brainstorming  │
└──────────────────┘
         │
         ▼
┌──────────────────┐
│  Prototyiping a  │
│     softwarre    │
└──────────────────┘
         │
         ▼
┌──────────────────┐
│     Designing    │
└──────────────────┘
         │
         ▼
┌──────────────────┐            ┌──────────────────┐
│   Programming    │◄───────────│  Update Coding   │
└──────────────────┘            │       Fail       │
         │                      └──────────────────┘
         ▼                               ▲
┌──────────────────┐            ┌──────────────────┐
│   Integration    │───────────►│   Short trial    │
└──────────────────┘            │      runs        │
         │                      └──────────────────┘
         ▼               Pass            │
┌──────────────────┐◄───────────────────┘
│  Quality testing │
└──────────────────┘
         │
         ▼
┌──────────────────┐
│     Release      │
└──────────────────┘
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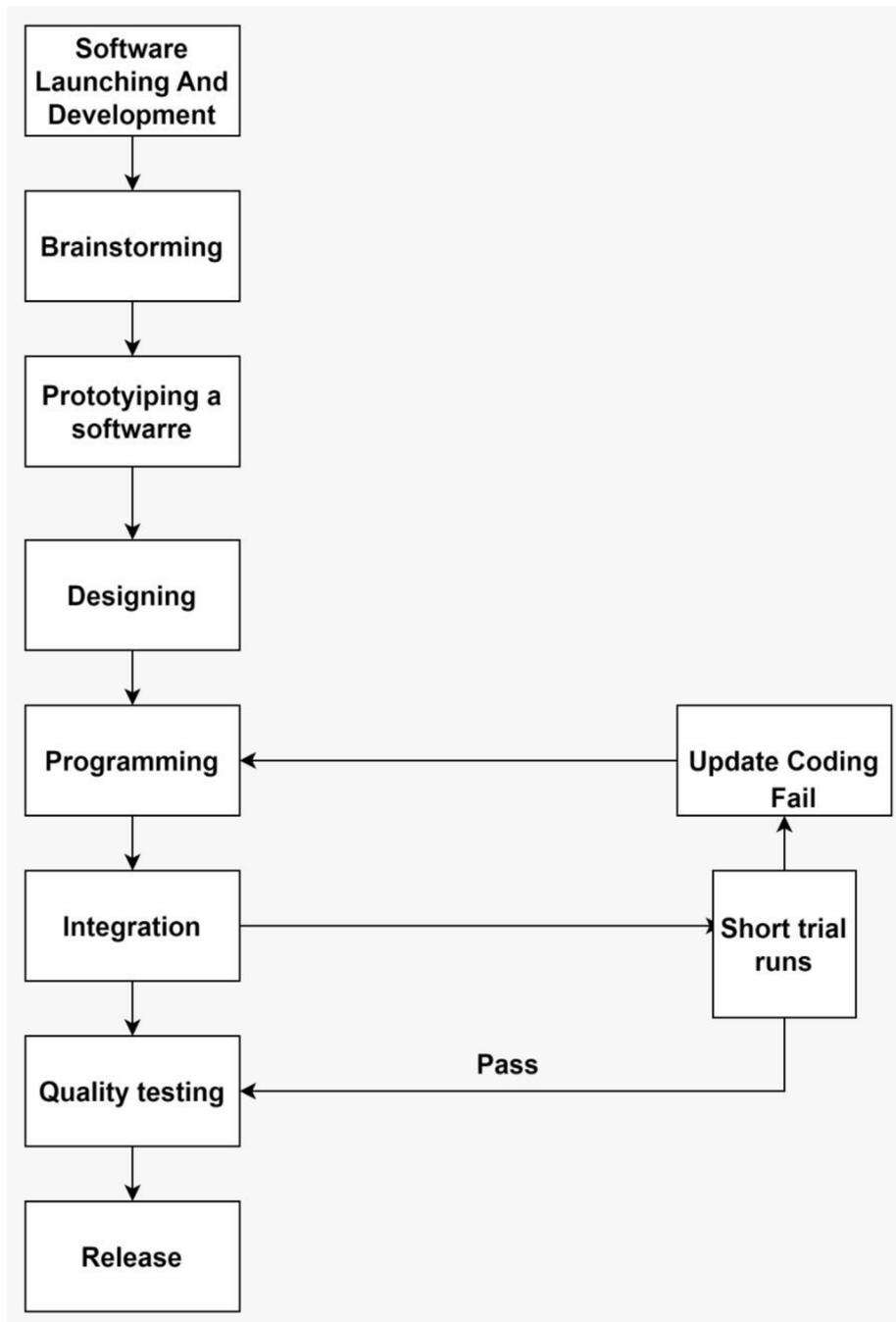
Figure 8 Flow diagram for new product launch

Image Source: Self-made

Difference between Product owner and Project manager
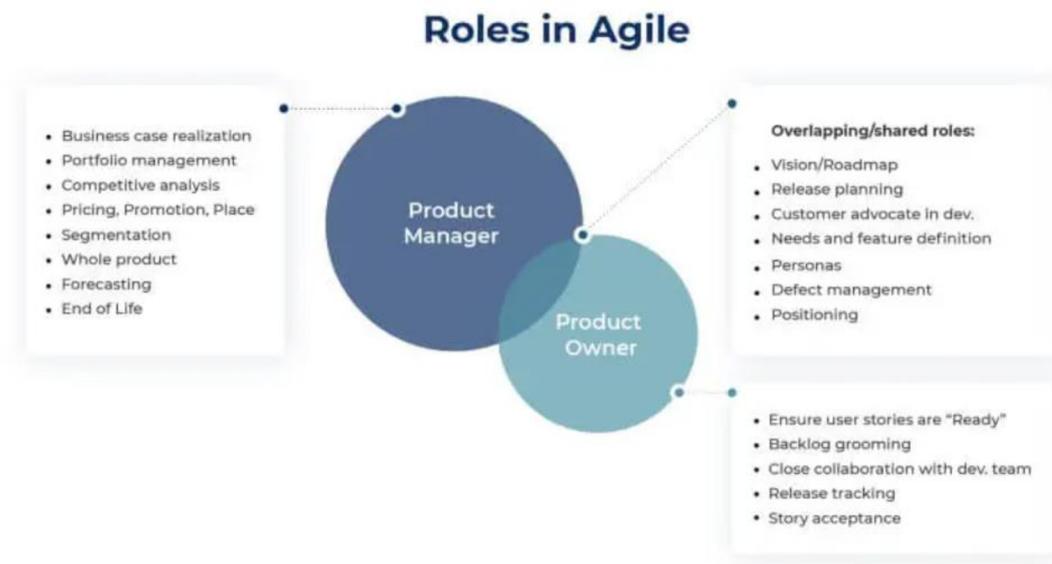
Figure 9 Difference between product owner and project manager

Image Source: "Difference between product owner and project manager." 280 group, 27 Sep. 2021, [online] 280group.com. Available at:< https://280group.com/product-management-blog/product-manager-vs-product-owner-you-asked-we-answered/>

(Snyde, 2021)[Accessed 21 Jan. 2022]

Responsibilities of Product owner
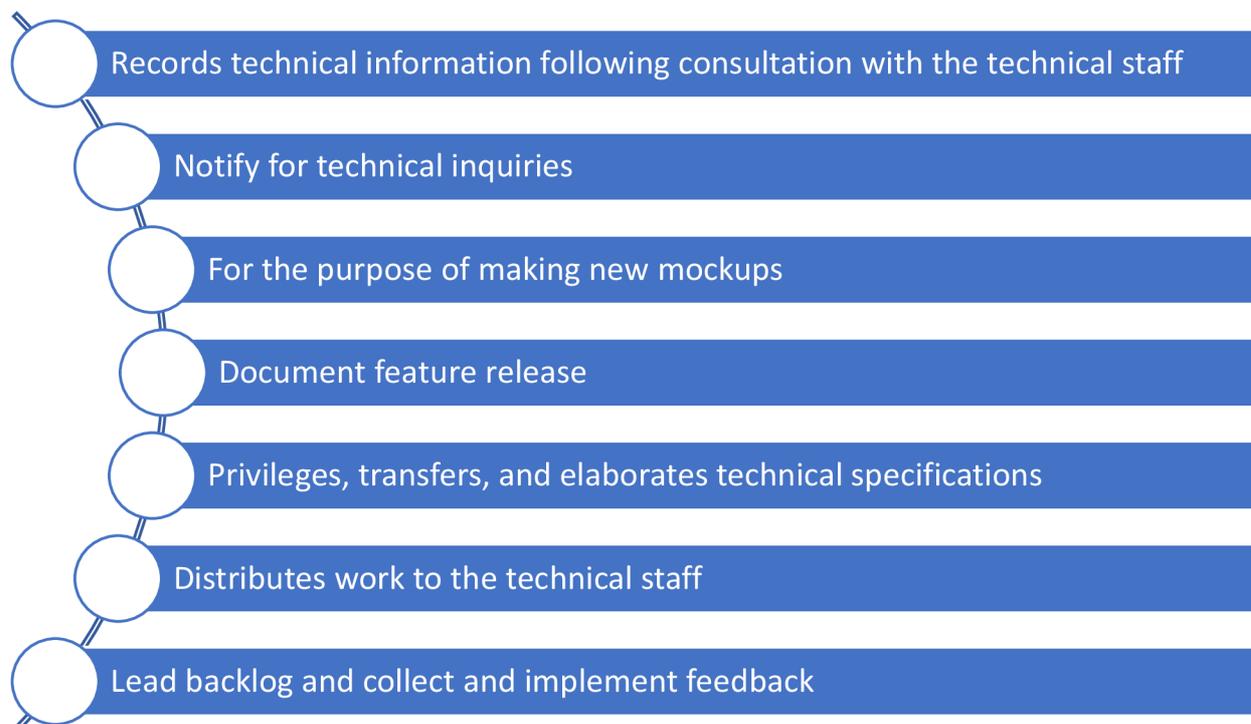
Figure 10 Responsibilities of product owner

Responsibilities of Project manager

Provides direction for the future of the product and its development.

Collects information from customers and the market, then organises and ranks the results.

Assumes the role of customer spokesman, making the case for the client's wants and requirements.

Manages technology, marketing, sales, and support to meet business goals and customer satisfaction.

Possesses expert level skills in a standard technical area or industry.

Long term project strategy

Point person for non technical team

Support engineers to build software

Track market change and competition

Demo of the software

Write test and acceptance

Figure 11 Responsibilities of Project manager

Data Source: Self-made

Agile Project Management

Product Management, a lesser-known software development discipline, makes evaluation harder. Different companies define and apply it. Despite its vagueness, several firms teach product management. Product managers love its periodic table-like corporate product management system. The architecture indicates that Product Management has numerous aspects that few PM jobs can cover.

Product management of "old-fashioned" development techniques, in which the whole product development goes through many lengthy, well-defined stages with the expectation that everything comes out properly the first time, is full of variation. This article examines how Agile and similar methods have altered Product Managers' employment without adopting a side.

The product owner

All Agile enthusiasts agree that someone must know the market, prioritise the requirements, and represent the stakeholder when they are unavailable. Someone is currently the Product Owner. This new post is not a substitute for PM since strategy choices, sales and marketing assistance, and organisation department planning and liaison are lacking.

Here, a few conventional Project Management functions are wrapped into the Product Owner, which is a component of the Product Manager's responsibilities, further confusing the two. Product Owners are often mistaken for Product Managers and Project Managers.

Project Management

The delivery of software is often included in the responsibilities of a Product Owner, as we have seen. This is significant since it implies that the need for a Project Manager, as was common in more conventional approaches of software development, is eliminated in Agile projects. A conflict of interest might arise, which poses a risk. Despite the shift in Agile development's schedule and planning approaches, there are still delivering targets, making it a push-and-pull juggle between satisfying stakeholders and meeting those targets. If a single individual is tasked with both roles, compromises may be made to ensure timely delivery, which will please the development organisation.

While including stakeholders into the development process using an Agile methodology might help reduce this danger, in the end the stakeholder is still an outsider, and the needs of the business must be prioritised. For commercial products with no specific target market, there is also no such safety mechanism. Having a Product Manager who is engaged in all aspects of product delivery as a distinct function is another option for resolving this tension.

Diversifying the roles responsible for delivery is another strategy to reduce this risk. The Scrum Master, Delivery Manager, or Development Manager all fit under this category. A Scrum Master's position is more akin to process management than project management, since the Scrum Master's main duty is to guarantee that Scrum principles are adhered to at all times. However, the job may go beyond by balancing the demands of users and developers by guaranteeing a steady and controlled supply of demands from the Product Owner. While a Project Manager's duties are more clearly defined, a Delivery Manager's are more open-ended; they may be viewed as those of a highly effective team manager or as someone with a more limited emphasis on the software delivery time.

Project manager v/s Scrum Master

The goal of project management is to direct work toward a desired output within a certain time frame and financial constraint. There is no one set way in which a project manager works across all projects. All the potential pitfalls and setbacks in a project may be mitigated with the help of well-thought-out project management approaches. Agile project management is a relatively new method for overseeing complex endeavours.

Here for this project, we are not using scrum master because as seen above for this project management we are using agile methodology and that divides expert teams into small batches and they are required to finish their task i.e. R&D team has their task such as brainstorming and testing team have their task such as accepting the change. In our project, project manager having oversees all aspects of project including outline, scope, budget and time. Project manager handles many project at once so here it is very small project so no need to use of scrum master. A project manager is responsible for streamlining procedures and delegating work to team members. In this project project manager id directly deal with teammates product owner is no taking any guidance from any one so there is no need of scrum master.

Table 3 Project manager v/s Scrum master

Project Manager	Scrum Master
A project manager ensures that the project's goals, timeline, budget, and quality are all met.	Every scrum is overseen by a scrum master responsible for ensuring the project goals are accomplished.
A single project manager may oversee many different endeavours simultaneously.	a scrum master will work with only one team at a time.
A project manager manages the risk factors and budget of a project.	A team needs a scrum master to keep them motivated and to aid in sprint planning and scrum meetings.

The job of a project manager is to establish norms and delegate responsibilities.	The project calls for it, a scrum master may foster better team dynamics and act as a servant leader.
A project manager's role is to relay information from upper management to workers on the ground.	The product owner receives guidance and direction from a scrum master.
A project manager is responsible for keeping upper management up-to-date on the project's progress and coordinating many teams' efforts.	An effective scrum master will invigorate the group and create closer relationships among its members.

Recommendation

Recommendations	Using agile methods helps customers realise value proposition continuously throughout the project's life cycle.
	Agile project teams are taught to be self-organizing, i.e., to self-allocate duties; this significantly increases individual members' sense of ownership over their work.
	The formula for success may be summed up as follows: "Ambitious employees who are creative, with outstanding interpersonal skills, and with the capacity to think broadly"
	The early identification of the quality vulnerabilities and risks of the project has been made possible by the inclusion of testing into the fundamental development cycle.
	In the agile model, it moves to "delivering working and functional product
	The responsiveness of the team to unforeseen challenges, the team's ability to adjust to the evolving requirements of the project, and the team's ability to sustain the intended pace.
	The degree of documentation and code remarks that Agile methodologies must implement should be specified.
	Agile approaches like as daily scrum, shorter versions, prioritised long delays, etc., should be supplemented with monthly reviews.
	With the scrum masters and using the tools, it becomes easier to manage the roles and responsibilities for the case of new team members.
	The scrum master helps the Product Owner to clear the roadblocks for the undertaken projects to meet the timeline.

Figure 12 Recommendations

Data Source: Self-made

Practices for developing software in an agile manner have seen significant growth in popularity over the last several years. Agile approaches are used when it is expected that the needs of the

project will change often since this enables more dynamic turnarounds. In contrast to this, the classic waterfall methodology involves projects that are well outlined, have unchanging needs, and are carried out over an extended period. When it comes to software development, using agile methods helps customers realise value proposition continuously throughout the project's life cycle.

In opposed to waterfall solutions, which place a greater emphasis on the procedures, agile initiatives place a greater emphasis on the individual contributors and team members involved in the testing cycles. Because of this, careful recruiting of employees who not only possess the appropriate expertise but also possess the appropriate mindset is required. In this phase of the software development cycle, the team is segmented according to the various skills that are required. As a result, the amount of time required for development is cut down, and fewer faults are discovered as a result of each phase having specialised team members. The formula for success may be summed up as follows: "Ambitious employees who are creative, with outstanding interpersonal skills, and with the capacity to think broadly"

The quality of the software or program being tested is the ultimate objective of any testing effort. Within an agile-based dispersed team model, the line of demarcation between the creator (the developer) and the reviewer (the tester) becomes blurrier. Testing teams significantly impact the software's overall quality due to the important function they perform. The testing process should be integrated as smoothly as possible throughout the lifetime. The early identification of the quality vulnerabilities and risks of the project has been made possible by the inclusion of testing into the fundamental development cycle.

Agile project teams are taught to be self-organizing, i.e., to self-allocate duties; this significantly increases individual members' sense of ownership over their work. This sense of

responsibility, together with the personal connections made between all teammates, is what ultimately drives quality and effectiveness throughout the project.

Under the conventional approach, a tester's success is described as "finding and resolving problems," In the agile model, it moves to "delivering working and functional product." Because of this shift in what constitutes success, the group's strategy and dynamic must be adjusted.

In order to have a successful agile and dispersed project, it is crucial that the teams involved be able to communicate and work together quickly. The effectiveness of agile projects depends on several factors, including the responsiveness of the team to unforeseen challenges, the team's ability to adjust to the evolving requirements of the project, and the team's ability to sustain the intended pace. Effective testing for agile projects relies heavily on ensuring that teams have enough time for overlap, establishing an environment conducive to productive discussion and communication, and implementing technologies to improve team interaction and collaboration.

With the rapid speed of testing in an agile setting, it is essential to have robust communication systems at all levels. However, if proper documentation is prioritized, testing can be sped up, quality concerns can be better managed through planned change, resource onboarding can be simplified, and the whole project lifecycle can be analysed with greater ease. Several people work together to meet documentation needs, including highly specialized writers, functional specialists from testing teams, program managers, and analytics. The degree of documentation and code remarks that Agile methodologies must implement should be specified.

Once effective knowledge exchange workshops and retrospect discussions are created, testing teams see a significant improvement in their abilities and output. If you want to help your dispersed teams better, it's crucial that you provide them with a bird's-eye view of the situation. Agile approaches like as daily scrum, shorter versions, prioritised long delays, etc., should be

supplemented with monthly reviews. The overall course of the project, the experiences acquired during the many cycles, the status of the integrity of the deliveries, and the development of preventative measures should all be discussed at each monthly review. It's reminiscent of the "scrum of scrums" idea. In agile initiatives, quality assurance and testing play a bigger role. When the goal is to have smoothly running software, it requires a shift in perspective that leads to improved productivity.

The most important part of a project management case is to involve the stakeholders as well as the team members. Understanding the other responses from the project manager, it can be said that the project managers are responsible for checking the product quality before the product-related data. And then, the project managers test the product and then allow the release. The PjM of this company involves their stakeholders to ensure the project deliverables in time and ensure higher product quality. But it also has been said that at the time of product release, the project manager must face challenges to meet the client's expectations at that time; other different project releases also need to be managed. But in the case of adopting an agile methodology for managing the project, the challenges can be overcome easily as it can help the project managers to prioritize the work way making a checklist. Managing the new team members sometimes can be a little bit stressful and challenging, but with the scrum masters and using the tools, it becomes easier to manage the roles and responsibilities for the case of new team members.

On the other hand, the responsibilities of the product owner are to manage the team members while working on the project and to ensure the project deliverables are within the due timeline. In this case, the product owner maintains daily face to face conversation so that they can understand the team members' issues and challenges, and by taking appropriate steps, they can mitigate the challenges. If the Product Owner may face any challenges when adopting the agile method, then they can get an advantage with the presence of the scrum masters and the agile

tools as the agile principles also give them benefits. The Product Owner of the project manager should always be adaptive and responsive to manage different types of team members and projects that can be simple or complex or any other types of project. If the Product Owner is not adaptive, then managing the projects can be difficult as well as managing the different team members can also be a difficult task. if the product owner gets some unexpected project work between the scheduling, then it splits among the team and with prioritizing the works it becomes also managed the scrum master can help to provide training to the team movers to become an effective software project management by practices to increase more producibility.

5. Discussion

In this overall research thesis, which is focused on the analysis of the value addition of agile methodology in project management, the importance of the agile methodology has been discussed thoroughly in this paper. To understand the overall software project management and the role of the agile project methodology in the case of adding value to the software project management, a case study of the RedHat company has been discussed here. In this thesis paper, secondary type of data have been collected together with relevant data within the research area. Collected data were beneficial for understanding this selected topic and the challenges that the software project manager faced. The roles and responsibilities should be clearly understood. To ensure this successful competition in project management, it becomes necessary to maintain the mutual interaction between the Product Owner and PjM by avoiding overlapping roles and responsibilities. Also, in this case, the Product Owner has to manage the working procedure of the undertaken project and manage the team member by taking responsibility for the completion of the work, whereas the project manager is responsible for checking the quality of the undertaking project work. If any changes are required, then it needs to be done under the supervision of the product owner (Paton & Andrew, 2019). The product owner concedes their

timelines, prioritizes the work, and conducts the work by involving all team members. The Product Owner of the company should be adaptive and flexible; thus, they can take any risks and can coordinate with any team members and any type of project. In this case, the project manager must coordinate with the team members as well as the product owner to chain the quality of the product. But for the project manager, it becomes complicated with various types of product releases. Working with a new team also can sometimes be challenging for the project manager, which can create issues in project management. Here the role of the scrum master and the agile methodology tool is effective to improve the project management, as the main role of the scrum master is to help the product owner in identifying the barriers of the project management. The adopted agile methodology can provide guidance to the project management of the software company to divide the larger project and helps to prioritize the works according to the due timelines of the undertaken projects. In this way, the Product Owner and PjM can manage their work.

The agile methodology also shows the guidance of the Project Manager of the company to engage the stakeholders and the project team members fully with their work. Accordingly, the Project Manager of RedHat company can understand the importance of the engagement of the team members and the stakeholders, and by following the guidelines and the principles of the agile methodology, the product owner meets with the team members on a regular basis, which help her, to understand their working conditions and problems or issues. On the other hand, the project manager of the RedHat organizes weekly or monthly meetings to review the project process and check the product quality, which helps him get an overview of the status of the undertaken project work and accordingly, he can make decisions. Also, the PjM of RedHat organizes meetings with the stakeholders to make decisions by involving the team members and the stakeholders, which can add value to the stakeholders, and as a result, they can get better productivity with effective teamwork. Through maintaining better relations and applying

the agile method, the Project Manager and Product Owner become able to measure the team members' performance, through which they can make better business decisions with the involvement of the stakeholders.

This paper is conducted to find an effective solution to successfully manage the software project. After analysis of the gathered secondary data, it has been understood that adopting the agile methodology in software project management can ensure quality deliverables to the customer. In this way, the software company can satisfy their customers (Paton & Andrew, 2019). In the case of the agile methodology application, the project plan can be changed anytime as this project methodology can offer flexibility to manage the project, and the changes can be included at any time. But here, in this case, it becomes necessary that during the overall project management lifecycle phase, the mutual understanding between the product management and project management should be efficient as that can improve the software development process in the company. Product management (PM) is all about defining and controlling the products' quality and understanding the market demands, whereas project management (PJM) has no control over the strategies and tactics. Also, it can help the company to provide quality products by managing the project portfolio and monitoring and controlling the overall performance (Paton & Andrew, 2019).

The problem between product management and project management can be increased in the case of a software company, and thus the RedHat company needed a solution that could manage their larger software project by managing the overall product lifecycle. And the success of the software project cannot be ensured if the mutual interaction between the product management and the project management will not be clarified. Thus, In this paper, the role of the product owner and the project manager has been discussed, along with various agile-based approaches that can add value to the completion of the project and can provide quality deliverables. After Analyzing the collected data, it has been understood that with the *Agile Manifesto*, this project

management methodological approach will effectively manage the software products and projects and shorten the timeline, maximize productivity, and make better decisions for the company (Koi-Akrof, 2019). The primary difference between the traditional waterfall methodology and the agile methodology is the iterative nature of the agile approach and theories approaches such as Scrum and Kanban, which can break the whole larger project work into a small division named sprints, and in this way, they can help to the reject management to understand the prophet activities clearly (Alqudah & Razali, 2018). Making sprints can minimize the required time, and the shortened loops of work help add value to the project work as the project team can improve their work activities and improve the quality of the work from the very initial stage to the completion.

After analyzing the overall thesis objective, it is understood that software development is a cooperative work distributed over different categories; the management task must be handled based on some criteria. Based on the researchers, the task must be done in parallel; one task can be started after the end of the previous task. For this reason, the developers need coordination whenever developing the task. Managing the complex situation is the major objective to develop the satisfaction of the customers. For this reason, in the literature review section, it is mentioned that agile software development provides a coordination approach that explains how the team members fit together and discusses the strategy. Also, in the above section, the researchers focus on the agile development process, which is an important part of this thesis paper (Dudhat & Abbasi, 2021). Therefore, to select the best agile methodology useful for the project development process, the author must be careful to choose an effective methodology. There are also 12 different types of principles, and each principle plays a separate role in software development. An organization with a huge number of teams as well as employees mitigate the criticality of software development. As per the analysis of the literature review section, it is understood that agile methodologies can be used on a small budget along

with a small number of employees (Dudhat & Abbasi, 2021). Whenever discussing agile development and traditional trends, it is understood that agile methodologies are more effective than traditional trends. In the research paper, it is mentioned that the managers of the project are in a complex situation in the competitive markets to deliver a successful project. In this situation, the project manager plays an important role to organize the overall project to ensure success. It is the responsibility of the project team to include the agile methodology to mitigate the complexity of the project (Essebaa & Chantit, 2018).

From analyzing the collected existing research paper, it can be said that the roles and responsibilities of the project manager are not independent as in the traditional project management case. From the analysis of the previous researcher, it also has been understood that the structure of the agile project is different from the traditional project management, and thus here, the project manager has lower responsibilities (Gandomani et al., 2019). The age project management can be done by adapting the agile methodologies to setting the goals for the project. This can promote teamwork along with effective communication channels and can maintain team sustainability, as adapting the agile, it can create a dynamic learning environment in the organization. And by engaging the stakeholders, the PM of the company can receive important feedback through which they can solve the problems of their team members.

6. Conclusion

From the overall discussion on the chosen topic that is value adding by the agile methodology in the project management, this entire case has been discussed depending on the ownership and the project management areas of Red Hat Company in this paper. To understand and apply the agile project management methodology into IT and software-related project management, the project managers must be familiar with the values of the agile approach. Along with this, this

company must be aware and understand the importance of the project management lifecycle in their organization as they can manage the larger software projects by adapting the agile methodology. The project management of this software company should be able to control their project by making proper strategy and tactics as they can manage the project phases properly and can achieve the project goals. Here the role of the product owner and the project manager should understand their responsibilities in the project management areas; that is, product owners of the company must support the project activities by developing an effective team and prioritizing the requirements of the product.

In contrast, the project manager must be responsible for ensuring to meet project deliverables with the deadlines. In this case, to manage the modern project activities in this software project management, the project management should map the activities across the whole project management lifecycle. This study has executed a mixed type of methodological approach to get real-time and in-depth data regarding the research topic to make a directive of understanding for the agile methodology and its valuation in software project management.

In software companies, there are a lot of complexities to manage the product, such as confusion within the company, complexity with the diction rules and policies, accountancy of the product director and so on. Though it may become a challenge for the project team member, after applying the agile approach, the team member can be more engaged by understanding the roles and responsibilities and can minimize the risk factors of the risks and can ensure project access.

In this overall thesis, the main objective is to understand the value of agile methodology. The agile team is not only necessary for developing the project management concept, but also this technique helps the project to provide an effective value to the project. Through the agile approach, it is easy to provide a good engagement with the team members. On the other hand, it is said that project managers are responsible for understanding the role of the stakeholders

on a weekly basis for a better working environment. Also, the project manager is responsible for understanding the value of the agile methodology during the project. As per the analysis of the business system analyst, it is understood that the responsibilities of the product owner are to understand and take responsibility for ensuring success and also coordinate with the stakeholders. In the above result section, it is already mentioned that the working procedure of the product owner to focus on the customer's satisfaction. Through this procedure, they can easily develop the attraction of customers for better progress. The result section of this thesis shows summarizes the major agenda of the value of agile methodology. It is true that without an agile methodology approach, it is shown in analysis that it takes more time.

Project management in agile changes incurred several changes because of its commitment to the governing values and handling complications along with uncertainties and lack of clarity. Therefore, a self-managed and self-organized team is required in the agile project manager to simultaneously govern the changes. Besides, a need for a project manager is introduced who is solely responsible for monitoring and assigning everyone the responsibility to achieve success in agile project management. In this cognitive study, the SLR method has been represented to investigate and evaluate the importance of an effective project manager. After reviewing this supplement, it can be concluded that there is a superficial notion of the project manager in the agile methodologies; still, there is a need for a manager to be represented. The study represents that this vague notion of the project manager in the agile project manager assumes the roles and responsibilities of a project manager of an agile method is structurally different from the traditional project manager. It is observed that differences are mainly related to agile approaches and assigning duties based on the agile roles of the team members. The study also illuminated that understanding responsibilities help in achieving self-governing abilities in agile project management the team member in the absence of a project manager. A project manager who is responsible for looking after each activity and a product owner who works

directly with the project manager and clients are called project managers and product owners, respectively. The product owner is not charged with communicating with each department; instead, they should coordinate their efforts with the project manager to get additional information.

The company, Redhat, has a tailoring agile software development process for their project. It can be applied to all types of projects indeed. This method can be applied to perform tasks repeatedly to achieve a success rate. It has been suggested to emphasize the agile principles rather than the agile methods. In the process, it has been seen that engagement of agile teams is a key success factor for agile implementation. Higher levels of team collaboration sustain trust among the team members. The study chose a relatively chosen small sample size to produce highly effective results. Empirical evidence in the study reveals that project management success is likely to be associated with the team's degree of cooperation and collaboration. It can be concluded that project managers' success is one of the organization's strengths to become successful and gain practical insights.

Software Engineering Management optimization has been one of the essential concerns for organizations in the Software Development Industry. They have been looking for innovative ways to use the Agile Business Process Reengineering (ABPR). Several software projects fail due to poor project management, even though every project has the potential to be a great success.. The research aims to discuss the implementation of the Agile methodology in adding value to project management in software development. The research has discussed both the methodologies in-depth and thoroughly described what they are and what can be acquired by them. The research has also discussed the two methods' differences and has provided a comparative discussion on their distinct nature. From the findings of the current research, it can be considered that there is not a single Agile methodology that can be used for all kinds of projects. The complexity of the different project types makes it difficult for a single

methodology or approach to be implemented effectively. Some methods may serve a specific project effectively while others cannot. Thus, each has its traits and must be used based on the unique requirements of the different projects. The research has also found that combining the different methods can be most effective as no particular Agile method can fulfil all the requirements of current projects. The research has provided a comprehensive study of the effectiveness of Agile methodologies in project management. The research conducted a mixed-method including the secondary data has provided the findings in a manner that can be useful for other scholars to use the literature as a reference for future research on the subject matter.

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