



Comparative analysis between the implementation of agile project management and critical chain project management in the cyber security sector of the IT industry.

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DECLARATION

I, Madhusmita Bora, declare that the dissertation that I have submitted to Dublin Business School for the award of MBA in Project Management is the result of my own investigations, except where otherwise stated, where it is clearly acknowledged by references. Furthermore, this work has not been submitted in whole or in part for any other degree or qualification.

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Abstract

This study focuses on assessing and comparing agile project management and critical chain project management contributions within the cybersecurity sector in the IT industry. To gather a valuable and deeper understanding of this topic, its research aims, objectives and research questions are selected that help in providing a clear path for the investigation. The significance of the research is not just related to obtaining the impacts of both of the approaches but also associated with the contribution to the implementation in the industry by the organisation.

The incorporation of relevant literature on the effectiveness, benefits and implementation challenges of agile and critical chain project management have been broadly evaluated within the empirical findings. To gather in-depth information related to the implementation of both approaches in the cybersecurity sector in the IT industry, some relevant literature sources are analysed. After analysing literature sources, few best practices, success factors and crucial considerations within the implementation of both approaches were highlighted.

The primary research is the methodology used for completing this study and obtaining valuable information. The positivist research philosophy, descriptive research method, inductive research design, interview, and thematic analysis are the processes that follows to collect the relevant data related to the research topic and analysis of collected data for discussion. Following this method helps in gathering real-world data from the industry's professionals and makes the work more reliable and appropriate.

The chapters focus on providing relevant information taken from the transcript of the interview session conducted to understand more about the research topic, bringing about relevant information directly connected to agile project management and critical chain project management. The generation of various themes is done with the help of the thematic analysis

technique, which further provides significant information, ideas and patterns associated with the data collected providing relevant information about the entire research topic.

The discussion part of the assignment provides deeper knowledge related to the findings obtained from the primary research. After analysing the findings, it is noticed that agile project management and critical chain project management are the two popular approaches that are used in the IT industry including the cybersecurity industry. Investigating the capability of the approaches and usage process in projects, it is noticed that several strengths, limitations and best practices are related to mitigating the challenges faced while implementing these practices in the organisations. The discussion part also helps in identifying the strength of the study and the limitations that reflect the potentiality of the research in this domain.

After analysing the overall discussion, within the conclusion part, it is summarised that both of the approaches are useful in the context of the cybersecurity sector in the IT industry. Some recommendations are suggested for the study that has the capability to improve the effectiveness of the study.

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Chapter 1: Introduction

1.1 Background

In the evolving landscape of information technology industry where constant innovation and rapid technology advancement are the normalisation, the significance of cyber security has increased to unprecedented level. Both large- and small-scale organisations are struggling with the increasing threats to the integrity besides confidentiality and availability of their digital assets (Shaukat et al. 2020). As a result, the field of project management within the industry has undergone a transformative shift for effectively addressing the unique challenges posed by cyber security initiatives. The ubiquity of digital technologies and the interconnectivity of global networks have triggered the increase to an alarming surge in cyber threats. The range of these threats is wide that ranges from sophisticated malware and ransomware attacks to state sponsor Cyber Espionage (Pan and Zhang 2021). The cyber security landscape is dynamic which necessitates constant vigilance besides adaptation and a proactive approach to stay one step ahead of the adversaries. Organisations operating in the IT sector find themselves facing the formidable task of fortifying their defences along with responding swiftly to emerging threats and maintaining the resilience of their digital infrastructure.

Traditional project management methodologies like waterfall model have played a foundation role in guiding IT projects through distinct phases of planning followed by execution and delivery (Derirkan et al. 2020). However, the conventional approach that is characterised by its sequential and linear structure might prove inadequate when applied to the rapidly changing and inherently unpredictable nature of cyber security projects (Popkova and Gulzat 2020). The recruitment for adaptive and interactive project management approach has been observed to be evident since the organisations face challenge to deliver cyber security solutions while

maintaining efficiency within their work while experiencing evolving threats during their project execution.

Within the agile methodology framework, projects are divided into Binary and manageable phases that are also termed as sprints. This approach of working elevates cybersecurity teams to focus on minor specific aspects within the project to respond towards the emerging threats within real time and make necessary adjustment as required to overcome those threats (Lallie et al. 2021). Frequent observations and retrospective monitoring ensure that projects are in line with the organisational goal and are able to adapt the dynamic changes in the threatening environment. The agile methodology helps to promote a collaborative culture in which communication and transparency plays a vital role that helps in creating more effective response towards the challenge faced due to cyber security (Lock 2020). DevOps is another shift within the project management which has emerged in the cyber security landscape which emphasises on the integration and collaboration between the development and operational teams which results in more reliable and faster development life cycles.

In the context of cyber security, it means that security considerations are created into the development process from the outset (Tawalbeh et al. 2020). This proactive integration of security within the development lifecycle helps in creating more robust and resilient systems. In addition to this the adoption of risk management framework that includes NIST cyber security framework has become an integral part to effective cyber security project management (Al-Sagga et al. 2020). These frameworks provide a structured approach for identifying, protecting, responding to and recovering from cyber security incidents by aligning project management practises with established frameworks, organisations will be able to enhance their liability to manage risks and respond effectively to cyber threats.

1.2 Research Rationale

Traditional project management methodologies although has been proved to be effective in several contexts however it encounters challenges when applied to the dynamic and unpredictable nature of cyber security projects. The need for addressing evolving threats and the critical requirements for shift and efficient cyber security measures necessitates a more adaptive approach (Landoll 2021). Agile project management and critical chain project management have immersed as a contemporary methodology with widespread success in diverse industries. However, their specific application and efficiency within the area of cyber security projects have not been explored extensively. Therefore, with this research the objective is to bridge the gap by conducting a comprehensive comparative analysis of agile project management and critical chain project management in the context of cyber security (Humayun et al. 2020). Investigating their strengths besides weakness and applicability, the study aims to provide valuable insight for cyber security professionals along with project managers and organisations navigating the complex landscape of securing digital assets (Awan et al. 2021). By understanding these methodologies and aligning with the unique challenges of cyber security projects with informed strategy and decision making, one can enhance the project outcomes and contribute to the ongoing optimisation of project management practises while facing the evolving cyber threats.

1.3 Research aim

1. To investigate the advantages and disadvantages of both the methodologies by using characteristic factors such as project speed, flexibility, resource utilization, adaptability to change, customer satisfaction, and overall project success (Primary factors) in the cybersecurity sector in the IT industry context.

2. To examine challenges and implementation considerations: Identify the challenges, barriers, and critical factors by investigating factors such as organizational culture, team dynamics, stakeholder engagement, and leadership support (Secondary factors), which may impact and affect the successful implementation of Agile and CCPM in the IT industry.
3. Compare suitability for different project types: Analyse the suitability of Agile and CCPM methodologies for various IT projects, such as software development, infrastructure implementation, system integration, and data management.

1.4 Research objectives

1. Assess and compare the effectiveness of Agile Project Management and Critical Chain Project Management in the cybersecurity sector in the IT industry.
2. Explore and compare the specific benefits and limitations associated with Agile Project Management and Critical Chain Project Management in the cybersecurity sector in the IT industry.
3. Identify and examine the challenges and barriers that organizations may face when implementing Agile Project Management and Critical Chain Project Management in the cybersecurity sector in the IT industry.
4. Identify and analyse the best practices, success factors, and critical considerations associated with the implementation of Agile Project Management and Critical Chain Project Management in the cybersecurity sector in the IT industry.

1.5 Research questions

1. What is the comparative effectiveness, challenges, and suitability of Agile Project Management and Critical Chain Project Management in the IT industry, and how do these methodologies address the specific requirements of different types of IT projects?

2. Which out of the 2 Project management methodology is better suited for implementation in the IT industry when compared in terms of primary and secondary characteristics or factors?

1.6 Research significance

This dissertation has substantial significance among multiple stakeholders within the information technology industry which addresses the crucial intersection of cyber security along with project management and organisational leadership. The competitive analysis of agile and critical chain methodology seen in the cyber security context is required to deliver invaluable insights which can significantly affect decision making process related to the project management methodology section (Prinsloo et al. 2019). Cyber security professionals can have benefits that are directly derived from the findings of this research. The dynamic and integrate nature of cybersecurity projects requires project management methodologies which can adapt to evolving threats and ensure swift effective response. By comprehensively assessing the applicability, along with strengths and limitations of both agile and critical chain methodology, cybersecurity professionals will be able to make informed decisions about the most suitable approach for their specific projects (Ferragret al. 2020). This knowledge empowers them to streamline processes enhancing collaboration and proactively addressing the ever-changing threat landscape.

Project managers who are responsible for successfully execution of cybersecurity initiatives will find actionable insights about their approach from this dissertation (Chong et al. 2019). The study aims to equip project managers with a valuable understanding of how agile and critical change mythologies align with the unique challenges of cyber security projects as this knowledge would allow them to investigate their approaches optimising research allocation and creating a project environment which is agile as well as responsive and resilient. The cyber

security projects often require a rapid and adaptive response. The ability to choose and implement the most effective project management mythology is important to maintain strategic advantage for the project managers within a project (Peng et al. 2019).

1.7 Dissertation structure

Chapter one of this dissertation was based on the background study followed by rationale of the research and significance of conducting this research work. This Chapter also discusses about the aims of the research followed by the objectives and the research questions that would help to conduct this research work efficiently. Chapter two discusses about the previous literatures that exist which are related to the topic of this research work including concept of agile project management critical chain project management and distinct challenges inherent in cyber security projects. Chapter three discusses about the methodology that has been employed to conduct this research work followed by the findings of this research that will be discussed in chapter four. Chapter five discusses about the research findings and synthesis their implication aligning with the initially identified research objectives. Chapter six discusses the conclusion of the dissertation followed by the recommendation and future implication of this research work to conduct a more comprehensive research by analysing the gap and limitations of this research study.

Chapter 2: Literature Review

2.1 Introduction

In this chapter of the study, a broader dimension of aspects and facts will be explained through the short accounts of various literature. Several objectives have been determined in the first chapter of the study which will be used in this chapter as well for generating relevant themes that could satisfy the aim of the study. The literature review chapter is a valuable section within a research study where the author could show personal acknowledgement of the scholarly

contexts and the topic of the study. The opportunity of developing a clear and concise theoretical framework could also be achieved in this chapter. The essence of literature review also extends to the realisation that one can create a link between personal understanding of the work with the proven studies and findings of scholars. It is the section of the study which holds voluminous thoughts, ideas, questions, and findings of past scholars and recognises conflicts among those findings. In a desire to present all these features of a literature review in this section of the study, the chapter has been divided into several subsections. After a brief introduction to the chapter, the core findings of previous literature will be presented concerning the scholars. For the present study, six different but subject-relevant themes have been developed and will be evaluated. After the empirical findings, a theoretical framework will be attached to bring a practical understanding of the subject. To prevent any relevant gaps or lack of data while collecting information from previous literature, a brief account will be mentioned in the literature gap. Finally, an overview of the chapter will be presented in the chapter summary.

2.2 Empirical Findings

2.2.1 Assess and compare the effectiveness of Agile Project Management and Critical Chain Project Management in the IT industry context.

In a recent study conducted by Asprionet *al* (2023) agile project management has been focused in terms of cybersecurity evaluation. Application of traditional project management methodologies in the cybersecurity sector could bring delays in management activities and it has generally been found to be cumbersome. The findings of Asprionet *al* (2023) have promptly suggested that the effectiveness of agile project management is quite significant for projects where tasks, duration, scope, and resources are not defined. Additionally, cybersecurity management teams are also facilitated through agile project management in mitigating various

challenges. According to the findings of Ju *et al* (2020), agile project management has become quite an essential aspect in various small and medium-scale organisations which are characterised by high-tech activities. The level of innovation capability in companies is highly dependent on technological advancements undertaken by a company, further affecting the firm's performance. Ju *et al* (2020) selected two SMEs and following the technique of comparative analysis, agile project management theories and innovation capabilities were assessed. The result of the study was quite dynamic as it incorporated six hypotheses and found some diverse results on innovation. However, a clear indication of a positive impact on firm performance due to agile project management was offered in the study. Ciric Lalic *et al* (2022), on the other hand, have conducted a study on the entire project management aspect and its impact on the success of a project. The study did not concentrate distinctly on agile project management like Ju *et al* (2020). However, among the three types of project management processes assessed by Ciric Lalic *et al* (2022) such as agile, traditional and hybrid, the result was similar to the study of Ju *et al* (2020). Agile project management has been stated proactive in bringing success to an organisation by offering efficacy in projects. In yet another study by Ciric *et al* (2019), agile project management was compared with traditional techniques of project management. In this study, Ciric *et al* (2019), mentioned some essential facts about agile project management. Agile project management focuses on the acceptability of change, flexibility, and strong interaction along with continuous advancement. The study mentioned some arguments about traditional and agile project management, but the thorough analysis established that though agile project management has been introduced in the software development area, it could be applied to all kinds of projects to bring efficiency and overall success. In a comprehensive study conducted by Araszkievicz (2017), critical chain project management has been analysed focusing on its effectiveness in construction projects. The findings of the study are quite concerning as some barriers were found while assessing the

effectiveness of critical chain project management in construction projects. Araszkievicz (2017) mentioned that the need for fast decision-making in construction projects is quite essential which has been observed to be impacted by the application of critical chain project management. Management of construction project portfolios has been found to pose a threat to the industry that has been mentioned as a barrier by Araszkievicz (2017) in construction practices. As the research focused on a case study, the results being practical and authentic has contributed to building an understanding that the though critical chain project management is effective in various types of projects, but in construction projects, while managing multiple projects at once, further analysis should be done to find a better way of doing so. The findings of Ju *et al* (2020), Ciric Lalic *et al* (2022) and Ciric *et al* (2019) have been found to present a contrasting aspect with the research findings of Araszkievicz (2017) on Critical Chain Project Management. The effectiveness of agile project management has been established by more than one researcher but there is a lack of research on critical chain project management and among the existing studies, less priority has been given to critical chain project management than agile project management.

2.2.2 Explore and compare the specific benefits and limitations associated with Agile Project Management and Critical Chain Project Management in the IT industry.

Though agile project management and critical chain project management are quite effective in improving the project management aspects in tech companies and IT sectors, there are also some limitations associated with these. Santos and de Carvalho (2022) have explored the benefits and challenges of scaling agile project management in large-scale projects. The researcher stated that modern companies are majorly focused on applying agile project management but even at the age of fast-paced technology, organisations are facing several challenges while scaling agile project management to large projects. The number of barriers found in the study was quite high. Thus, 53 barriers which were identified while scaling up

agile project management were categorised into six main categories. The categories developed in the study were managerial issues, organisational issues, process/product issues, barriers specific to the agile method, team issues and customer issues. Santos and de Carvalho (2022) have also established some benefits which were less than the barriers and yet categorised into three sections such as project, business, and teams. This specific research should be stated as one of the valuable assets in terms of information regarding agile project management and its scale-up process. A key element was identified and mentioned in the study which impacts the connection between the barriers and benefits of agile project management such as requirement management. Stadnyk and Palamar (2022) have presented significant benefits of agile and integrated project management in the realm of cybersecurity but this can only be achieved with a proper exploration of the implementation process, resources, and capabilities of an organisation. The study of Kaim *et al* (2019) has focused on the effects of transaction costs on agile project management and the benefits enterprises achieve through the same. The study was conducted in several steps where theoretical fundamentals were worked out on complexity, agility, and transaction costs. The next section was for the examination of the effects of SCRUM on the costs of transactions. Kaim *et al* (2019) showed that because of acceptance problems, a considerable amount of transaction costs could rise along with the implementation of SCRUM. If the environment becomes quite complex, which is a contribution of frequent and rapid changes, a reduction of transaction costs could be found when utilising SCRUM. As extensive results, the use of SCRUM could also increase the speed of reaction, enhance teamwork, and improve the foundation of trust. The application of SCRUM in an IT company is thus quite important for it operates in one of the most complex environments. The study of Kaim *et al* (2019) also focused on enterprises that face little complex environments while running their activity where more transaction costs have been stated to be observed due to the use of SCRUM. Instead, traditional project management often costs less for less complex

environments. Thus, it can be stated that the findings of Kaim *et al* (2019) in terms of the cost benefits of agile project management are quite controversial according to the findings of Santos and de Carvalho (2022), where SCRUM-related cost barriers have not been mentioned among 53 limitations of agile project management. According to the study of Han *et al* (2021), critical chain project management has been stated to be one of the valuable additions to project management that takes in the aspects of resources while utilised. The benefits of this project management is that it effectively helps construction projects manage project duration and resource availability. But at the same time, Han *et al* (2021) have mentioned a chain of factors that affect critical chain project management. Moreover, one significant limitation of critical chain project management is that it cannot direct a project emphasising its randomness. So, it can be stated that though agile project management has limitations in terms of scalability, the randomness of critical chain management is quite less beneficial and presents more limitations for organisations.



Figure 1: Agile Project Management

(Source: Nathan Sebastian, 2023)

2.2.3 Identify and examine the challenges and barriers that organizations may face when implementing Agile Project Management in the IT industry context.

Modranskyet al (2020) conducted a study on the implementation process of agile and lean project management in some small and medium-scale organisations in the Czech Republic. The researcher has concentrated mostly on the challenges that the SMEs face while implementing agile project management. Mostly the introduction of agile project management was focused

on the industry of software development, but it has widened its stem into multiple sectors since then. Cyber security is one of the aspects where agile project management is serving significantly (Tashtoushet *al.* 2021). The results of the study proposed by Modranskyet *al.* (2020) reflected positive results with the statement that manufacturing SMEs could get benefits with carefully applied SCRUM in its practices. However, the scope of challenges in this respect is quite wide and suggests that organisations requiring a more detailed analysis of SCRUM. Additionally, without some urgent adaptations, SCRUM could not be applied to SMEs while avoiding barriers. The study of Tashtoushet *al.* (2021) has focused on agile approaches in cybersecurity measures, intelligent transportation and IoT at once. The author has explained that the challenges in cybersecurity have been increasing due to the changing dynamics of threats. Various software products are exposed to vulnerabilities in this changing period which suggests a need for agile project management implementation for the issue. In the context of software development, methods of agile project management have been observed to grow in volume. The use is significantly rising where risks of cybersecurity are considered as prominent challenge in the context of critical software projects. Such approaches and applications of agile project management are becoming more popular in terms of cybersecurity because of the iterative support that agile management offers while delivering products and services in smaller branches. It allows professionals associated with security measures to integrate software seamlessly. Tashtoushet *al.* (2021) also mentioned that agile project management brings encouragement to tests, inspections, and software patching systems frequently besides its iterative nature. Thus, risks of cybersecurity could be highly mitigated through the inclusion of agile project management. However, instead of providing these multiple benefits, agile project management poses some challenges during its implementation. The findings of Tashtoushet *al.* (2021) have clearly shown that the nature of cyber threats has been evolving and this is bringing challenges for agile project management in IT sectors. Though this project management is quite

efficient in terms of adaptability, the development of this software has been stated to be quite challenging for companies. The development process is quite costly and requires intense expertise. Moreover, the efficacy of developed agile project management software is another challenging factor in the context of the security and safety of sensitive data of an organisation. Thus, a detailed evaluation of the studies conducted by Tashtoushet *al* (2021) and Modranskyet *al* (2020) has agreed that the implementation process is introducing several challenges in terms of security concerns, increased cost, and lack of expertise.

2.2.4 Identify and examine the challenges and barriers that organizations may face when Implementing Critical Chain Project Management in the IT industry context.

The study of Msitshana (2023) has focused on embedding project management into DevOps as a tool for governance. DevOps or development and operations are considered a set of decent practices that help merge IT operations and software development into one. The purpose of this collaboration is to reduce the lifecycle of software development through continuous deployment and automation of processes. In this respect, Msitshana (2023) mentioned that Project Management or PM is a great and powerful tool that could be utilised to manage project software development. Here, the author mentioned that the scope of improvement in a project's delivery and quality could be managed through the collaborative use of DevOps and project management. The study of Msitshana (2023) is quite significant as it has mentioned the barriers which are at the core of delayed projects which further increases the need for the inclusion of critical chain project management. Furthermore, the scope for implementation of critical chain project management or CCPM in cybersecurity is huge in the IT sector (Aigbavboaet *al*. 2023). However, barriers for implementation arise mainly because of serious conflict among the teams of project management and DevOps in terms of the provision of ideas. Msitshana (2023) mentioned that project management teams are kept away from the development and operations teams which creates a communication gap. Another barrier arises when it comes to voluminous

and complex documentation. It is generally followed for keeping good governance within companies emphasising security. This documentation process creates challenges for the production of the software products. Finally, cultural change in an organisation is highly required by DevOps which is generally found to be quite a difficult matter. A sudden change in the culture of an organisation could not be considered beneficial at all times as the employees and existing processes might not accept the new culture positively. Additionally, the prevailing culture of the organisation generally determines the strategic direction of operations which will naturally be replaced by the introduction of the new one. Thus, a clear overview of challenges faced by companies during the implementation of critical chain project management has been mentioned in the comprehensive study of Msitshana (2023). In contrast to the study of Msitshana (2023), Canlas (2022) has presented some different results in a study concentrated on the efficacy of credentials of project management and implementation of integrated project management on the success of IT success. Canlas (2022) mentioned the fact that modern companies are actively replacing low-skilled workers and focusing on making a skilled workforce instead. The regression result of the study indicated that the chance of success in IT projects is higher with the implementation of integrated project management. Thus, it can be stated that though there is a significant challenge existing in the realm of implementation of critical chain project management, the chance of success is also higher if applied with proper strategy.

2.2.5: Identify and analyse the best practices, success factors, and critical considerations for APM:

Within this part of the assignment, some relevant literature will be analysed that provides in-depth information related to best practices success factors, and critical considerations associated with implementing Agile Project Management in the context of cybersecurity in the IT industry. According to Newton *et al.* (2019) in the context of the cyber security sector in the

IT industry, agile project management is associated with effectively managing software development projects related to cyber security issues and mitigation. As technology is getting advanced and business requirements or needs are changing, agile project management has its popularity. According to Jafari *et al.* (2023) to effectively implement agile project management in large projects for resolving security issues, an effective communication plan in different teams is required. An effective communication plan helps ensure a continuous flow within the teams and makes informed decisions for the implementation of an agile project management approach. According to Tashtoush *et al.* (2021) feedback loops are another suitable way to effectively implement agile project management within the cybersecurity sector. It is noticed that cybersecurity is dynamic and there are rapid changes noticed in the cybersecurity context. Feedback loops helps in understanding the changes that already take place. Based on the needs of the organisation in the IT industry, agile project management will be implemented easily. Security coding is another appropriate strategy that ensures the successful implementation of agile project management in the context of the cybersecurity sector in the IT industry. The success factor associated with the implication of agile project management in the cybersecurity sector in the IT industry is the flexibility factor. According to Asprion *et al.* (2023), agile project management helps provide flexibility within the projects and based on these factors any changes in any stage can be implemented. The adaptable nature of agile project management is another success factor that helps in effectively implementing this approach, in the cyber security sector in the IT industry. According to Salin and Lundgren (2022), collaboration is another factor that associated with this approach that helps in effectively implementing agile project management. Presently, technologies are getting advanced, and it is noticed that to effectively mitigate cybersecurity-related issues most organisations are implementing advanced technology as well as updated existing technologies. In the context of the cybersecurity sector in the IT industry, automation for code analysis is the

success factor in implementing agile project management. According to Matiti and Kabanda (2023), security testing is another factor. Critical consideration with agile project management is associated with risk management, secure coding standards, and responding according to the needs. Within the agile development process, the implementation of secure coding standards helps in effective early direction to the vulnerability in security, improves the code quality and others. This will positively impact the performance of the cybersecurity sector in the IT industry.

2.2.6: Identifying and analysing the best practices, success factors, and critical considerations for CCPM:

According to Gan *et al.* (2023) CPM in cyber security sector is associated with the appropriate usage of cyber security experts, usage of security tools, coding and others that help in making the projects related to cyber security. According to Kure *et al.* (2022) in the cyber security sector, the projects need to be completed on time and for that identification of critical chains helps in effectively using the resources. This is one of the best practices associated with the implementation of CCPM within the cybersecurity sector. According to Ackah (2019), cross-functional collaboration is also another best practice that helps in implementing CCPM. Within the cyber security industry, it is noticed that the issues in which the projects are related most are different from each other and for that different skilled employees are required from the different teams. According to Culot *et al.* (2019) to effectively resolve issues and complete the project successfully, cross-functional teams within the cybersecurity industry are important and for that, an appropriate communication plan is required. This will help in flowing the information in different groups and ensure an appropriate critical chain project management in the IT industry. According to Khang *et al.* (2023) implementation of regular tracking and monitoring mechanisms within the projects helps in effectively implementing critical chain project management by using appropriate human resources. It is noticed that within the

cybersecurity sector, a lot of diverse employees and skilled employees are required. Effectively monitoring and tracking their efforts with project progress helps in completing the project. This indicates that this approach plays a significant role in effectively implementing CCPM. According to Gan *et al.* (2023) success is associated with the ability to manage resources, find out the critical works, investigate crucial ways and dependencies, and task clarification streamlining the resources for cyber security projects and others. According to De and Vijayakumaran (2020), CCPM effectively manage resources that help in optimising the resource's benefits. CCPM within cybersecurity helps in optimising the resources such as the appropriate usage of human resources and their skills in projects. These not only help in effectively completing the projects on time but also help in effectively mitigating the risks that are coming in the path of project completion. According to Zohrehvandi *et al.* (2023) task clarifying is another success factor associated with CCPM in the cybersecurity sector in the IT industry. According to Canlas (2022) effectively allocating the resources and prioritisation of CCPM highly contributed to the causes of cyber security projects. In addition, the critical consideration is associated with risk mitigation. Cyber threats are associated with several risks and using CCPM the appropriate resources according to the needs are quickly identified. This helps in effectively tailoring the security strategy and making successful the projects. After analysing the above discussion, it can be said that in the cybersecurity sector to complete the projects, CCPM can ensure project completion within deadlines.



Figure 2: CCPM in Project Management

(Source: Miller, 2023)

2.4 Literature Gap

In-depth analysis of research upon Agile Project Management or APM as well as Critical Chain Project Management or CCPM within the IT industry, including a focus upon the field of cybersecurity, was offered by the literature study. Notwithstanding the substantial body of research on the subject, there remains an obvious void within body of knowledge that requires attention. The lack of discussion of CCPM throughout relation to cybersecurity among the IT sector serves as one among the biggest gaps throughout the literature. In contrast, whereas the study included a wealth of material about the efficacy, difficulties, and approaches of applying APM within cybersecurity, CCPM received fewer resources. A notable knowledge vacuum exists on the applicability, advantages, constraints, and difficulties unique to CCPM throughout the cybersecurity space, as indicated by the discrepancy within the amount of research conducted in this regard comparing APM along with CCPM. While the literature review

includes a brief comparison between APM along with CCPM, very few articles offer a comprehensive analysis of both of these managing projects methodologies in relation to cybersecurity. This might be possible to obtain essential data for IT organisations to make judgements by doing additional research that thoroughly examines the corresponding benefits, drawbacks, and specific application of each technique towards cybersecurity operations. Philosophical elements, empirical evidence, and academic opinion constituted the majority of the reviewed literature. Nevertheless, this seems that there would not be many real-world case studies along with illustrations within the IT sector that demonstrate the use of the two approaches to cybersecurity initiatives. Positive and failed case studies may be analysed to learn valuable lessons regarding the difficulties encountered, tactics used, and results attained when these techniques are used in actual corporate contexts. Most existing research concentrates upon the advantages, difficulties, and critical success factors associated with APM as well as CCPM within cybersecurity initiatives, accordingly. This is possible that insufficient research has been done regarding hybrid or combination methods that use components of both approaches to address the unique demands and complex specifications of cybersecurity initiatives within the IT sector. The literature study highlights on APM as well as CCPM's present cybersecurity effectiveness. However, there has been a dearth of discussion on recent advancements, evolving practices, along with the ways in which these approaches to project management have been affected by technological advances such as blockchain technology, AI, as well as neural networks within the cybersecurity space.

2.5 Theoretical Framework

Numerous popular concepts as well as conceptual frameworks through project management, the field of cybersecurity, along with managerial behaviour are incorporated into theoretical framework over understanding the efficacy, difficulties, and practical decisions about APM as well as CCPM throughout the cybersecurity field.

Agile manifesto forms the theoretical basis of Agile Project Management (Cobb 2023). This represents a set of values that emphasises individuals and their relationships over procedures and instruments, cooperation with client over negotiating contracts, flexibility over rigidity, and useful software throughout dense records. Through impacting project management approaches, these concepts might be leveraged to promote adaptability, versatility, along with iterative growth in adaptation to evolving needs for cybersecurity as well as risks.

The constantly changing multidimensional nature of cybersecurity concerns is acknowledged by the complicated theory paradigm (Nkongolo 2023). Within cybersecurity operations, unanticipated and unpredictable factors are frequently encountered. This makes it easier to recognize the importance of adaptable management approaches, such as APM as well as CCPM which may respond to unforeseen circumstances and shifts in the environment when projects are understood through this framework.

The conventional techniques of project management are conceptually supported by classic ideas about project management such as PRINCE2 along with Project Management Organization's body of learning (PMBOK) (Kühn 2021). Agile techniques, on the other hand, reject conventional sequential project management models and promote more adaptable strategies by emphasising incremental advancement, client interaction, and flexibility scheduling.

Organizational transformation is required for the cybersecurity industry to carry out APM along with CCPM. Ideas for managing organizational changes, dealing with opposition to transformation, and creating an environment that supports the adoption of new methods for project management may be found in theories like Lewin's model for change management along with Kotler's 8-step change model.

A fundamental element of CCPM includes the Theory of Restrictions (TOC) that centres upon the recognition and handling of project limitations in order to maximize assets and effectively accomplish project goals (Penn 2021). As a means of guaranteeing that resources are allocated within cybersecurity programmes in accordance with project demands, this theory emphasises the vital importance of discovering and handling key networks.

Consistent through Agile methodology's focus on ongoing enhancement include the cycles of PDCA along with additional learning organization concepts (Poth 2021). The integration of feedback chains and incremental advancement techniques from CCPM along with APM facilitates ongoing learning and process improvement within cybersecurity.

Assistance for assessment and handling risks related to cybersecurity can be found by cybersecurity framework developed by NST, ISO 27001, as well as other cybersecurity guidelines (Giucaet *al.* 2021). Understanding the way such project management methodologies relate to cybersecurity objectives, managing risks, along with legal obligations is necessary in order to integrate APM as well as CCPM within these models.

2.5 Chapter Summary

The findings of the chapter can be stated as quite significant for the further sections of the study. Under the first theme, the empirical findings suggested that the sector of cybersecurity could become widely effective with the implementation of agile project management and integrated project management as well. The effectiveness is more prominent when the right process is undertaken by companies operating under the complex landscape of the IT sector. The findings of scholars in the realm of critical chain project management have also been positive but in a comparative view, agile project management has been found more effective in the cybersecurity section. The next theme concentrated on the benefits and limitations of agile project management and critical chain project management. The result suggested a critical

placement and relation between the benefits and challenges. The number of challenges was found quite high which promptly suggested the need for strategic implementation. Moreover, whenever agile project management is updated or developed, its effectiveness becomes a matter of concern. The number of benefits is quite low but in the case of the cybersecurity sector, agile and integrated project management has achieved great recognition by assisting cybersecurity teams of the concerned sector to manage various challenges that arise during operations against cyber threats. The implementation of SCRUM has been found quite challenging for SMEs but large-scale organisations suffering from complex environments have been massively helped through agile project management. While discussing critical chain project management implementation in IT sectors, various dimensions have arrived. Through the implementation of critical chain project management in the cybersecurity sector, at the initial stage of implementation, conflicts arise among teams associated with the implementation process such as development teams, operations teams, and project management teams. Further complications arise during the complex process of documentation. Apart from these challenges of implementation, critical chain project management has been stated to bring proven success to IT sectors in the modern world. Agile project management's standards of security coding are significant elements in safeguarding the cybersecurity sector. While looking for information related to agile project management and the cybersecurity sector, a moderate amount of data was available from scholarly sources. The gap was identified to be in the case of critical chain project management. The amount of data relating to the objectives of the study where cybersecurity is also included, seemed to lack a significant number. It indicated a more comprehensive analysis focusing on the growing importance of implementing agile and critical chain project management in the cybersecurity sector.

Chapter 3: Methodology

3.1 Chapter overview

The chapter lays emphasis on laying out a nuanced plan of action in relation to the process of the research. The aim of the chapter will be to present a description of the methodology that has been employed in the research, the ways of collection of data along with the process of evaluation employed in the analysis of the measures of the management of agile project and chain projects in the cyber security sector of the IT. The chapter is dedicated towards the promotion of reception, the spirit of recreation and the formation of information that can be relied on in relation to the explanation of the methodical approach of cyber security of the IT and its agile management, through accumulation and evaluation of data.

3.2 Research philosophy

The purpose of research philosophy is to state certain guidelines accentuating the principles and convictions which help in the shaping of the process of research. It offers the framework for selection of methods, interpretation of data and stating of conclusions. The design and validation of the study is impacted by the choice made for the philosophy of research, as it can be positivist, interpretive, or pragmatic. The research philosophy plays a significant role in the determination of the approach of the researchers, paving their way to reality, knowledge and the kind of truth that they achieve through the process (Mishra and Alok 2022). Transparency in research philosophy can aid in the escalation of the enthusiasm towards the study, help in gaining more relevance and comprehensibility. It is a rudimentary aspect of any study which is in alignment with the experiences of realities of researchers along with their objectives. It develops consistency in methodology and makes findings profound in the process of acquiring knowledge and comprehension. The significance of research philosophy lies in its

impeccability in the direction of a research study, serving the role of a mentor which formulates the stages of the research by employing different perspectives and convictions. The process of conducting a research can be multifarious, engaging different kinds of research philosophy. The positivist research philosophy is dedicated towards observations which are empirical in nature (Fellows and Liu 2021). It employs objective process extensively which give rise to the formation of knowledge relevant to conduct research. The interpretive philosophy lay its foundation on the belief that the comprehension of the crux of the research through interpretation relies on the subjective nature of perspectives and experiences of individuals. Researches made on the basis of interpretivism philosophy lay emphasis on the significance of qualitative evaluation for gaining the cognizance of the subjective nature of the research. Contrary to this, pragmatism philosophy lay emphasis on the development of a connection to curb the gap between the traditional methods and scientific approaches for comprehending the fostering of knowledge in the process of research. The research in question deliberates on the agility of management of project and management of chain project in the cyber security sector of the IT. The employment of interpretivism philosophy will be complementing the purpose of the research for comprehension of the different experiences in managing projects, the challenges faced in ensuring cyber security in the IT sector. It can be done through evaluation of the convictions, perspectives and experiences of professional and IT engineers related to their endeavours in securing safety in cyber security and maintain agility in the management of projects. Nevertheless, employment of interpretivism philosophy will not be bereft of challenges in this regard. The philosophy relies heavily on the perspectives and the principals of the participants of the research (Pandey and Pandey 2021). This in turn is subjected in the creation of impediments in the process of formation and collection of general information from the participants. It is also responsible for the formation of a prospective scope for the development of research oriented biasness which can be impacting the standard of the research.

Therefore it can be concluded that the research which deals with agile project management and chain project management in the cyber security sector of the IT can achieve advantages and impediments with interpretivism philosophy approach. However the justification for the employment of this philosophy is embedded in its offering of a structure which is helpful in the comprehension of the research topic.

3.3 Research approach

The role of research approach lies in guidance and its offering of an organized process of evaluation of phenomena, determination of the scope of study and formation of methodology. It offers a direction dedicated towards the collection, evaluation and interpretation of data corroborating dependence and validation of findings. A research approach having a well structure can help in the enhancement of the zeal to study, developing objectivity and offers in the acquisition of cumulative knowledge related to a specific field (Bougie and Sekaran 2019). It offers a direction to researchers for making appropriate choices in methods, techniques and instruments which are in corroboration with the question of research and the hypothesis contained within it. Various research topics employ different research activities for its execution which reflects the different approaches of research. Research approaches can be described as one of the primary parts for executing the studies for research and they aid in the process of comprehension of the requisite of the execution of the research.

In the research, a descriptive research method has been employed. It aims at the representation and evaluation of the features of occurrences without tampering with the factors. Descriptive research is a method which aligns with the evaluation of the management of agile project and management of chain project in the cyber security sector of the IT. The method contains within itself the prospect to conduct observation which is systematic, evaluation of pragmatic

occurrences and documentation of the same for the production of a perspective which is complete within itself (Leszczyna 2021).

3.4 Research design

In order to accomplish a systematic guidance in the process of investigation research design offers significant and robust bedrock. It helps in the definition of methodology, methods of collection of data and techniques of evaluation which is dedicated towards the offering of an approach which is proactive and nuanced. Validation and reliance on findings can be enhanced with reduction in discrepancies and discriminations (Wiafe *et al.* 2020). It helps in the facilitation to recognize variables, patterns and relationships which in turn offer towards earning a generalization and credibility of the outcomes of research. Research design can be described as the skeleton which offers aid in the shaping of the efforts of the whole research, ensuring that researchers acquire the capacity to form questions which have meanings and is worthy for the accumulation of related data and achieve pragmatic conclusions. It helps in the advancement of knowledge in a structured way.

Inductive research design is used in the research which is in question. The design offers a method which give importance to the formulation of perspectives and the creation of general ideas on the basis of the pattern of observation (Tracy 2019). Nevertheless, there are many challenges in the employment of this style. Concepts and ideas which are adopted and applied generally might not arise from outcomes which are dependent on particular occurrences and speculations as the emphasis is on the creation of cognizance from the inverted side, that is bottom up. Secondly, the biasness associated with the study might impact the conjectures which are developed as there is subjectivity while interpreting (Kovach 2021). However, even with the presence of these limitations the experimental nature of the research aligns with the inductive design corresponding to the outcome of the research. The research on the agile project

management and chain project management in the cyber security sector receive recognition of innovative patterns along with new perspectives through the bottom up method of investigation. It allows an unhindered and detailed investigation of project management required for securing cyber threats. This results in acquisition of an elevated knowledge of their operations and efficiencies. To conclude, it can be said that the research in concern follow a research design which is benevolent towards its study and outcome.

3.5 Data collection and data analysis

The research in concern has employed qualitative method for the collection of data required in the procedure for its primary research approach. The process of data collection is imperative to execute and conduct study of research. It is a process through which information is accumulated from different sources. The procedure of collection of data for primary research incorporated interviews by formation of questionnaire (Frost 2021). In the procedure of the execution of the research in question, an interview has been formed and executed on the particular participants of research. The human interaction offers a congregation of information from individuals through a process of interview. The process can be segregated into different kinds of interview such as interviews on personal levels, focusing on group interviews, telephonic interview and interview in depths. The questionnaires, employed in the process of interview, is structural, semi-structural, unstructured and non-directive. The research in question has a semi-structure interview and was executed through the formation of 10 interview questions and offering those to 7 participants of research incorporating professionals of cyber security sectors. There are many criteria which are meditated while selection of the participants which incorporated the diversity in the participants of research related to age, gender, background of education, diversity of experiences and ethnicity (Bell *et al.* 2022). The predilection of participants to share their perspectives and experiences is also a concern in this aspect.

With the intention of evaluation of the collected information, the employment of the analysis of thematic data helps in the process which is relevant in the definite process of the interpretation of information which is accumulated for the generation of novel patterns and themes. In order to conduct the process of thematic evaluation, this research has ended up following few different steps as accentuated in the study of research (Kovach 2021). It incorporated in the procedure of acquiring acquaintance with the information that is gathered and the formation of the codes conceived at the initial stage for the set of data. Moreover, the different stages such as offering names to the themes and the assessment of the themes are also determining factors in the process of evaluation. It can be stated that these factors were rudimentary for the procedure to conduct the evaluation of data which gradually help in the process to generate four significant themes from the inspection of data which have been mentioned further in the findings that follows in the next chapters. At the end, the process of evaluation is accentuated in the best way through primary qualitative research as the content of the research topic is in alignment with the primary qualitative research method.

3.6 Ethical considerations

In terms of the research in question, the ethical considerations which have been promoted incorporate the acquisition of consent from the participants in concern. They need to willing and to participate in the process of interview concerning the study of the research (Byrd 2020). It is imperative to maintain confidentiality of the data and comments that the participants offer and also ensure the privacy of the information that they provide. This corroborates with the security of the participants, saving them from any kind of harm, both physical or mental health . It also offers leeway to the participants to take themselves away from the activities concerning the research at any time. It include the procedure of gaining consent from participants which is indispensable for the process of research and it a foremost part to conduct primary research where the purpose and objectives of the research is to gain pragmatic and probable outcomes

with no scope for dubiousness (May and Perry 2022). Therefore discussion with the participants related to the outcome of the research prior to the beginning of the research is important. The credibility of the research gains significance with the maintenance of confidentiality of the information offered by the participants. Participants must also be given the leeway to withdraw their participation from the process of the research (Valverde-Berrocoso *et al.* 2020). Participants must be safeguarded from any kind of physical violence or mental abuse in relation to their participation in the research. This can help in the avoidance of the development of any prospective ethical issues such as filing of lawsuits and petitions against the research or the researchers.

3.7 Chapter Summary

The investigation of the research of agile project management and chain project management in the cyber security sector of the IT employs interpretivism research philosophy and the approach of descriptive research. The Ethical considerations of the research have been deliberated upon as it is a requisite for maintaining the conduct of the research.

Chapter 4: Findings

4.1. Introduction

The chapter focuses on finding the exact information that can be significantly related to the effectiveness of agile project management for the significant uses of critical chain project management in the case of the IT industry. The selected participants were provided with some questionnaires that provided relevant information and understanding directly connected to the critical chain project management in cybersecurity for the IT industry and its context. The participants' responses are significantly considered to deal with the generation of the themes that will bring about a special understanding of important areas that are directly connected to the research topic and understand more about important elements that are directly connected to the cyber security observed in the IT industry.

4.2. Thematic analysis

4.2.1. Theme 1: Assess and compare the effectiveness of Agile Project Management and Critical Chain Project Management in the cybersecurity of the IT industry context

Understanding more about important elements that are directly connected to the agile project management considered in the IT industry tries to initiate various activities that are involved in understanding various elements directly connected to cyber security. The interview generated question 1 regarding the understanding of the roles and responsibilities of various project management related subordinates specifically in the case of the IT industry where Participant 1 focuses on providing information that further helps in improving the overall efficiency of the cyber security projects. The other participants also provided information that helps in execution and proper planning along with monitoring of different teams present within the organisation focusing on tracking all the activities present for the project. The participants selected provided information about the respective job activities that are directly connected to

the project management area focusing on understanding more about important areas that are directly connected to critical chain management focused on cyber security in the IT industry.

Question 2 generates an understanding of the working process of agile project management, which is relevantly used by the participants in their day-to-day activities in the context of cyber security in the IT industry. The participants provided information that agile methodology focuses on improving the overall project management thematic and tries to provide flexibility to the overall project activities and respond to different risk factors. Other than this, it is also initiated from the interview that agile methodology helps in providing information that is directly associated with identifying different threats present in the cyber security context. Participant 4 has provided information that agile methodology becomes beneficial for bringing about various cyber security strategies and helps in the early testing for understanding various standards. As for the information generated from the participants in the interview, it is every day that the use of agile methodology helps in initiating collaboration that leads to effective communication between different teams, which helps in mitigating various cyber security threats and helps in making some of the important decisions. Participants also informed that the involvement of project management and its principles helps to incorporate important information that directly helps in dealing with various critical operations in the cyber security area and ensures better flexibility, adaptability, and understanding of different collaborative factors that rightly impact the overall activities of cyber security observed in case of IT industry. Therefore, it is significantly evident that understanding more about agile project management and its rule in critical management for cyber security in the IT industry can be obtained from the first two questions providing significant information about its activities and role specifically in the case of cyber security in the IT industry.

A significant comparison of agile project management arises to provide different crucial information and ensure an understanding of the critical chain project management that is used

in this context. The participants provided significant information about the comparison of the two project management areas of the IT industry. The participants have provided relevant information about their jobs that are connected to the usage of agile and critical chain project management that are in active usage. The questions considered for understanding this theme have provided relevant information that has acted as one of the important linking points to understand more about important areas that are covered for the case of agile project management and critical chain project management. Some of the direct information generated has brought about relevant information about the usage of project management in the IT industry and has focused on the use of areas of project management activities and endorsed proper tracking for different actions present within a particular project. The participants have also provided relevant information from which significant collaborative factors can be observed that focus on understanding various cyber security elements that play an active role in revealing important factors that are directly connected to the critical management of various actions. The role of each of the project management tool is eminent so that all the important actions for the case of dealing with various elements of cyber security in the IT industry can be focused on.

4.2.2. Theme 2: Explore and compare the specific benefits and limitations associated with Agile Project Management and Critical Chain Project Management in the cybersecurity of the IT industry

Gathering relevant information and focusing on important differences that are directly connected to agile project management and critical chain project management in cyber security sector is essential so that a better differentiation can be established by the people who eminently uses this management tool. Question 4 focuses on understanding the important areas and elements that are directly connected to a critical chain management program and focusing on its benefits. One of the participants provides information that dominates the overall cyber

security section in the IT industry and brings about the benefit of understanding resource management more appropriately. Similarly, the benefit of this management tool helps in bringing about better potential that further help in dealing with various critical activities. Participants also highlighted the fact that it helps in analysing various vulnerabilities in security and helps benefit the overall theory using different activities and streamlining the resources.

The participants also provide valuable insights about the flexibility that is observed in the case of agile project methodology that is directly connected to the context of cyber security. The involvement of different activities helps in dealing with the risk mitigation strategy that further focuses on increasing the overall speed of the responses, which is mentioned by one of the participants in question 6. Understanding more about the adaptive piling process of project management helps in focusing on agile management activities and further creates an understanding of the immediate needs and focuses on various strategies for implementing any kind of change. One of the participants also provided information that focuses on bringing about transformative impacts that can be done with the help of SCRUM for the case of the IT industry, which significantly helps in generating strong collaboration and bringing about a regular feedback process within the project. It helps in dealing with various activities and brings about mitigation of strategy for any kind of cyber security issues.

The interview questions also involved the impact of critical chain project management and its adaptability activities when working with different resources in the cyber security context and participants provided a wider range of information that is different from one other. Participants focused on providing information about the strategic allocation of different resources for their help in the risk mitigation activities of cyber security and also focus on understanding more about the implementation challenges that might be faced by the organisation and might bring about some significant disruption for the overall project. One of the participants provided information which implied the creation of various kinds of appropriate change within the

domain of cyber security and brings about flexible compatibility when taken for agile project management, which also impacts the adaptability to change as per the resources available in the industry.

The theme has significantly focused on the comparison and understanding of various benefits and limitations that are associated with both agile project management and critical change project management, which can be observed in the case of cyber security. Different kinds of benefits can be highlighted by the participants that have focused on providing significant information to the audience that is directly connected to understanding the overall differentiation that is present for the two-project management tools. The interview questions are structured in such a significant manners that a better understanding of the benefits and limitations of agile and critical chain project management can be derived for understanding more about cyber security present in the case of the IT industry. The participants have highlighted the information that cyber security can be observed to be dominating the overall IT industry and it helps in bringing about better resource management, which is considered as one of the essential elements. Different participants have also tried to focus on providing information about various vulnerabilities that are often associated with security that are directly connected to various activities observed in the case of project management tools specifically in the areas of testing. The participants have tried to provide information about the flexibility of agile project management, which acts as a beneficial element for any project in the cyber security context. Therefore, the role of each of the project management tools is essential to deal with various activities that are directly connected to the working process of the project in the context of cyber security in the IT industry.

4.2.3. Theme 3: Identify and examine the challenges and barriers that organisations may face when implementing Agile Project Management in the cybersecurity of the IT industry context

Understanding the different challenges and barriers of implementing agile project management in cyber security context and understanding more about agile project management is essential for the people who are in active usage in this tool. Question 3 focuses on understanding more about important challenges that is be focused on this. One of the participants provided information that agile methodology has inept adaptability factors such as comprehensive road mapping for different security purposes, which is sometimes observed to be lacking for some project. Lack of proper knowledge regarding agile project management also creates significant problems in dealing with it in any specific cyber security projects in the IT industry. Another important challenge that one might face on is the problem with the understanding of various security strategies and their efficiency, which results in business issues while handling when using agile project management tools in different cyber security projects.

Similarly, understanding the challenges of critical chain management is also essential so that better flexibility within the project can be maintained without any kind of problems. Different kinds of challenges can be observed in the case of critical chain project management as difficulty in the implementation can be observed because of the digit structure. Other than this, it also includes relevant problems with the planning that bring about significant challenges for the IT industry to deal with in terms of different aspects. Question number 7 also focuses on the issues that might be observed and connected to the critical chain project management, which will focus on understanding various issues associated with cyber security in the IT industry. Participants initiated understanding and provided information that the implementation process becomes problematic and brings about different options. Making special arrangements for the agile project methodology is essential so that all the important actions and elements can be directly connected to improve all the important elements of the cyber security projects in the IT industry.

Different kinds of challenges and barriers that are highlighted by the participants provide a significant understanding of the important processes that are adopted for the implementation of agile project management in the case of cyber security in the IT industry context. The participants have tried to provide information about the adaptability problem that is faced when bringing about the understanding of the comprehensive road mapping process that is observed for security purposes. The environment for understanding more about agile project management is also necessary so that a better understanding of important needs of the business issues can be possible for the project management activities. The process of understanding various challenges that are present for critical chain project management is directly associated with understanding various flexibilities that are present for various problems. The involvement of the digital structure is also crucial for the use of agile project management for cyber security projects in the IT industry. The participants have highlighted relevant problems that they face due to lack of planning process of the entire project management and lack of handover of a detailed working of various special arrangements that can be made prior. Therefore, understanding various areas that are directly connected to understanding agile project management is essential specifically in the cyber security context in the IT industry bringing about better possibilities for different projects.

4.2.4. Theme 4: Identification of examining of the challenges and barriers along with focusing on some of the best practices that are considered for the implementation of Critical Chain Project management in the cybersecurity of the IT industry

Different kinds of challenges can be significantly observed in the implementation of critical chain project management, which are also discussed in several questions and are highlighted by the participants with their respective thought processes and understanding of this area. One of the participants provided information that different critical paths are associated with bringing

about bottlenecks for cyber security assessment that led to problems with the implementation of critical chain project management in the sector.

Question 10 also focuses on understanding in details what other problems are associated with the implementation of the 2 types in cyber security projects. The participants involved focus on providing different kinds of information that are beneficial to gather more information that is directly connected to a project management tool. One of the participants highlighted the fact that focusing on an effective communication plan helps the cross-functional team to deal with various practices that are directly connected to the project management present in the IT industry and focus on initiating element that understands about various reasons for the cyber security projects and its lack of proper implementation. The participants highlighted the fact that involvement of proper planning of the project integrity also becomes active problem as specific feedback is essential to improve the overall efficiency for the involvement of both the project management area and deal with better activities associated with cyber security. Participant 3 provided information that continuous training and a significant awareness process related to understanding more about the threats can help in providing better information regarding agile project management and important information in dealing with the implementation activities. Other than this, focusing on various coding automation processes helps in ensuring better understanding and initiating best practices that are directly connected to the cyber security procedures and understanding the threats leading to continuous monitoring for the entire process.

The question highlighted to address this theme has focused on understanding various challenges and barriers that are faced by different organisations for the significant implementation of the critical chain project management observed for the case of cyber security in the IT industry context. The participants have relevantly highlighted important thought processes that are directly connected to important challenges that are faced during the

implementation of activities and focus on different problems that might be faced by the people who are directly connected to the project. The participants have provided relevant information that has initiated significant knowledge about the problems and challenges that have a significant impact on the overall project management activities and focuses on understanding more about significant issues that are directly considered to be playing a crucial role in dealing with activities of the IT industry. Various elements of understanding are essential for the people who are in active usage of the critical chain project management and gathering important feedback for better implementation of the project management can be pushed forward without any kind of delay or misinformation. Therefore, it can be effectively considered that the different understandings that are generated can ensure significant use and bring about a continuous training process for the participants to ensure a detailed working of the entire process of handling critical change project management and bring about significant awareness. This helps in improving the overall usage of project management for any project.

4.3. Summary

The chapter has provided relevant information that is directly connected to understanding more about agile project management and critical path project management that is respectively used to deal with various cyber security projects in the IT industry. Relevant information gathered from the participants from the interview session has provided a significant understanding of the important strategies and problems that might be faced by the management team to deal with the project management activities for the case of cyber security in the IT industry. Gathering better knowledge and understanding more about project management activities can bring about significant details about the working process of cyber security projects in the IT industry.

5. Discussion:

5.1. Introduction:

All the findings related to the research topic are gathered and mentioned in the findings section and will be discussed in detail within this part of the study. Both methodologies such as agile project management and critical chain project management are used for effectively managing the processes and outcomes of the project in the IT industry, especially in the cybersecurity sector. It is noticed that the projects within the IT industry are associated with complexity. To complete the projects, IT organisations have to use different project management methodologies according to the nature of the complexity and the project goals. Discussing the findings helps in providing in-depth information as well as authentic information related to the research topic as all the findings are generated from the practical experiences of the people who are selected for the interview and the discussion is based on the findings gathered during the interview.

5.2. Discussion on findings:

The findings help in providing the information related to that all the participants closely worked with the selected methodologies and belong to the IT industry which helps in providing relevant information and practical information on the benefits and the effectiveness of both of the project's methodologies such as agile project management and critical chain project management. While analysing the effectiveness of using the agile project management approaches in the cybersecurity sector in the IT industry, the findings highlighted the flexibility provided while working on the project. It is noticed that priorities and requirements change during the working on the projects as well and the client's demands also changes over time. Using this methodology within the project management team helps in providing flexibility and ensures the changes in the projects (Saeeda *et al.* 2020). This helps in making the projects more

appropriate for usage and increases the satisfaction level of the employees. Feedback is gathered through monitoring the projects and feedback is important for analysing the working process appropriateness, the growth within the projects and identifying the gaps. Agile methodology helps fill the gaps based on the feedback (Binci *et al.* 2023). The changes that were made after gathering the feedback, not only helped in reducing the gaps but also improved the quality and the effectiveness of the projects in the cybersecurity projects. The findings also highlight that the agile method helps in directing the threats and based on the nature of the threats associated with the project, the responses against the threats are quickly solved by this method. Within the cyber security projects, several associated threats have the potential to negatively impact the projects. To reduce the threats, early troubleshooting of the threat and appropriate measurement within the projects is important (de Araújo Lima *et al.* 2020). The findings highlighted that using the agile methodology helps in detecting the future threats related to the project and the adaptability strengths of the team and the project itself, thus helping adjust the project strategies that impacted the project's success by mitigating the risks. The effective collaboration strength of agile is another aspect that was addressed through the interview. Effective collaboration with the members helps to improve the working processes and contributes to the success of the work and this helps in ensuring coordination (Sinha *et al.* 2020). As mentioned earlier cybersecurity projects are complex and to make these projects more viable, involving the stakeholders and team members from the different teams in the decision-making process is one of the strategic approaches. The involvement of team members from the different teams and stakeholders helps in providing different perspectives about the project and enhances the project management process. The strength of this approach is collaboration which help in ensuring cross-team collaboration and involvement of stakeholders in cybersecurity-related projects. Communication is another finding associated with agile methodology and using this methodology within their security projects helps in ensuring

effective communication within the teams and internal communication in teams also. This helps in the flow the information related to the projects to the different levels that are associated with the projects. On the other hand, investigating this topic through the primary research showed that findings related to the CCPM associated with the high visibility in the project, proper utilisation of the resources, detection of security vulnerabilities and others. Providing a clear and visual image of the appropriate path that indicates the practices, activities and usage of the resources in a way that completes the project more effectively is ensured by CCPM (De, 2022). This strength of CCPM, helps cybersecurity-related projects to be completed effectively. Moreover, the usage of the cybersecurity experts in different projects based on the project requirements and the skills of the experts in the cybersecurity projects can be also ensured by this CCPM processes. Assigning the right employee for the right projects helps improve the productivity of organisations that deal with cybersecurity-related projects. The overall discussion helped in identifying that both of the project management tools are effective in the context of cybersecurity-related projects in the IT industry.

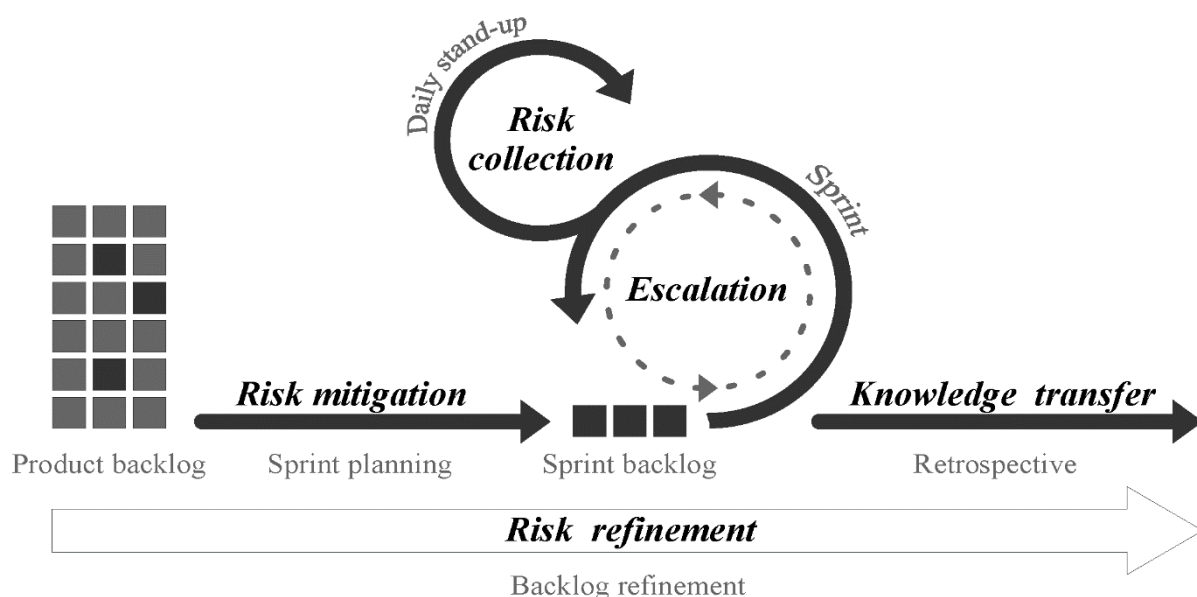


Figure 3: Agile project management in Risk mitigation in the context of Cybersecurity

(Source: Salin and Lundgren, 2022)

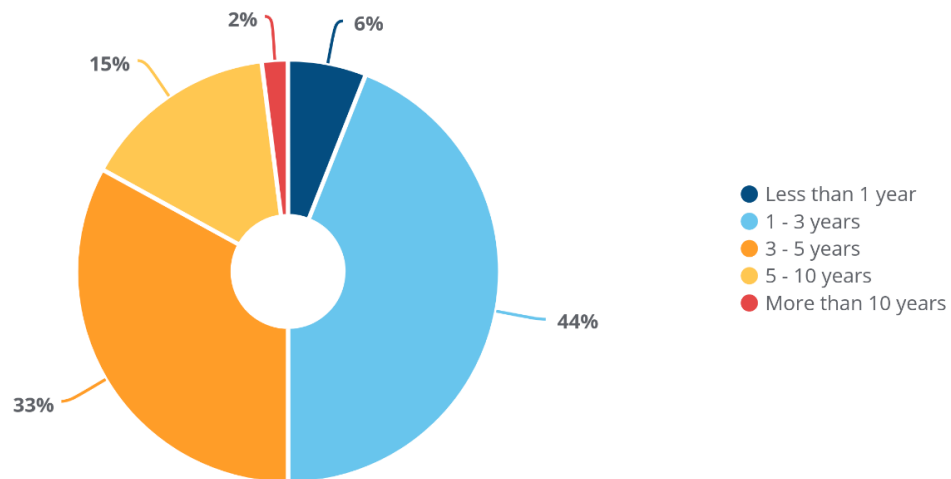
After analysing the findings, we noticed that several strengths and limitations are associated with both of the project management approaches. Lack of maintaining a comprehensive road map for the cybersecurity projects, the flexible nature impacted the security testing, the reduction of existing security strategies, and others are the limitations of the agile project management process. The adaptability nature and flexibility nature of the agile methodology are responsible for creating these challenges in the projects that impacted effectivity in managing projects and completing them on the scheduled time (Villamizar *et al.* 2020). The rigid nature of CCPM is highlighted within the findings that indicate this is the drawback of CCPM. To effectively manage the project a seamless implementation of the project management approach within the projects is essential. Due to the rigid nature of the CCPM, some organisations avoid this project management approach. Flexibility, speed enhancement in the projects, and adaptability are the benefits achieved by using agile methodology and the limitations associated with rapid changes in projects, reduction of existing security strategies and others are the limitations that impacted the cyber security projects (Elkhatib *et al.* 2022). Optimisation of resources, processes and activities are the benefits, and the requirement of appropriate planning is the barrier associated with CCPM processes in the cybersecurity sector in the IT industry. The overall discussion highlighted that both the project management approaches have benefits and challenges and while implementing these approaches a detailed analysis of these approaches needed to be conducted by the organisations.

While implementing both of the approaches within the project management practises, several difficulties were noticed by the IT professionals within the industry that that came to light while interviewing the participants. After interviewing participants, it was noticed that when implementing an agile methodology in cybersecurity projects, the professionals face difficulties in effectively creating a balance between communication processes and the flow of security-related information. In addition, the flexible nature of agile project management

created challenges in aligning the overall project with the changes in security measures (Lampe *et al.* 2021). While working on security projects, security measures incorporation is required based on the project objectives and this is the reason that creates challenges for the security in the cybersecurity projects. Agile project management cycle is resistance to adopting the changes due to security concerns which is one of its other challenge associated with the implementation of agile project management in cybersecurity projects. While working with the project in an existing set of approaches for managing the projects, the implementation of new approaches increases the resistance to change within the management practices. This is also noticed within the cybersecurity sector in the IT industry and despite having several benefits, organisations can not implement this approach. The changes in the security infrastructure are another barrier that creates challenges for the implementation of agile project management in the context of the cybersecurity sector in the IT industry. In contrast, the rigid nature of the CCPM is the most prominent challenge associated with its implementation highlighted within the findings. This makes the implementation process more complex and appropriate planning for implementing CCPM is required. This creates several challenges such as starting the projects on the scheduled time, managing the projects, assigning a team to create the planning process and implementation processes and others. Bottlenecks in aligning critical paths with cyber security assessment is another reason that created implementation challenges for CCPM (Järvinen, 2023). Cybersecurity assessments are required for creating visual pathways for the projects and the stoppage of progress in between alignment of the critical path with cyber security assessment responsible for the challenge to implement CCPM in the project effectively. The overall discussion highlighted that despite having several strengths associated with these project management approaches, due to the challenges in implementation within the projects is where the cybersecurity sector is lacking in efficiently and appropriately using both of the approaches. Usage of both approaches based on the requirements in the cybersecurity-

related projects by the cybersecurity sector helps in enhancing the overall project management process in the IT industry.

Time Spent Using Current Agile Project Management Tool



Q: How long have you been using your current project management software?
N = 218
Source: Capterra 2019 Agile Project Management Software User Survey



Figure 4: Usage of APM tool

(Source: O'Loughlin, 2020)

The best practices and success factors are also identified through the investigation into this topic in the context of both APM and CCPM. Effective communication within the teams and integration of the feedback system are appropriate practices that help in implementing the CCPM approach within the organisations as the project management approaches (Salama *et al.* 2021). Effective communication helps in reducing the resistance to change by clarifying the benefits that are obtained through the implementation of new approaches within the business process (Ayaz and Shaukat, 2021). Different stakeholders and team members will showcase their interest account leverage on the new project management approach for the project. Implications for APM in the project's continuous training and awareness are the best practices that are addressed in the investigation (Alsubaie, 2022). Continuous threat monitoring is also confirmed by the professionals related to this industry as a success factor for the

implementation of CCPM in projects. The above discussion highlighted the recommendations for the organisations that belong to this industry and reduced challenges in the implementation of both approaches in future.

5.3. Link with objectives:

Within this part of the study, all the findings and discussion will be linked with the objectives of the study and justify whether the findings help in achieving the project objectives or not. The overall project outcomes will be addressed in this part of the assignment.

5.3.1. Linked with objective 1:

Investigating the research topic helps in identifying that using agile project management within cybersecurity-related projects helps in satisfying the clients and improving the productivity of the organisation. This methodology provides flexibility, collaboration, and communication appropriately. This helps in making changes in the projects according to the needs ensuring the completion of the projects effectively and satisfies the clients by making changes according to their preferences. The risks are also mitigated by enhancing the project's overall success by using this approach within the projects such as in cybersecurity projects (Salin and Lundgren, 2022). This identifies that the effectiveness of the agile project management approach is significant. CCPM is another approach that is used in project management within the IT industry. CCPM effectiveness is associated with improving the utilisation of the project resources and visualisation of the success path that influences the growth within the project in the right direction (Sinaga and Husin, 2021). To reduce the mistakes within the projects, and errors within the process, this approach is useful in the cybersecurity sector in the IT industry as there are lots of data used and errors associated with interpreting these data as well as analysing the data and creating appropriate ways for completing the projects. Investigating this topic helps in finding all the relevant information related to the effectiveness of both of the approaches that are highlighted in the achievement of objective 1 for this study.

5.3.2: Linked with objective 2:

The second objective of the study is focused on finding out the specific benefits and limitations associated with APM and CCPM. While investigating this topic it was noticed that customer centricity, adaptability, flexibility, and effective collaboration within the teams, effective communication within the teams are some benefits associated with agile project management. The rapid changes in the project due to the client's demands or the threat aspects within the projects create challenges for effectively managing the security measures, security strategy of the organisation that existed and others. This makes the process more complex and impacts the projects in the cybersecurity sector in the IT industry. Optimisation of the resources in the cybersecurity sector such as the utilisation of the appropriate human capital within the cyber security projects based on the skills, optimisation of the appropriate path for the projects by providing the visual representation of the critical chain of the project and others (Bendler and Felderer, 2023). Implementation challenges and maintaining security strategies are the barriers that are associated with CCPM obtained through the investigation. Both of the approach's strengths and barriers are obtained from the investigation as the primary research used and the appropriateness of these data are authentic. This indicates that the study has also achieved its second objective through the investigation and addressed all the requirements stated in the second objective.

5.3.3 Linked with Objective 3:

The third objective of this study is to gather information related to the implementation challenges associated with agile project management and critical chain project management in the context of the cybersecurity sector in the IT industry. Examining this topic through primary research helps in gathering information from the participants who belong to the IT industry. While investigating this topic, it was noticed that the integration of security assessment in the agile project management cycle, resistance to adopting the changes due to security concerns,

and rapid changes in the projects are the changes that created implementation challenges for this. Changes in security and in infrastructure are also challenge associated with the agile project management approaches (Santos *et al.* 2022). Lack of growth within aligning critical path with cyber security assessment, ensuring the security aspects within the projects, and creating a balance between project management needs and cyber security needs are the challenges that created barriers to implementing CCPM. All this information is gathered from an investigation into this topic and provides in-depth information related to the context of the third objective of this topic. This is justified by the achievement of obtaining information related to the third objective of this topic.

5.3.4: Linked with objective 4:

Investigating this study topic, it is noticed that some best practices for the implementation of both of the approaches in the cybersecurity sector in the IT industry are highlighted. Effective communication within diverse teams helps in providing different perspectives that improve the decision-making process and generate effective ideas for the implementation of both approaches in cybersecurity projects. Continuous feedback needs to be followed and utilised during the planning process for the implementation is another best practice for the implementation of the approach. The Success factors associated with continuous training and awareness of the APM process and continuous threat monitoring with the CCPM process. Obtaining the information related to the study topic justifies the information gathered and achieves the objective in the context of objective 4.

5.4. Strengths and limitations:

After analysing the overall discussion on the study, it is noticed that so many strengths and limitations associated with the study. This part of the study will focus on all the strengths and limitations that are out within the study.

Strengths:

- All the required areas that are needed for a comparative analysis between the two approaches are conducted within this research. Investigation into different areas such as effectiveness, strengths and barriers of the approaches in the context of the cybersecurity sector in the IT industry and others are appropriate.
- Thematic analysis for analysing the collected data is another strength of this study. This helps in creating different themes according to the collected data and analysis of each theme (Dawadi, 2021). This not only helps in showcasing study-related information in depth but also the presentation of the research is also improved.
- Engaging participants who belong to the same industry related to the research topic is one of the strengths of this research topic. This helps in providing real-world examples in the context of the research topic and makes it relevant to the study (Vaughn and Jacquez, 2020).

Limitations:

- The size of the participants is very low for comparing between the two project management approaches that are used within the cybersecurity sector in the IT industry. To obtain relevant information related to industrial information sample size needs to be large (Braun and Clarke, 2021).
- Some participants were unable to provide answers related to the question that impacted the overall results and findings related to the research topic. This indicates the inappropriateness of leverage only in research methodology.
- Potential biases in the responses of the participants are another limitation of the study.
- The study is focused on only one sector of the industry which reduces the applicability of the findings in other sectors of the IT industry. This impacted the overall study implication in different sectors of the IT industry as well as in the other industries.

5.5. Summary:

After analysing the overall discussion, it can be summarized that in the cybersecurity sector in the IT industry, both agile project management and critical chain project management play significant roles in improving the management process. Both of the approaches have the efficiency to improve the project outcomes that not only satisfy the clients but also improve the business performance of the organisations that belong to the cybersecurity sector in the IT industry. The discussion also highlighted that the findings' relevance aligned with the objectives that meet the aim of the study. Despite having so much of advantages associated with this project, the discussion section also highlighted the drawbacks associated with both of the approaches. The significance of the study is also addressed by focusing on its strengths and limitations of the study.

6. Conclusion and Recommendations:

6.1. Conclusion:

The topic of this study is related to drawing a comparison between APM and CCPM in the context of the cybersecurity sector in the IT industry. To effectively obtain the information related to the appropriateness and benefits of these two project management approaches, the research aims and objectives have been created that help in providing the pathway of the research to achieve the goal of the study. Some relevant literature that highlighted these approaches' usage in the IT industry was reviewed within the study in the literature review part. Reviewing this literature, provided so much information related to the effectiveness, of the agile project management approach and critical chain project management approach. Analysing these articles journals and other literature it is noticed that the productivity and the changes within the project are easily implemented within the project using agile methods. On the other hand, the optimisation of sources is also ensured through this approach. While

reviewing the literature the strengths and limitations associated with both of the projects are also addressed indicating how these approaches impact the project process and the challenges that organisations can face by leveraging these project management approaches. The literature shows that flexibility strengths that help in making changes according to the demands of the projects and due to these rapid changes, the delays in project completion are highlighted. While reviewing articles and journals, it was also noticed that organisations face challenges in implementing both of the approaches that reduce the project management efficiency of the organisations. Some articles and journals highlighted that after overcoming challenges and assessing the challenges it can be concluded that continuous development in organisational processes is important. Additionally, the primary methodology is selected for collecting the relevant data for the study. After analysing the methodological process for the investigation, it can be said that this is an appropriate methodological process, and all the stages of the primary research are appropriate. For example, selecting an interview as the data collection process within this research not only helps in obtaining deeper information on the research topic but also ensures qualitative data gathering, incorporation of the different perspectives on the research topic, real-world information and implementation strategy of both of the approaches in the project management. This enriches the information those are authentic and sector-specific. After analysing the findings, it can be concluded that both of the approaches have different significance in managing projects within the cybersecurity sector in the IT industry. Relevant information, those that are cybersecurity sector-specific, is collected and analysed through thematic analysis. In summarisation of the discussion section of the study, it can be said that flexibility, adaptability, collaboration, and communication are the aspects of the agile methodology that makes it an appropriate choice for using cybersecurity projects in the IT industry. While the adaptability, utilisation of the resources, and visualisation ability to

showcase the suitable way for completing the projects makes CCPM an appropriate choice for using in projects in the IT industry.

6.2. Recommendations:

Some recommendations are going to be provided concerning the study for the improvements in future research on this topic that help in completing this research in a more holistic approach and process.

- The stakeholder's perspectives are limited and their involvement in the project outcomes is crucial (Lehtinen and Aaltonen, 2020). This is the reason that the involvement of the stakeholders is required for future research within research related to this topic.
- To obtain more relevant information related to both of the approach's appropriateness a cross-sector comparison is required. As this study is only focused on the cybersecurity sector, creating a similar study that focuses on the other sectors in the IT industry will help in generating more perspectives and effectiveness of both of the approaches. This will also help in generating more knowledge for using these approaches in different ways in the cybersecurity sector.
- The sample size is not much larger which provides different perspectives related to the research topic and all the generated data are qualitative which reduces the outcomes of the research. Surveying will be appropriate for generating quantitative data and making the research work more relevant (Mohajan, 2020).
- A mixed methodology for the research is another suitable recommendation for future research relevant to this type of research. Mixed research helps in collecting data from the participants also and the research papers that are used in primary research within their work (Harrison *et al.* 2020). This will help in cross-checking all the gathered

information through primary research as well as from the secondary research data collection processes.

- Case studies are not included in this research which reduces the validation of the outcomes. For example, within this research work, there is no case studies were used those help in finding out which cybersecurity organisations implemented these methodologies in their project management and how these two project management methods impacted the business of the organisations. Incorporation of the case studies within the study in the context of the selected escort will help in making the work more relevant and authentic. The practical implications make them more reliable work and increase confidence in other organisations' implementation of these approaches for obtaining benefits and reducing the barriers during and after implementing these project management approaches.
- Industrial trends are one of the external factors that influence the choices of organisations within the sectors for the implementation of project management approaches (Gemino *et al.* 2021). After analysing the overall study, it is noticed that the market trends' impact on the choices for the project management approaches is not covered and highlighting this area is essential. The changes in technology implementation within the project management and the changes in best practices to implement these approaches impacted the overall usage of agile project management and critical chain project management approaches.

All these recommendations have the potential to improve the investigation of similar research on this topic in the future through the leverage of suitable research approaches.

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Appendix:

Interview Transcript:

Consent form 1: Information Form and Consent Sheet

INFORMATION SHEET FOR PARTICIPANTS

PROJECT TITLE: Comparative analysis between the implementation of agile project management and critical chain project management in the cyber security sector of the IT industry.

You are being asked to take part in a research study on my research thesis for my MBA in project management. I am conducting a comparative study between two major types of project management approach which is Agile project management and Critical chain project management to investigate and compare their flexibility and adaptability in major cyber security project in the IT industry. I am conducting this research under the supervision of Mr. Mehran Rafiee, for the partial fulfilment of my degree under Dublin Business School.

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TIME COMMITMENT

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PARTICIPANTS' RIGHTS

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procedures answered (unless answering these questions would interfere with the study's outcome. A full de-briefing will be given after the study). If you have any questions as a result of reading this information sheet, you should ask the researcher before the study begins.

CONFIDENTIALITY/ANONYMITY

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FOR FURTHER INFORMATION

I or / and Mr. Mehran Rafiee will be glad to answer your questions about this study at any time. You may contact my supervisor at mehran.rafiee@mydbs.ie.

INFORMED CONSENT FORM

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Kartikey Sharma

Participant's signature

Participant's Name (Printed)

Madhusmita Bora



Student Name (Printed)

Student Name signature

14/12/2023

Date

Questions and Answers:

Question 1:

Introduce yourself with a brief discussion of your roles and responsibilities concerning project management in the IT industry.

Participant 1:

Good Morning. Presently, I am working as an IT coordinator within an organisation and my role in project management is associated with ensuring appropriate communication within the

teams. This indicates that I am closely connected with project managers and to monitor the project deadlines, whether all the components are effectively implemented or not and whether others help in effectively improving the efficiency of the overall project.

Question 2:

Are you experienced in working with Agile project management? If yes, then please provide your perspective on the benefits of this methodology in the context of the cybersecurity sector in the IT industry.

Participant 1:

Yes, I have experience working with agile methodology in project management. From my experience, this methodology provides flexibility in the project that helps in responding to the risk factors effectively.

Question 3:

Can you tell us your opinion about any challenge that you faced in Agile project management in the context of the IT security sector?

Participant 1:

I have not experienced any challenge in Agile project management in the context of IT security.

Question 4:

Now tell us, are you experienced with Critical Chain Project Management (CCPM)? If yes, then provide some key benefits of this project management.

Participant 1:

Yes, I had experience in this domain and in IT cyber security, this project management greatly benefited with resource management appropriately.

Question 5:

Can you provide your opinion about the challenges of CCPM in the cybersecurity sector in the IT industry?

Participant 1:

Yes, while working in CCPM it is noticed that this project management is inflexible.

Question 6:

How does Agile project management impact the flexibility and speed of projects in the context of the cybersecurity sector in your opinion?

Participant 1:

In the context of the cybersecurity in IT industry, agile project management ensures low-time adjustments in the strategies related to cybersecurity that increase speed of the risk mitigation.

Question 7:

How does CCPM impact the adaptability to change and proper usage of resources in the cybersecurity sector in the IT industry in your opinion?

Participant 1:

In my opinion, CCPM helps in the strategic allocation of resources based on the cybersecurity risk that reduces cybersecurity issues quickly.

Question 8:

Can you provide some information related to specific areas in which challenges and barriers are noticed in the implementation of agile project management in the context of the cybersecurity sector in the IT industry?

Participant 1:

As I am working as an IT coordinator, challenges in the implementation of agile project management in the terms of the cyber security sector in the IT industry are noticeable in effectively creating a balance between the need for sharing security information with the need for effective communication.

Question 9:

Can you provide some information related to specific areas in which challenges and barriers are noticed in the implementation of CCPM in the context of cyber security sector in the IT industry?

Participant 1:

Yes, I can provide answers related to this domain. Creating a balance between project management needs and cyber security needs effectively at the same time which is responsible for creating challenges.

Question 10:

Can you provide your insights on best practices associated with the implementation of both or one project management in the cybersecurity context in the IT industry?

Participant 1:

Yes, an effective communication plan for a cross-functional team is the appropriate practice for both of the project management in the IT industry for cyber security reasons.

Consent form 2: Information Form and Consent Sheet

INFORMATION SHEET FOR PARTICIPANTS

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FOR FURTHER INFORMATION

I or / and Mr. Mehran Rafiee will be glad to answer your questions about this study at any time. You may contact my supervisor at mehran.rafiie@mydbs.ie.

INFORMED CONSENT FORM

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Jay Chauhan

Participant's signature

Participant's Name (Printed)

Madhusmita Bora



Student Name (Printed)

Student Name signature

10/12/2023

Date

Question and Answers:

Question 1:

Introduce yourself with a brief discussion of your roles and responsibilities concerning project management in the IT industry.

Participant 2:

Good morning. I am working as a Project Manager and my role and responsibilities in the IT industry are associated with the planning of the projects, execution of projects, resource allocation, monitoring cross-collaboration among teams, aligning organizational goals with projects and tracking overall projects.

Question 2:

Are you experienced in working with Agile project management? If yes, then please provide your perspective on the benefits of this methodology in the context of the cybersecurity sector in the IT industry.

Participant 2:

Yes, I am experienced in this methodology in my projects and reflecting on my experience I am quite sure about its benefits in project management. Adaptability has improved making agile project management. Different types of cyber threats are noticed and agile project management helps acting according to the different threats.

Question 3:

Can you tell us your opinion about any challenge that you faced in Agile project management in the context of the IT security sector?

Participant 2:

I have noticed that in agile project management due to the adaptability factor, creating and effectively maintaining a comprehensive road map for security purposes is lacking.

Question 4:

Now tell us, are you experienced with Critical Chain Project Management (CCPM)? If yes, then provide some key benefits of this project management.

Participant 2:

Yes, I am familiar with this, and the benefit is associated with effectively finding out the critical works and allocating potential experts such as cybersecurity experts to manage critical works in the IT industry.

Question 5:

Can you provide your opinion about the challenges of CCPM in the cybersecurity sector in the IT industry?

Participant 2:

No, I have no idea about the challenges of this project management.

Question 6:

How does Agile project management impact the flexibility and speed of projects in the context of the cybersecurity sector in your opinion?

Participant 2:

In my opinion, Agile project management helps in ensuring adaptive palling within the project that increases the speed of the responses.

Question 7:

How does CCPM impact the adaptability to change and proper usage of resources in the cybersecurity sector in the IT industry in your opinion?

Participant 2:

In my opinion, cybersecurity is dynamic and in general, the issues in cybersecurity disrupts the whole project and leveraged this project management to help in effectively implementing challenges through its systematic ability that reduce the changes to disrupt the overall project.

Question 8:

Can you provide some information related to specific areas in which challenges and barriers are noticed in the implementation of agile project management in the context of the cybersecurity sector in the IT industry?

Participant 2:

In my opinion, the barriers are related to aligning the overall project with the changes in security measures.

Question 9:

Can you provide some information related to specific areas in which challenges and barriers are noticed in the implementation of CCPM in the context of cyber security sector in the IT industry?

Participant 2:

Security implementation created challenges by ensuring delays in the overall project completion.

Question 10:

Can you provide your insights on best practices associated with the implementation of both or one project management in the cybersecurity context in the IT industry?

Participant 2:

In my opinion, while planning the project integration of cybersecurity based on feedback has the potential to improve efficiency in both cases.

Consent form 3: Information Form and Consent Sheet

INFORMATION SHEET FOR PARTICIPANTS

PROJECT TITLE: Comparative analysis between the implementation of agile project management and critical chain project management in the cyber security sector of the IT industry.

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TIME COMMITMENT

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CONFIDENTIALITY/ANONYMITY

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FOR FURTHER INFORMATION

I or / and Mr. Mehran Rafiee will be glad to answer your questions about this study at any time. You may contact my supervisor at mehran.rafiie@mydbs.ie.

INFORMED CONSENT FORM

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The research aims to compare and evaluate the contributions of critical chain project management and agile project management to the cybersecurity field in the IT industry. The topic's research aims, objectives, and research questions are chosen to help provide a clear path for the inquiry and to help obtain a meaningful and deeper understanding of the subject. The relevance of the research lies not only in determining the effects of both techniques, but also in the organization's contribution to their application in the industry.

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Keshav Singh

Participant's signature

Participant's Name (Printed)

Madhusmita Bora



Student Name (Printed)

Student Name signature

11/12/2023

Date

Question and answers:

Question 1:

Introduce yourself with a brief discussion of your roles and responsibilities concerning project management in the IT industry.

Participant 3:

Thank you for asking that question. I am currently working as an IT analyst and my roles and responsibilities include managing risks and assessing securities with the project team of xxx company.

Question 2:

Are you experienced in working with Agile project management? If yes, then please provide your perspective on the benefits of this methodology in the context of the cybersecurity sector in the IT industry.

Participant 3:

Yes, I have worked in one project before that have applied the agile project management approach but unfortunately, I am not familiar with its key benefits and as such.

Question 3:

Can you tell us your opinion about any challenge that you faced in Agile project management in the context of the IT security sector?

Participant 3:

Despite working in agile project management, due to lack of knowledge I cannot answer this question.

Question 4:

Now tell us, are you experienced with Critical Chain Project Management (CCPM)? If yes, then provide some key benefits of this project management.

Participant 3:

I had worked in CCPM and noticed that the detailed investigation of crucial ways and dependencies is the benefit.

Question 5:

Can you provide your opinion about the challenges of CCPM in the cybersecurity sector in the IT industry?

Participant 3:

Difficulty in implementation is the challenge that I noticed in CCPM in the context of cybersecurity.

Question 6:

How does Agile project management impact the flexibility and speed of projects in the context of the cybersecurity sector in your opinion?

Participant 3:

Despite working in agile project management, due to lack of knowledge I can not answer this question.

Question 7:

How does CCPM impact the adaptability to change and proper usage of resources in the cybersecurity sector in the IT industry in your opinion? Participant 3:

Sorry, I have no idea about this in detail but acknowledge the ability to allocate resources by CCPM.

Question 8:

Can you provide some information related to specific areas in which challenges and barriers are noticed in the implementation of agile project management in the context of the cybersecurity sector in the IT industry?

Participant 3:

Being an IT analyst, I have noticed that the challenge is associated with the integration of security assessment in the agile project management cycle.

Question 9:

Can you provide some information related to specific areas in which challenges and barriers are noticed in the implementation of CCPM in the context of cyber security sector in the IT industry?

Participant 3:

No, I have no in-depth information related to this context.

Question 10:

Can you provide your insights on best practices associated with the implementation of both or one project management in the cybersecurity context in the IT industry?

Participant 3:

Continuous training and awareness related to the threats to team members is the best practice in my opinion for APM.

Consent form 4: Information Form and Consent Sheet**INFORMATION SHEET FOR PARTICIPANTS**

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TIME COMMITMENT

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Abdul Basit

Participant's signature

Participant's Name (Printed)

Madhusmita Bora



Student Name (Printed)

Student Name signature

15/12/2023

Date

Question and answer:

Question 1:

Introduce yourself with a brief discussion of your roles and responsibilities concerning project management in the IT industry.

Participant 4:

I am a software developer, and the role of my job is cyber security applications, creating tasks, defining scopes within the projects and others.

Question 2:

Are you experienced in working with Agile project management? If yes, then please provide your perspective on the benefits of this methodology in the context of the cybersecurity sector in the IT industry.

Participant 4:

As it is earlier mentioned I am a software developer and due to this job role, I have experience in Agile project management. This allows for testing early related to cyber security standards.

Question 3:

Can you tell us your opinion about any challenge that you faced in Agile project management in the context of the IT security sector?

Participant 4:

Security testing is impacted due to the flexible nature of this project management which is a challenge that I noticed.

Question 4:

Now tell us, are you experienced with Critical Chain Project Management (CCPM)? If yes, then provide some key benefits of this project management.

Participant 4:

I have worked in CCPM and experienced the analysis of security vulnerabilities that have the potential the benefit associated with this project management.

Question 5:

Can you provide your opinion about the challenges of CCPM in the cybersecurity sector in the IT industry?

Participant 4:

The rigid structure of CCPM creates challenges to make changes in risk mitigation strategies such as cybersecurity strategies.

Question 6:

How does Agile project management impact the flexibility and speed of projects in the context of the cybersecurity sector in your opinion?

Participant 4:

In my opinion, agile project management helps in finding the immediate needs and based on the need's changes are implemented. Such as based on security needs, cybersecurity strategies have evolved.

Question 7:

How does CCPM impact the adaptability to change and proper usage of resources in the cybersecurity sector in the IT industry in your opinion?

Participant 4:

In my opinion, the ability to provide well-defined scopes for adjustments helps in making the appropriate changes in the cyber security domain.

Question 8:

Can you provide some information related to specific areas in which challenges and barriers are noticed in the implementation of agile project management in the context of the cybersecurity sector in the IT industry?

Participant 4:

I have no idea about the specific area in which challenges are associated with the implementation of agile project management in the context of cyber security in the IT industry.

Question 9:

Can you provide some information related to specific areas in which challenges and barriers are noticed in the implementation of CCPM in the context of cyber security sector in the IT industry?

Participant 4:

Bottlenecks in aligning critical path with cyber security assessment are the specific areas that created challenges in the implementation of CCPM in the context of cyber security in the IT industry.

Question 10:

Can you provide your insights on best practices associated with the implementation of both or one project management in the cybersecurity context in the IT industry?

Participant 4:

In my opinion security coding automation will be an appropriate factor that ensures best practice in this context.

Consent form 5: Information Form and Consent Sheet

INFORMATION SHEET FOR PARTICIPANTS

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Wayne Swords

Participant's signature

Participant's Name (Printed)

Madhusmita Bora



Student Name (Printed)

Student Name signature

16/12/2023

Date

Question and answer:

Question 1:

Introduce yourself with a brief discussion of your roles and responsibilities concerning project management in the IT industry.

Participant 5:

Hello, I am a SCRUM mentor and mainly ensure agile methodology within the project and teams. To effectively remove all the obstacles and improve the efficiency of the project, I am working on this.

Question 2:

Are you experienced in working with Agile project management? If yes, then please provide your perspective on the benefits of this methodology in the context of the cybersecurity sector in the IT industry.

Participant 5:

Yes, I had experience. The main benefit of agile methodology helps in effectively making the cyber security strategy for a successful operation.

Question 3:

Can you tell us your opinion about any challenge that you faced in Agile project management in the context of the IT security sector?

Participant 5:

The existing security strategy's efficiency is reduced due to the alignment of the needs of the business with the security strategy in this project management.

Question 4:

Now tell us, are you experienced with Critical Chain Project Management (CCPM)? If yes, then provide some key benefits of this project management.

Participant 5:

I am experienced in working with CCPM and task clarification such as cybersecurity testing is a key benefit.

Question 5:

Can you provide your opinion about the challenges of CCPM in the cybersecurity sector in the IT industry?

Participant 5:

Though I have worked in CCPM, there have been no challenges noticed by me.

Question 6:

How does Agile project management impact the flexibility and speed of projects in the context of the cybersecurity sector in your opinion?

Participant 5:

Transformative impacts are noticeable to me while working as a SCRUM mentor in the IT industry. Strong collaboration and regular feedback help improve the speed of the project such as mitigate any cybersecurity issues.

Question 7:

How does CCPM impact the adaptability to change and proper usage of resources in the cybersecurity sector in the IT industry in your opinion?

Participant 5:

As it is noticed, CCPM is much more inflexible compared to agile project management and I think there are limited impacts on adaptability to change and proper usage of resources in cybersecurity in the IT industry.

Question 8:

Can you provide some information related to specific areas in which challenges and barriers are noticed in the implementation of agile project management in the context of the cybersecurity sector in the IT industry?

Participant 5:

Resistance to adopting the changes due to security concerns is a noticeable area in the implementation of agile project management in the context of cyber security in the IT industry.

Question 9:

Can you provide some information related to specific areas in which challenges and barriers are noticed in the implementation of CCPM in the context of cyber security sector in the IT industry?

Participant 5:

From my experience, I can say that the integration of agile methodologies with the principles of CCPM is complex and responsible for creating challenges.

Question 10:

Can you provide your insights on best practices associated with the implementation of both or one project management in the cybersecurity context in the IT industry?

Participant 5:

An appropriate communication plan for cross-functional teams in my opinion is the best practice in this domain.

Consent form 6: Information Form and Consent Sheet

INFORMATION SHEET FOR PARTICIPANTS

PROJECT TITLE: Comparative analysis between the implementation of agile project management and critical chain project management in the cyber security sector of the IT industry.

You are being asked to take part in a research study on my research thesis for my MBA in project management. I am conducting a comparative study between two major types of project management approach which is Agile project management and Critical chain project management to investigate and compare their flexibility and adaptability in major cyber security project in the IT industry. I am conducting this research under the supervision of Mr. Mehran Rafiee, for the partial fulfilment of my degree under Dublin Business School.

WHAT WILL HAPPEN

In this study, you will be asked to answer a few questions regarding your past or present experience of handling any of your projects using one or both project management approaches. The questionnaire will contain questions regarding your opinions on the adaptability, flexibility and efficacy of the approaches in your projects. In no way or form will the questionnaire have questions asking for any debriefing of the projects or the details of it.

TIME COMMITMENT

The study typically takes only one session and there will be 10 questions which can be answered over a span of 15-20 mins.

PARTICIPANTS' RIGHTS

You may decide to stop being a part of the research study at any time without explanation required from you. You have the right to ask that any data you have supplied to that point be withdrawn / destroyed. You have the right to omit or refuse to answer or respond to any question that is asked of you. You have the right to have your questions about the procedures answered (unless answering these questions would interfere with the study's outcome. A full de-briefing will be given after the study). If you have any questions as a result of reading this information sheet, you should ask the researcher before the study begins.

CONFIDENTIALITY/ANONYMITY

The data I collect does not contain any personal information about you except about your designation and role in the company while handling projects and your personal opinions about handling projects through Agile or Critical Chain Project management. The data collected through the interview will be used solely for the purpose of the dissertation. The name and identity of all interviewees will be kept confidential as well as their affiliation to any companies or their employers.

FOR FURTHER INFORMATION

I or / and Mr. Mehran Rafiee will be glad to answer your questions about this study at any time. You may contact my supervisor at mehran.rafiie@mydbs.ie.

INFORMED CONSENT FORM

PROJECT TITLE: Comparative analysis between the implementation of agile project management and critical chain project management in the cyber security sector of the IT industry.

PROJECT SUMMARY:

The research aims to compare and evaluate the contributions of critical chain project management and agile project management to the cybersecurity field in the IT industry. The topic's research aims, objectives, and research questions are chosen to help provide a clear path for the inquiry and to help obtain a meaningful and deeper understanding of the subject. The relevance of the research lies not only in determining the effects of both techniques, but also in the organization's contribution to their application in the industry.

By signing below, you are agreeing that: (1) you have read and understood the Participant Information Sheet, (2) questions about your participation in this study have been answered satisfactorily, (3) you are aware of the potential risks (if any), and (4) you are taking part in this research study voluntarily (without coercion).



William Fenton

Participant's signature

Participant's Name (Printed)

Madhusmita Bora



Student Name (Printed)

Student Name signature

14/12/2023

Date

Question and answer:

Question 1:

Introduce yourself with a brief discussion of your roles and responsibilities concerning project management in the IT industry.

Participant 6:

Hello, I am working as an infrastructure project manager in the IT industry and associated with overseeing projects' infrastructure, effectively tracing resource management processes and more.

Question 2:

Are you experienced in working with Agile project management? If yes, then please provide your perspective on the benefits of this methodology in the context of the cybersecurity sector in the IT industry.

Participant 6:

Yes, I had experience. Collaboration that helps ensure effective communication within the teams and mitigates cybersecurity concerns through making informed decisions.

Question 3:

Can you tell us your opinion about any challenge that you faced in Agile project management in the context of the IT security sector?

Participant 6:

In agile project management, due to the changes in different operations, the working efficiency might be affected.

Question 4:

Now tell us, are you experienced with Critical Chain Project Management (CCPM)? If yes, then provide some key benefits of this project management.

Participant 6:

I have experience in CCPM and streamlining the resources for cyber security projects is a benefit.

Question 5:

Can you provide your opinion about the challenges of CCPM in the cybersecurity sector in the IT industry?

Participant 6:

Careful planning is required for the implementation and lack of planning creates so many challenges such as cyber security issues in the IT industry.

Question 6:

How does Agile project management impact the flexibility and speed of projects in the context of the cybersecurity sector in your opinion?

Participant 6:

In this context, I have limited information to skip this question.

Question 7:

How does CCPM impact the adaptability to change and proper usage of resources in the cybersecurity sector in the IT industry in your opinion?

Participant 6:

Due to a lack of in-depth knowledge in this domain, I am unable to answer this question.

Question 8:

Can you provide some information related to specific areas in which challenges and barriers are noticed in the implementation of agile project management in the context of the cybersecurity sector in the IT industry?

Participant 6:

Without delay, the implementation of changes in security in infrastructure is the barrier that is seen by me.

Question 9:

Can you provide some information related to specific areas in which challenges and barriers are noticed in the implementation of CCPM in the context of cyber security sector in the IT industry?

Participant 6:

Sorry, I have no idea about this.

Question 10:

Can you provide your insights on best practices associated with the implementation of both or one project management in the cybersecurity context in the IT industry?

Participant 6:

Continuous threat monitoring is a best practice according to my opinion for CCPM.

Consent form 7: Information Form and Consent Sheet

INFORMATION SHEET FOR PARTICIPANTS

PROJECT TITLE: Comparative analysis between the implementation of agile project management and critical chain project management in the cyber security sector of the IT industry.

You are being asked to take part in a research study on my research thesis for my MBA in project management. I am conducting a comparative study between two major types of project management approach which is Agile project management and Critical chain project management to investigate and compare their flexibility and adaptability in major cyber security project in the IT industry. I am conducting this research under the supervision of Mr. Mehran Rafiee, for the partial fulfilment of my degree under Dublin Business School.

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The study typically takes only one session and there will be 10 questions which can be answered over a span of 15-20 mins.

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FOR FURTHER INFORMATION

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INFORMED CONSENT FORM

PROJECT TITLE: Comparative analysis between the implementation of agile project management and critical chain project management in the cyber security sector of the IT industry.

PROJECT SUMMARY:

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By signing below, you are agreeing that: (1) you have read and understood the Participant Information Sheet, (2) questions about your participation in this study have been answered satisfactorily, (3) you are aware of the potential risks (if any), and (4) you are taking part in this research study voluntarily (without coercion).



Sean Doyle

Participant's signature

Participant's Name (Printed)

Madhusmita Bora



Student Name (Printed)

Student Name signature

21/11/2023

Date

Question answer:

Question 1:

Introduce yourself with a brief discussion of your roles and responsibilities concerning project management in the IT industry.

Participant 7:

I am a technology officer and ensure the adoption of technologies implementation, monitor implemented technologies, collaborate with teams and more.

Question 2:

Are you experienced in working with Agile project management? If yes, then please provide your perspective on the benefits of this methodology in the context of the cybersecurity sector in the IT industry.

Participant 7:

Yes, I am familiar with agile project management and its principles. Flexibility, adaptability, and collaborative factors impacted cyber security in the IT industry.

Question 3:

Can you tell us your opinion about any challenge that you faced in Agile project management in the context of the IT security sector?

Participant 7:

No, in my opinion, I have not experienced any challenges in this project management.

Question 4:

Now tell us, are you experienced with Critical Chain Project Management (CCPM)? If yes, then provide some key benefits of this project management.

Participant 7:

Yes, I work in so many CCPMs and it is noticed that as I work as a technological officer my focus on cyber security improved a lot.

Question 5:

Can you provide your opinion about the challenges of CCPM in the cybersecurity sector in the IT industry?

Participant 7:

I am unable to answer this question.

Question 6:

How does Agile project management impact the flexibility and speed of projects in the context of the cybersecurity sector in your opinion?

Participant 7:

This highly increases the speed of the project by identifying the actual needs of customers such as strengthening security facilities.

Question 7:

How does CCPM impact the adaptability to change and proper usage of resources in the cybersecurity sector in the IT industry in your opinion?

Participant 7:

Easily adopting appropriate measures such as allocation of cyber security experts and updated software to mitigate issues, CCPM ensures proper utilization of resources.

Question 8:

Can you provide some information related to specific areas in which challenges and barriers are noticed in the implementation of agile project management in the context of the cybersecurity sector in the IT industry?

Participant 7:

Being a technology officer, integration of new advanced technology in effectively maintaining cyber security measures is the challenge.

Question 9:

Can you provide some information related to specific areas in which challenges and barriers are noticed in the implementation of CCPM in the context of cyber security sector in the IT industry?

Participant 7:

Due to a lack of knowledge, I am unable to answer this question.

Question 10:

Can you provide your insights on best practices associated with the implementation of both or one project management in the cybersecurity context in the IT industry?

Participant 7:

Yes, I can provide information about this. Technologies are getting advanced and staying informed about the best technologies that improve cyber security for implementation is one of the best practices.