Master Thesis

Agile Project Management Tools for Successful Information Technology Projects

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Agile Project Management Tools for Successful Information Technology Projects

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- CONBOY, Kieran a Noel CARROLL, 2019. Implementing Large-Scale Agile Frameworks: Challenges and Recommendations. online. *IEEE Software*, vol. 36, no. 2, s. 44–50. ISSN 0740-7459. Dostupné z https://doi.org/10.1109/MS.2018.2884865.
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- GOODPASTURE, John C., 2016. *Project Management the Agile Way: Making It Work in the Enterprise*. 2nd Ed. Plantation, FL: J. Ross Publishing. ISBN 978-1-60427-115-7.

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Anotace

Tato práce zkoumá, jak lze agilní projektový management a koncepty databáze převzít v kontextu řízení kontinuity podnikání.Prostřednictvím pečlivého zkoumání jejich interakcí studie zdůrazňuje potenciální výhody, které agilní rámce mohou poskytnout procesům Řízení kontinuity podnikání,které jsou zásadní pro udržení chodu podniků tváří v tvář přerušením.Práce v zásadě analyzuje, jak by definující charakteristiky přizpůsobivost a iterace agilní mohly zlepšit postupy řízení kontinuity podnikání.Flexibilita agilní ve srovnání s konvenčními koncepty projektového řízení je zásadní pro vyjednávání v měnícím se a nejistém terénu obchodních požadavků.Studie objasňuje, jak může agilní přístup podporovat úkoly správy kontinuity podnikání, včetně stanovení priorit obnovy a provádění plánu obnovy prostřednictvím důkladného šetření.Pravidelné sprinty umožňují týmům efektivně stanovit priority úkolů, rychle identifikovat vznikající rizika a reagovat na ně a neustále zlepšovat strategie řízení kontinuity podnikání, aby byla zajištěna odolnost podniku.Svou strategii jsme iterativně vylepšovali pomocí iterativních sprintů, průběžně testovali a vyhodnocovali efektivitu řešení.

Klíčová slova

Nástroje projektového řízení, agilní metodiky, řízení kontinuity podnikání, iterativní procesy.

Annotation

This thesis explores how Agile Project Management and database concepts can be adopted in the context of Business Continuity Management. Through a careful examination of their interactions, the study highlights the potential benefits that Agile frameworks can provide to Business Continuity Management processes, which are critical to keeping businesses running in the face of disruptions. Fundamentally, the thesis analyzes how Agile's defining characteristics of adaptability and iteration might improve Business Continuity Management procedures. Agile's flexibility, compared to conventional project management concepts, is crucial for negotiating the shifting and uncertain terrain of business demands. The study clarifies how the Agile approach may support Business Continuity Management tasks including recovery prioritization, and recovery plan execution through a thorough investigation. Regular sprints, enable teams to prioritize the tasks effectively, identify and respond to emerging risks promptly, and continuously improve Business Continuity Management strategies to ensure business resilience. We iteratively improved our strategy through iterative sprints, continuously testing and evaluating the effectiveness of the solution.

Keywords

Project Management Tools, Agile Methodologies, Business Continuity Management(BCM), Iterative Processes.

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List of Abbreviation

PMM   Project Management methodology

IT   Information Technology

PMI   Project Management Institute

BCM   Business Continuity Managementnt

MVP   Minimal Variable Product

WIP   Work In Progress

BI   Business Intelligence

RT   Restoration Time

UI   User Interface

BCI   Business Continuity Institute

BCP   Business Continuity Plan

BIA   Business Impact Analysis

RTO   Recovery Time Objective

RM   Risk Management

ID   Identity

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Introduction

In the dynamic and ever-changing domain of project management, the adoption of Agile methodologies has brought about a paradigm shift, redefining traditional practices and approaches. In the field of Business Continuity Management (BCM), where Agile's influence has brought about more dynamic and flexible techniques to manage and mitigate disruptions, this transition is especially noteworthy. In order to secure and maintain critical business processes, this thesis aims to investigate how Agile concepts are applied inside BCM frameworks. Specifically, it emphasizes how these approaches enable organizations to react quickly and efficiently to unforeseen interruptions. This study's main contribution is its in-depth examination of the collaborative and iterative aspects of Agile approaches. Agile concepts like flexibility, iterative development, and stakeholder engagement are essential for effectively managing and quickly addressing changes and obstacles. It aims to illustrate the major benefits that Agile techniques can provide in improving the efficacy and efficiency of BCM procedures by applying these concepts to these processes. Agile has the capacity to revolutionize BCM because of its adaptability and proactive approach to problem-solving, both of which are essential for preserving continuity in times of crisis. Agile techniques can be incorporated into BCM strategies to improve workflow, cut down on downtime, and lessen the effect of interruptions on important company operations. The study seeks to improve present body of knowledge by demonstrating how the adaptable qualities of Agile approaches can be utilized to enhance BCM procedures. The goal of the research is to give project managers and business executives insightful information about how to improve organizational resilience and adaptability by integrating Agile techniques into their BCM plans. By doing this, businesses may protect vital business operations from the erratic threats presented by the external environment by improving their readiness for, response to, and recovery from disruptive events. Agile approaches, with their emphasis on continuous adaptation, stakeholder involvement, and quick response capabilities, provide a strong framework for boosting an organization's resilience and flexibility and preparing it for unforeseen difficulties. This thorough research contributes to more robust and flexible organizational practices by expanding the theoretical discussion of Agile and BCM and acting as a useful manual for putting Agile techniques into practice

in business continuity planning. It shows the importance of a systematic yet flexible approach to BCM, advocating for a blend of strategic foresight and operational agility that can significantly enhance the resilience of business operations against disruptions. Also, the developed database tool is aimed for BCM policy charting in modern enterprises and is tested for it's functionality by BCM experts from the economics faculty, department of informatics TUL. Dr.Podaras, the role of TUL BCM expert, who is the supervisor of the current thesis, is to validate the database tool's results and support its design, conceptualization and development via continuous feedback from the end user's perspective.

Goals and Research description

The goal of this thesis is to design and implement an effective Business Continuity Management (BCM) process using Agile methodology within project management to ensure rapid and efficient continuity planning in the event of disruptions. By leveraging the iterative and collaborative nature of Agile, the thesis aims to enhance the agility and resilience of BCM processes, allowing organizations to quickly adapt and maintain operations under various contingency scenarios. This approach will help to reduce the time to recover from disruptions while ensuring that critical business functions are preserved, minimizing the potential impact on the organization's operations and profitability.

Research Objectives:

To assess the effectiveness of Agile methodology in enhancing the efficiency of Business Continuity Management (BCM) processes.

To identify challenges and develop strategies for the integration of Agile methodology into BCM.

To provide a comprehensive framework for the application of Agile methodology in BCM

1 Project Management overview

Project management refers to the discipline of planning, organizing, leading, and controlling resources to achieve specific goals within defined constraints, such as time, budget, and scope. It involves the application of knowledge, skills, tools, and techniques to manage various aspects of a project effectively. These aspects typically include defining project objectives, creating project plans, allocating resources, managing budgets, coordinating tasks and activities, monitoring progress, mitigating risks, and communicating with customer. The primary objective of project management is to successfully deliver the desired outcomes or deliverables while adhering to constraints and meeting customer' expectations. Whether in construction, IT, engineering, healthcare, or any other industry, project management provides a structured approach to completing projects efficiently and achieving desired results. (Institute PM, 2017)

Planning and Execution: During the planning phase, project objectives, scope, timelines, resources, and budget are defined meticulously to establish a clear framework for success. This involves identifying the goals of the project, outlining the boundaries of work, setting achievable deadlines, allocating necessary resources, and estimating costs. Subsequently, during the execution phase, the project plan is put into action. This involves managing tasks, utilizing resources efficiently, monitoring progress against established timelines and milestones, mitigating risks, and ensuring effective communication with customer. By systematically addressing both planning and execution, project management methodologies provide a structured approach to achieving project objectives while navigating constraints and meeting customer' expectations. (Institute PM, 2017)

Delivering Projects on Time and Within Budget: The central tenet of project management is the timely and cost-effective delivery of projects while meeting specified requirements. This involves meticulous planning to establish realistic timelines and budgets aligned with project objectives and scope. Throughout the project lifecycle, project managers employ various tools and techniques to monitor progress, track expenditures, and manage resources efficiently. By identifying potential risks and implementing mitigation strategies, they safeguard against delays and budget overruns. Effective communication with customer ensures alignment, manages expectations, and

facilitates timely decision-making. Adherence to best practices, continuous monitoring, and agile adaptation to changing circumstances are vital for successful project delivery within prescribed timelines and budgets. Ultimately, by prioritizing efficiency and accountability, project management methodologies contribute to the achievement of project goals while maximizing value for customer. (Institute PM, 2017)

Balancing Competing Constraints: The project managers have to expertly balance a number of variables during the course of a project, including scope, quality, cost, timing, and risk. This means managing expectations from customer, establishing reasonable deadlines, and meticulously planning the distribution of resources. While adhering to budgetary restrictions and quality standards, they must make sure that the project's objectives and scope stay linked. Furthermore, project managers actively recognize and reduce risks that could affect the completion of the project and use techniques to lessen their possible influence. Project managers maximize project performance and raise the possibility of successful outcomes by carefully balancing these variables. Project managers can traverse complexity and give value to customer by utilizing critical components of this balancing act, which include effective communication, smart decision-making, and continual monitoring. (Institute PM, 2017)

Project life cycle: The majority of the time, projects have a systematic lifecycle that includes stages like planning, initiation, execution, monitoring, and closing. There are specific tasks and outcomes associated with each phase. Project objectives are established during the startphase, and requirements from customer are obtained. Planning includes drafting comprehensive project plans that include the budget, timetable, resources, and scope. The process of producing project deliverables through the planned activities is called execution. Project progress is tracked throughout monitoring and controlling, and changes are made as necessary to guarantee adherence to plans. Obtaining stakeholder approval, formalizing project completion, and transferring deliverables to end users are the last steps in the closing phase. Through a methodical progression through these phases, project teams are able to manage resources efficiently, reduce risks, and guarantee good project outcomes. (Institute PM, 2017)

Project Management Tools and Techniques: Utilize a wide range of instruments and methods to efficiently oversee projects. These consist of budgeting tools for allocating and monitoring project expenses, scheduling software for making and maintaining project schedules, and risk management techniques for spotting, evaluating, and averting possible risks. Plans for communication delineate methods for informing project participants while maintaining openness and coherence. In order to satisfy the requirements and expectations of project customer, stakeholder management software assists in locating, ranking, and interacting with them. Furthermore, project management approaches like Waterfall or Agile offer structures for planning and carrying out project activities. Project managers can improve resource usage, reduce risks, promote cooperation, and guarantee project success within predetermined restrictions and objectives by utilizing these tools and strategies. (Institute PM, 2017)

1.1 Benefits of Project Management

Increased Project Success Rates which reduce risks and allocate resources as efficiently as possible, the application of organized project management techniques increases the probability of project success. Project managers reduce uncertainty and increase predictability by methodically planning, carrying out, and monitoring projects using approaches like Agile or Waterfall. Through the early identification of possible dangers via risk management systems, proactive mitigation techniques can be put into place. Project management frameworks also make it possible to allocate resources efficiently by defining precise project objectives, scope, and deadlines. This guarantees that teams have the resources and assistance they need to complete tasks on schedule and within budget. Effective stakeholder involvement and communication also promote alignment and collaboration, which lowers misunderstandings and improves project outcomes. Overall, by encouraging openness, responsibility, and flexibility throughout the project lifetime, structured project management techniques raise the success rates of projects. (Institute PM, 2017)

Improved Communication and Stakeholder Satisfaction: It creates successful stakeholder management methods and clear communicationplans is a major focus of

project management, as these factors ultimately lead to improved stakeholder satisfaction and communication. Clearly defined communication plans specify who the intended receivers are, how information will be distributed, and how often communications will occur. Project managers make sure that all interested parties are informed on the status, modifications, and possible difficulties of their projects by creating clear and open lines of communication. Key customer must be identified, their requirements and expectations must be comprehended, and proactive communication with them must occur throughout the project lifetime in order for stakeholder management to be effective. Project managers increase stakeholder satisfaction with project outcomes by establishing an environment of open communication and promptly addressing issues. Prioritizing stakeholder management and communication generally improves relationships, reduces miscommunication, and enhances. (Institute PM, 2017)

Enhanced Project Efficiency and Cost Control: Project management, with its careful planning and execution, enables enhanced team productivity and efficient cost control. During the planning stage, project managers lay the groundwork for success by carefully outlining the project's goals, scope, schedule, and resource needs. Teams are able to function more effectively because they have a clear grasp of their duties and responsibilities and a clear direction. Project managers also supervise the project plan's implementation during execution, keeping an eye on developments, assigning and managing tasks, and quickly resolving any problems that may come up. Project managers make ensuring that resources are used as efficiently as possible, reducing waste and effectively controlling costs through proactive management and adherence to deadlines and budgets. Through the integration of strategic planning and methodical execution, project management empowers teams to complete projects punctually and economically, hence optimizing value. (Institute PM, 2017)

1.2 Agile overview

Agile project management is based on the same principles found in agile manifesto. Therefore, unlike the linear sequence of well-defined activities of traditional project management, agile project management is characterized by short cycles of iterative and

incremental delivery of product features and continuous integration of code changes. Agile project management introduces changes in management roles as well as in practices. In practice, however, many companies also appoint a project manager to assist a product owner in working on requirements and to handle other matters than those directly related to software development, such as internal and external reporting. However, the introduction of agile development does not change the fundamental knowledge required to develop software, but it does change the nature of collaboration, coordination, and communication in software projects. Moving from traditional to agile project management implies a shift in focus from extensive up-front planning to the crucial decisions that are made during the execution of the project. Most importantly, moving from traditional to agile development implies dealing with complexity and unpredictability by relying on people and their creativity rather than on standard processes and thus moving from command and control to shared decision-making and self-management in software teams. (Dybå et al., 2014)

1.2.1 Uses of Agile

The examination of agile methodology within the context of software projects, particularly concerning project completion time and cost, has become a focal point of recent scholarly research. Notably, scholars like Chow and Cao (2008) and Moore and Benbasat (1991) have contributed significantly by delineating completion time as users' perception of how agile methodologies facilitate the timely delivery of projects. Their research findings have underscored the potential for consistent and frequent utilization of agile methodologies by IT professionals to enhance project success, particularly by adhering to estimated completion timelines. Importantly, perceived compatibility has emerged as a crucial moderating factor influencing this relationship, indicating that its alignment with agile practices can significantly impact project outcomes. (Chiyangwa a Mnkandla, 2018)

The emphasis placed by IT professionals on timely project completion is indicative of their recognition of its pivotal role in ensuring project security and aligning with overarching business objectives. Additionally, the consideration of project cost, as

defined by users' perception of cost savings facilitated by agile methodology usage (Chow & Cao, 2008; Islam, 2016), has emerged as a significant determinant of project success. This suggests that heavy and consistent usage of agile methodologies may contribute to project success by effectively meeting budget estimates, with perceived compatibility playing a crucial role in moderating this effect. (Chiyangwa a Mnkandla, 2018)

Furthermore, the strategic alignment with cost-saving measures facilitated by agile practices may reflect IT professionals' awareness of the direct impact on their remuneration tied to project sales. Consequently, there exists a strategic incentive for IT professionals to prioritize the efficient use of agile methodologies to ensure project success within budgetary constraints. (Chiyangwa a Mnkandla, 2018)

However, it's worth noting that certain factors such as the scope of software projects, which encompass meeting project requirements and specifications, as well as the quality of project outcomes, were not deemed significant in this study due to inconclusive testing results. Nonetheless, this research serves to highlight a notable gap in peer-reviewed literature concerning the moderating effects of perceived compatibility on agile methodology use and perceived success. By shedding light on these nuanced dynamics within software project management, this research offers valuable insights for practitioners and researchers alike seeking to optimize project outcomes through the effective implementation of agile methodologies. (Chiyangwa a Mnkandla, 2018)

1.2.2 Agile project management methods

Agile isn't one specific method, but rather an umbrella term for a set of approaches to project management that emphasize adaptability, collaboration, and continuous improvement. Here are some of the popular Agile methodologies,

Scrum: This is a widely used framework that breaks down projects into short, focused sprints (typically 2-4 weeks). Scrum teams use a variety of ceremonies like sprint planning and daily stand-up meetings to stay on track. (Highsmith, 2009)

Kanban: Kanban focuses on visualizing workflow and limiting work in progress (WIP) to improve efficiency. It uses a Kanban board with columns representing different stages of work (e.g., To Do, In Progress, Done). (Highsmith, 2009)

Extreme Programming (XP): This methodology emphasizes close collaboration between developers and customers. XP practices include pair programming, test-driven development, and continuous integration. (Highsmith, 2009)

Lean: Adapted from manufacturing, Lean Agile focuses on eliminating waste and maximizing value for the customer. It uses techniques like value stream mapping and pull production to streamline processes. (Highsmith, 2009)

ScrumBan: This is a hybrid approach that combines elements of Scrum and Kanban. It offers more flexibility than Scrum while still providing some of the structure of the framework. (Highsmith, 2009)

These are just a few of the many Agile methodologies available.

1.2.3 Agile Project Management Tools

This topic explains about the tools that are using in agile project management.

Kanban boards: Tools like Trello and Kanbanize are two well-known platforms that use this technique, Kanban boards are visual tools that represent workflow stages with cards representing tasks. They emphasize Work in Progress (WIP) limits and continuous flow, facilitating efficient task management and progress tracking. Teams can visualize their work, limit multitasking, and prioritize tasks effectively with the help of Kanban boards, which also increase productivity and streamline project management processes. (Brechner, 2015)

Task Management Tools: Teams may manage tasks more effectively by creating, assigning, monitoring progress, and setting deadlines with the help of tools like Asana and Todoist. They offer cooperative platforms so that members of the team may plan and coordinate their activities, guaranteeing that roles and deadlines are clear. These

characteristics improve overall project structure and execution and enable efficient work delegation. (Brechner, 2015)

Product backlogs: They are lists of prioritized user stories, are effectively managed with the help of tools like Jira Backlog and UserVoice. They give teams the ability to plan, set priorities, and monitor feature and enhancement development by project objectives. (Brechner, 2015)

Communication and Collaboration Tools: Tools like Slack and Microsoft Teams play a crucial role in enhancing communication among team members and customer. They offer features such as messaging, file sharing, and video conferencing, enabling real-time collaboration and information exchange. By providing a centralized platform for communication, these tools help streamline discussions, decision-making, and project coordination, ultimately improving overall team productivity and collaboration. (Brechner, 2015)

Iteration Planning Tools: Scrum planning in agile development is greatly aided by tools such as Azure Boards and Jira Agile Boards. They help teams develop user stories for the sprint, illustrate the workflow, and precisely estimate effort. Through the provision of a task organization platform, priority setting, and progress tracking capabilities, these technologies enable productive sprint planning sessions. They also enable teams to work together to refine user stories, assign tasks, and set sprint goals—all of which contribute to more effective and successful sprint executions. (Brechner, 2015)

 Reporting and Analytics Tools: In agile contexts, tools like Power BI and JIRA reports are essential for gaining insights into project performance. They monitor important data like as burndown charts, which provide a visual depiction of the amount of work left over versus the length of time, and velocity, which shows how much work is accomplished each sprint. Teams may assess their progress, locate bottlenecks, and make wise decisions to increase productivity and efficiency by examining these data. JIRA reports provide in-depth analysis on a number of project management topics, such as team performance, sprint progress, and issue resolution rates. Similar to this, Power BI offers

fully configurable dashboards and reports that combine information from several sources to give in-depth analysis of performance trends and project health. By utilizing these technologies, teams can ensure timely delivery of high-quality work by continuously monitoring and optimizing their agile processes. (Amuthabala et al., 2023)

1.2.4 Classification Based on Functionalities

Planning: Platforms like Jira Backlog help prioritize and manage a list of tasks or user stories. Tools like Sprint Planning in Azure DevOps aid in scheduling and organizing tasks for short development cycles. (Brechner, 2015)

Tracking: Enable tracking of individual tasks, assignments, and progress, ensuring clarity on who is responsible for what and monitoring completion status. Facilitate tracking workflow stages, task statuses, and work in progress limits, promoting transparency and efficient task management. Provide tracking of project metrics, performance indicators, and progress trends, aiding in informed decision-making and continuous improvement efforts. Communication and Collaboration Tools like Slack and Microsoft Teams streamline team interactions, allowing seamless communication, file sharing, and discussion. They enhance project coordination, foster teamwork, and facilitate efficient information exchange among team members. (Brechner, 2015)

1.3 Importance of Agile Tools in IT Projects

Conventional methods carry a high risk of project failure in the event that requirements change since they commit to a complete set of features up front. Because agile is iterative, problems may be found and fixed early on. Teams that operate in brief sprints with regular feedback loops are better able to recognize issues early on and produce deliverables that are of higher quality and require less rework. Shorter Time to Market: Long development cycles are a thing of the past. Agile encourages shorter sprints, which makes it possible to provide features and functionality more quickly. Companies can obtain real-world user input, launch a minimal viable product (MVP) more quickly, and iterate depending on that feedback. They can take advantage of new opportunities and

gain a competitive advantage thanks to their quicker time to market. This truth is embraced by agile techniques. Through iterative development cycles and ongoing feedback, teams may adjust to changing requirements. Because of this adaptability, projects are guaranteed to remain current and in line with market demands, even as those needs evolve. Enhanced Team Morale and Productivity: Agile promotes a cooperative work atmosphere where team members are self-reliant and empowered. Frequent retrospectives and transparent communication promote problem-solving and ownership, which boosts team morale and productivity. When members of a team are able to influence their work and have a clear grasp of the project goals, they feel more motivated and engaged. (Amuthabala et al., 2023)

1.3.1 Impact of Agile tools on project outcomes and success rates

Tools that offer a clear visual depiction of project progress are burndown charts and Kanban boards. All parties involved are able to view the work in progress as well as any obstacles that may arise. This openness encourages responsibility, enhances communication, and makes it possible to identify problems early on that could prevent a project from succeeding. Agile platforms that allow for seamless collaboration across geographical boundaries include Slack and Microsoft Teams. Teams can communicate more efficiently, share information, and stay connected with the help of features like file sharing, video conferencing, and chat rooms. This promotes a culture of information exchange and problem-solving, which enhances decision-making and project results. Repetitive operations like allocating work items, monitoring deadlines, and producing reports are automated by agile solutions. This gives teams significant time back to concentrate on the main tasks of the project. Workflow automation features can also be used to further streamline procedures and increase project productivity by triggering notifications and actions depending on predetermined circumstances. (Brechner, 2015)

1.3.2 Comparative analysis of agile versus traditional project management tools

Agile and traditional project management tools offer distinct features and functionalities catering to different project management methodologies. Traditional project management tools, such as Microsoft Project and Gantt charts, are typically designed for linear, sequential project management approaches. They excel in creating comprehensive project plans with detailed task dependencies, resource allocation, and timeline tracking. These tools provide a structured framework for project managers to plan, monitor, and control projects, offering features like critical path analysis and resource leveling to optimize project schedules. In contrast, Agile project management tools, like Jira and Trello, are tailored for iterative and incremental project management methodologies. They facilitate collaborative planning, prioritization, and execution of tasks in short iterations or sprints. Agile tools emphasize flexibility and adaptability, allowing teams to easily adjust priorities, accommodate changes, and continuously deliver value to customers. They offer features such as user story management, sprint planning, and burndown charts to support Agile practices like Scrum and Kanban. While traditional tools focus on detailed planning and control, Agile tools prioritize collaboration, visibility, and responsiveness to change. Both types of tools have their strengths and limitations, and the choice between Agile and traditional project management tools depends on factors such as project complexity, team dynamics, and organizational culture. Ultimately, organizations should select tools that best align with their chosen project management methodology and enable teams to effectively plan, execute, and deliver successful projects. (Engelhardt, 2019).

1.4 Agile project management and key indicators

In Agile project management, there are several key indicators that help teams and stakeholders understand the progress and success of their projects. key indicators such as velocity, cycle time, lead time, cumulative flow diagrams, defect rate, work in progress, customer satisfaction, backlog health, team happiness, and business value delivered, provide insights into project progress. These metrics aid teams and stakeholders in making informed decisions to ensure project success and deliver value effectively. (Shantaram, 2020)

Velocity: Velocity serves as a pivotal metric in Agile project management, quantifying the volume of work accomplished by a team within a specific iteration, typically a sprint.

By analyzing velocity, teams gain insights into their work capacity, facilitating better planning and forecasting for subsequent iterations. This understanding enables teams to make informed decisions about the amount of work they can realistically undertake in future sprints, promoting efficiency and productivity in Agile development cycles. (Shantaram, 2020)

Cycle time: A fundamental Agile metric, tracks the duration for work items, like user stories or tasks, to traverse from initiation to completion. This measurement serves as a diagnostic tool, revealing bottlenecks and inefficiencies within the team's workflow. By pinpointing areas of delay, teams can implement targeted improvements to streamline processes and enhance overall efficiency in project delivery. (Shantaram, 2020)

Lead time: It encapsulates the interval starting from when the developer team first receives a request until the work item is finalized, encompassing the journey of the task as it progresses through the workflow stages. This metric offers a holistic perspective on the efficiency and responsiveness of the team's processes. Analyzing lead time aids in pinpointing areas for improvement, optimizing workflow dynamics, and enhancing overall project delivery effectiveness. (Shantaram, 2020)

Defect rate: Defect rate quantifies the frequency of flaws discovered within the product over a defined timeframe, offering insight into its quality. By scrutinizing defect rates, teams can gauge the efficacy of their development practices and product quality control measures. (Institute PM, 2017)

Work In Progress: By monitoring Work in Progress (WIP), teams can pinpoint bottlenecks, regulate capacity, and ensure a smooth workflow in Agile projects. Excessive WIP signals potential overburdening or workflow inefficiencies, while low WIP may imply resource underutilization. Striking the appropriate WIP balance is vital for maximizing productivity and throughput. It facilitates efficient resource allocation, promotes timely task completion, and fosters a cohesive team dynamic, ultimately driving project success in Agile environments. (Institute PM, 2017)

Flow efficiency: Flow efficiency provides valuable insights into how efficiently work moves through the development process. A high flow efficiency indicates that work items are progressing smoothly without significant delays or idle time, while a low flow

efficiency suggests bottlenecks, interruptions, or inefficiencies in the workflow. By tracking flow efficiency, teams can identify areas for improvement, optimize their processes, and increase productivity. It helps in making data-driven decisions to streamline workflows, reduce lead times, and deliver value to customers more effectively in Agile projects. (Psarov a Druzhinin, 2024)

Customer satisfaction: These metrics like customer feedback surveys are pivotal in Agile project management, offering insights into customer contentment with products or services. These metrics gauge satisfaction levels and perception of value, aiding teams in evaluating alignment with customer expectations. By continuously monitoring these metrics, teams can adapt and refine their approaches to ensure customer-centricity, drive product enhancements, and foster long-term loyalty, ultimately bolstering the success and sustainability of Agile projects. (Berlas, 2024)

1.5 Criteria for selecting tool

In selecting project management tools, it's crucial to match their functionalities to the specific Agile methodology being employed. For Scrum, which emphasizes short, time-boxed iterations called sprints, tools with Scrum boards and sprint backlogs are essential. These boards visually represent the tasks to be completed within each sprint and track their progress. They typically include features for sprint planning, backlog grooming, and sprint retrospectives, facilitating the Scrum ceremonies and ensuring transparency and alignment within the team. Additionally, Scrum tools often offer burndown charts to visualize the team's progress towards completing the sprint goal, enabling better monitoring and adjustment of the team's performance. On the other hand, for Kanban methodologies, which focus on continuous flow and limiting work in progress (WIP), Kanban boards are fundamental. These boards visualize the workflow stages and allow teams to manage their work by moving cards across the board from one stage to another. Kanban tools provide features for setting WIP limits, prioritizing tasks, and tracking cycle time, enabling teams to optimize their flow efficiency and identify bottlenecks quickly. Moreover, Kanban tools often include cumulative flow diagrams to visualize the flow of work items over time, aiding in identifying areas for improvement and optimizing the overall process. (Shore et al., 2021)

Jira: It is a versatile Agile project management tool widely used by software development teams. It offers features for creating and managing Scrum boards, backlog grooming, sprint planning, burndown charts, and reporting. With its customizable workflows and boards, Jira enables teams to adapt Scrum practices to their specific needs. Its intuitive interface and integration capabilities make it a popular choice for teams of all sizes. (Li, 2016)

1.5.1 Factors influencing the choice of Agile tools

In project needs and methodology, it is imperative that tool functionalities align with the Agile approach that you have selected for successful project management. For example, scrum boards with sprint backlogs are essential to Scrum because they give a visual depiction of the tasks scheduled for each sprint and allow you to monitor their progress. Likewise, work in progress (WIP) limitations can be managed and workflow stages visualized by teams thanks to Kanban boards, which are crucial to Kanban techniques. Knowing the processes of your technique makes it easier to determine what features your tools need. In Scrum, this may include burndown charts, sprint planning, and backlog grooming; in Kanban systems, this could include features like work prioritization, WIP limits, and cycle time tracking. Teams may improve cooperation, transparency, and efficiency in providing value to customer by matching tool functionalities with your Agile methodology. (Layton a Ostermiller, 2017)

Team dynamic and collaboration: The team size and communication style play significant roles in determining the appropriate project management tool. Smaller teams with fewer members may find basic chat functionalities adequate for communication, as they can quickly exchange messages and updates. However, larger teams require more robust features like video conferencing and document sharing to facilitate seamless collaboration across dispersed members. The chosen tool should align with the team's preferred communication methods to ensure effective interaction and information exchange. Understanding the team's dynamics, preferences, and communication needs is essential in selecting a tool that fosters efficient collaboration and enhances productivity, regardless of team size. By selecting a tool that supports the team's communication style, organizations can promote transparency, streamline workflows, and ultimately achieve project success. (Layton a Ostermiller, 2017).

Project complexity: If is a crucial factor in determining the appropriate level of feature richness in project management tools. For simple projects, basic task management tools may suffice, offering functionalities like creating and assigning tasks, setting deadlines, and tracking progress. However, as project complexity increases, especially in large-scale or multi-faceted endeavors, more robust Agile project management software becomes essential. These tools provide advanced features such as dependency management, comprehensive reporting capabilities, and sophisticated workflow automation to handle the intricacies of complex projects effectively. The chosen tool should have the flexibility to scale with the project's evolving needs, accommodating additional functionalities and adapting to changing requirements as the project progresses. By selecting a tool that matches the project's complexity and can grow alongside it, teams can ensure efficient project management and successful project outcomes. (Layton a Ostermiller, 2017).

User-friendliness and training requirements: Project management solutions must be successfully adopted by a team, and an interface that is easy to use is essential. Team members should have as little of a learning curve as possible with the tool's simple navigation. A complicated UI can reduce productivity and cause users to become frustrated, which makes them reluctant to take full advantage of the tool's potential. Organizing training sessions can guarantee that team members are able to fully utilize the tool's potential and assist acquaint them with its functions. Providing resources for troubleshooting and continuing support can also take care of any issues that come up throughout use. In the end, choosing tools with user-friendliness as a top priority improves teamwork, expedites processes, and increases overall productivity. Choosing a tool with an easy-to-use interface and offering sufficient guidance and assistance are two ways that firms might simplify adoption. (Layton a Ostermiller, 2017).

1.5.2 Evaluation criteria for selecting the most suitable tool

It is essential to provide top priority to project management solutions that support the essential principles of Agile. Agile approaches and ideas are tightly aligned with tools that provide quick experimentation, constant feedback, and iterative development. By

facilitating iterative planning and execution, these tools facilitate rapid feature delivery by enabling teams to gradually provide value to customer. The implementation of user story management elements facilitates the division of requirements into feasible segments, hence promoting teamwork and openness. A comprehensive overview of activities and their progress is provided via visual workflow representation, such as Kanban boards or Scrum boards, which encourages visibility and alignment within the team. The selected tool can improve teamwork, adaptability to change, and ultimately the delivery of high-quality products that successfully satisfy client expectations by highlighting these essential Agile qualities. (Ries, 2011).

Focus on minimizing waste: while selecting a project management tool that minimizes waste is essential for optimizing efficiency and maximizing productivity. Look for features such as automated workflows, which reduce manual intervention and streamline processes, saving time and effort. Real-time collaboration capabilities enable seamless communication and coordination among team members, eliminating delays and ensuring swift decision-making. Additionally, robust reporting functionalities provide insights into project progress and performance, enabling informed decision-making and timely adjustments. By leveraging these features, the chosen tool empowers teams to focus on delivering value to customers rather than managing administrative burdens. It promotes a lean approach to project management, where resources are utilized efficiently, and efforts are directed towards achieving project goals effectively. Ultimately, minimizing waste enhances team productivity, accelerates project delivery, and drives overall success. (Ries, 2011).

Selection of tools: When selecting project management tools, prioritize those that offer insightful data and reporting capabilities. The ability to track metrics, analyze user feedback, and visualize progress allows for data-driven decision-making and continuous improvement. Look for a tool that provides data dashboards, customizable reporting tools, and integration with analytics platforms. These features enable teams to monitor key performance indicators, identify trends, and make informed decisions based on actionable insights. By leveraging data-driven reporting, teams can optimize processes, address bottlenecks, and enhance overall project performance. Additionally, the integration with analytics platforms facilitates deeper analysis and correlation of data across different sources, providing a comprehensive view of project health and enabling

proactive management. Ultimately, choosing a tool with robust data and reporting capabilities empowers teams to drive efficiency, effectiveness, and success in project management endeavors. (Ries, 2011).

scalability and future needs: Selecting a project management tool that can adapt and grow with your project and team is essential for long-term success. As projects evolve or teams expand, the tool should seamlessly scale to accommodate new requirements and challenges. Prioritize options with flexible features that can be tailored to meet evolving needs, ensuring that the tool remains relevant and effective as circumstances change. Robust customization options enable teams to configure workflows, processes, and layouts according to their unique preferences and workflows. Additionally, look for tools with the ability to integrate with additional software and tools as needed, allowing for seamless collaboration and data exchange across platforms. By choosing a tool that can adapt and grow alongside your project and team, you can future-proof your project management processes and ensure continued efficiency and productivity in the face of evolving demands. (Ries, 2011).

Security and User Adoption: When selecting a project management tool, prioritizing security features, especially when handling sensitive project data, is paramount. Look for tools that offer robust security measures such as data encryption to protect sensitive information from unauthorized access or breaches. Access control features ensure that only authorized users can view or modify project data, enhancing confidentiality and integrity. Regular backups safeguard against data loss and ensure business continuity in the event of system failures or disasters. Additionally, prioritize a user-friendly interface with a minimal learning curve to encourage team adoption and utilization of the tool's security features. Providing training sessions and resources can further support teams in understanding and implementing security best practices. By choosing a tool with comprehensive security measures and a user-friendly interface, organizations can mitigate risks, protect sensitive data, and foster a culture of security awareness within the team. (Ries, 2011)

1.6 Integration of Agile Tools with Development Processes

James P. Womack and Daniel T. Jones' 2013 book "Lean Enterprise" is still a useful resource for learning about Agile principles and how they are integrated with development processes using tools. (Womack a Jones, 2013).

1.6.1 Streamlining Workflows and Kanban Boards

By combining Agile technologies with Kanban boards, which are an essential visual aid in Kanban approaches, project managers may work more effectively and efficiently. By automating workflow stages like "To Do," "In Progress," and "Done," these integrated technologies make it possible to track work item progress consistently across the board. Kanban boards facilitate openness within the team by giving everyone a clear visual depiction of work status and making it easier to see possible bottlenecks or opportunities for improvement. Teams may streamline their operations, properly prioritize activities, and guarantee a consistent rate of delivery by visualizing the flow of work items. Additionally, by giving teams real-time insights into project performance and progress and enabling them to react, the combination of Agile technologies with Kanban boards promotes continuous improvement. (Womack a Jones, 2013).

1.6.2 Enhanced Collaboration and Communication

Agile tools offer invaluable features for real-time communication and collaboration within development teams, enhancing productivity and fostering teamwork. By integrating features such as chat rooms, task comments, video conferencing, and document sharing, these tools facilitate seamless information exchange and collaboration among team members. Real-time communication ensures that everyone stays informed and aligned with project goals, minimizing misunderstandings and reducing the risk of communication silos. Collaboration features allow team members to work together efficiently, share updates, and provide feedback instantaneously, promoting a collaborative environment where ideas can be shared and problems can be solved

collectively. By utilizing Agile tools for communication and collaboration, development teams can streamline workflows, improve decision-making processes, and ultimately deliver high-quality products more effectively and efficiently. (Womack a Jones, 2013).

1.6.3 Improved Reporting and Data-Driven Decision Making

Integrating Agile tools with reporting and data visualization functionalities is essential for gaining valuable insights into team performance and project progress. By tracking metrics such as velocity, cycle time, and defect rates, teams can measure their productivity, identify potential bottlenecks, and track progress towards project goals. These data-driven insights enable informed decision-making and continuous process optimization, as teams can identify areas for improvement and adjust their strategies accordingly. Visualizing data through charts, graphs, and dashboards makes it easier to understand trends and patterns, facilitating effective communication and collaboration among team members and customer. Ultimately, by leveraging Agile tools with robust reporting and data visualization capabilities, teams can enhance transparency, drive efficiency, and deliver high-quality results that meet customer expectations. (Womack a Jones, 2013)

1.7 Consideration of parameters

Agile project management techniques are becoming more and more common, but they are not without challenges. Some of the challenges are listed below.

1.7.1 Limited Team Ownership

In Agile methodologies, team empowerment is a cornerstone, fostering collaboration, creativity, and ownership of project outcomes. However, transitioning from a traditional, directive approach to a more autonomous one can encounter resistance within certain teams. Some individuals may be accustomed to clear instructions and hierarchical structures, feeling uncomfortable or uncertain with increased responsibility and

decision-making authority. Moreover, fear of failure or lack of confidence in their capabilities may hinder their willingness to embrace this change fully. Addressing these concerns requires supportive leadership, effective communication, and gradual adaptation strategies to encourage teams to embrace their newfound ownership and autonomy in the Agile process. (Institute PM, 2017)

1.7.2 Communication Issues

Clear communication is paramount in Agile methodologies, ensuring alignment between customers, product owners, and developers throughout the project lifecycle. However, despite its emphasis on communication, Agile teams may encounter challenges such as misinterpretation, information silos, or differing priorities. Ambiguity in requirements or frequent changes can exacerbate these issues, leading to misunderstandings and delays. Addressing communication issues requires fostering an environment of transparency, active listening, and regular feedback loops. By promoting open dialogue, shared understanding of goals, and collaborative problem-solving, Agile teams can mitigate communication barriers and enhance project success through effective coordination and alignment across all customer. (Crispin a Gregory, 2008).

1.8 Limitations of Agile Tools in Specific Project Scenarios

There are some of the limitations in specific project while considering or selecting the projects.

1.8.1 Large, Complex Projects

While Agile methodologies excel in iterative development and flexibility, they may encounter challenges when applied to large and complex projects. Such projects often involve intricate dependencies, diverse stakeholder interests, and extensive coordination efforts, which can strain Agile's lightweight and adaptive approach. Moreover, scaling Agile practices across multiple teams or departments may introduce coordination overhead and alignment issues. Additionally, maintaining consistency and

coherence in product vision and architecture becomes more challenging as project scope expands. To address these challenges, organizations may adopt scaling frameworks like SAFe or LeSS, supplement Agile practices with traditional project management techniques, or tailor Agile processes to suit the unique demands of large-scale projects. (Turk et al., 2014)

1.8.2 Day-to-day operational challenges

In Agile project management, day-to-day operational challenges can include issues such as backloading documentation and testing, decreased visibility of project progress, inaccuracies in effort estimations, difficulties in requirement development, integration complexities with other systems, frequent interruptions, indecisions on architecture, limited time to address failed tests, the intricacies of large and complex projects, overwhelming backlog sizes, outdated backlog items, and excessive meeting schedules, all of which can impact project efficiency and delivery timelines. (Miller, 2013).

1.9 Strategies for Overcoming Challenges and Mitigating Limitations

This topic explains the strategies to overcome the challenges and mitigation limitations while doing the projects.

1.9.1 Training and Education

Prioritize investment in comprehensive training programs tailored for management, product owners, and developers, aimed at instilling deep understanding of Agile principles and proficiency in utilizing Agile tools. Such initiatives cultivate a shared language and mindset within the organization, fostering smoother adoption and integration of Agile methodologies across teams and departments. (Crispin a Gregory, 2008)

1.9.2 Hybrid Approaches

Evaluate the feasibility of blending Agile methodologies with elements of traditional approaches such as Waterfall, particularly for larger projects or those governed by stringent regulations. By striking a balance between flexibility and structure, hybrid approaches enable organizations to harness the benefits of Agile's iterative nature while maintaining the necessary controls and predictability demanded by certain project contexts. (Crispin a Gregory, 2008).

1.9.3 Focus on Communication

Establish robust communication frameworks comprising clear channels, regular meetings, and open forums to ensure alignment on project priorities, progress, and challenges among all customer. Effective communication fosters transparency, collaboration, and timely problem-solving, facilitating smoother project execution and stakeholder engagement throughout the Agile journey. (Crispin a Gregory, 2008)

1.9.4 Invest in the Right Tools

Select Agile tools thoughtfully, considering factors such as functionality, scalability, and compatibility with organizational processes. Tailoring tool choices to specific project needs and team dynamics enhances workflow efficiency, promotes seamless collaboration, and supports effective project management, driving improved productivity and project outcomes in Agile environments. (Crispin a Gregory, 2008)

1.9.5 Metrics and Measurement

Define a set of relevant success metrics aligned with Agile principles, reflecting key aspects such as product quality, team performance, and customer satisfaction. Adapting these metrics to the unique context of each project enables teams to monitor progress, identify areas for improvement, and make data-driven decisions, ultimately driving continuous improvement and delivering greater value to customer. (Crispin a Gregory, 2008)

2 Data modelling for business continuity management

Data modeling for business continuity management involves structuring and organizing data in a manner that ensures critical information is accessible and resilient during disruptions. It helps in identifying dependencies, critical processes, and recovery priorities, enabling organizations to develop effective continuity strategies and mitigate risks effectively.

2.1 Database Theory

A database management system (DBMS) serves as a critical intermediary between users and the underlying database, providing a structured and efficient means of accessing, storing, and retrieving data. It acts as the custodian of the database, ensuring its integrity, security, and accessibility. Through its functionality, the DBMS enables users and applications to interact with the database seamlessly, abstracting away the complexities of data storage and retrieval. (Snehal Eknath Phule, 2024).At the core of the DBMS lies its ability to define, store, and retrieve information effectively. It offers mechanisms for users to specify the structure of the data, including defining tables, relationships, and constraints. By organizing data in a systematic manner, the DBMS facilitates efficient storage and retrieval operations, optimizing performance and scalability. (Snehal Eknath Phule, 2024).

One of the fundamental features of a DBMS is its capability to support concurrent access by multiple users and applications. Through sophisticated concurrency control mechanisms, the DBMS ensures that transactions are executed in a manner that preserves data consistency and integrity, even in a multi-user environment. Furthermore, the DBMS plays a crucial role in data security and privacy. It implements access control mechanisms to regulate who can access specific data and under what circumstances. By enforcing authentication, authorization, and encryption mechanisms, the DBMS safeguards against unauthorized access, data breaches, and privacy violations. (Snehal Eknath Phule, 2024).

2.2 Software tools for data modeling and database development

Data modeling is a fundamental aspect of database management, and here is where graph theory finds its relevance. Graph theory provides a powerful framework for representing and analyzing relationships between data entities. By modeling data as a graph, with nodes representing entities and edges representing relationships, graph theory enables sophisticated data modeling capabilities, such as hierarchical structures, networks, and interconnected systems. (Snehal Eknath Phule, 2024)In the context of query processing, graph theory offers techniques for optimizing query execution and retrieval. Graph algorithms, such as shortest path algorithms and graph traversal algorithms, can be leveraged to efficiently navigate through complex data structures and retrieve relevant information. Additionally, graph-based query languages and query optimization strategies enable the DBMS to execute queries more efficiently, reducing response times and resource consumption. (Snehal Eknath Phule, 2024).

System optimization is another area where graph theory plays a significant role in database management. By analyzing the structure and connectivity of data graphs, the DBMS can identify opportunities for performance improvement, such as index optimization, query rewriting, and data partitioning. Moreover, graph-based techniques can be applied to enhance data storage and retrieval strategies, leading to better overall system performance and scalability. (Snehal Eknath Phule, 2024).

2.2.1 Draw.io Diagrams and Project Management

Draw.io diagrams aid project management by visually representing project workflows, timelines, and structures, facilitating communication and enhancing collaboration among team members. Additionally, they provide a centralized platform for documenting project plans, requirements, and decision-making processes, streamlining project management efforts.

Visualizing Project Workflows: By using tools such as Draw.io to visualize project workflows, teams may generate detailed diagrams that represent activities, phases, and dependencies. These graphic depictions, like swimlane diagrams or flowcharts, provide a clear picture of the project's development. Teams can quickly locate bottlenecks and

areas for optimization by outlining the procedure. Team members are better able to comprehend one another thanks to this visual clarity, which promotes cooperation and alignment on project goals. It also aids in scheduling and resource allocation planning, guaranteeing effective project management. All things considered, using visualization tools such as Draw.io improves communication, expedites procedures, and ultimately helps projects be completed successfully. (Hernandez, 2022)

Mind Mapping and Brainstorming: Draw.io is a useful tool for team brainstorming sessions and mind mapping in addition to project workflows. Teams can visually capture ideas, investigate the connections between concepts, and efficiently prioritize activities thanks to its user-friendly design. Through the application of functionalities like editable forms, connectors, and color coding, users may arrange their ideas in a methodical and aesthetically pleasing way. Draw.io mind maps offer a comprehensive perspective of the brainstorming session, making it simple for team members to understand the main themes and relationships between various ideas. Additionally, Draw. Io's collaborative features allow for real-time editing and feedback, which promotes lively conversations and innovative teamwork. This method encourages creativity and problem-solving because groups can investigate different options and solutions together. Overall, Draw.io serves as a versatile platform for facilitating productive and engaging brainstorming sessions within teams. (Gates a Tonyan, 2022)

User Interface (UI) Prototyping: Draw.io is a good platform for simple UI prototyping, even though it's not as advanced as dedicated UI design tools. Early in the project lifecycle, it enables designers to rapidly produce wireframes and mockups to graphically convey design concepts to customer. Draw.io helps designers quickly develop user interface layouts and interactions using its user-friendly interface and extensive array of shapes and icons. Draw.io offers all the necessary elements for organizing and visualizing design concepts, even though it lacks some of the more sophisticated features found in specialized UI design tools. These prototypes serve as discussion starters and feedback loops, giving customer a chance to offer guidance and suggestions early on. Furthermore, Draw.io's collaborative features facilitate in-the-moment teamwork, which improves the prototype process. Because of its ease of use and accessibility, Draw.io is a useful tool for starting conversations about UI design and coordinating expectations among customer early in a project. (Gates a Tonyan, 2022)

Gantt Charts and Project Schedules: With the help of Draw.io, users may create simple Gantt charts that visually illustrate task relationships and project schedules. This function is helpful for preliminary project planning and progress tracking even though it isn't as feature-rich as specialized project management software. It is simple for users to set dependencies between activities, give durations, and specify project tasks. The resulting Gantt chart offers a concise summary of resource allocation, critical path analysis, and project dates. Teams may better grasp the scale of the project, spot possible bottlenecks, and modify timelines as necessary by displaying this data. Additionally, Draw.io's collaboration features let teams communicate and agree on project goals. Draw.io is a useful tool for basic project planning and progress tracking, although lacking some sophisticated capabilities. Its accessibility and ease of use make it an excellent choice. (Hernandez, 2022)

2.2.2 Ms Access for database development:

Microsoft Office suite, Access provides a comprehensive platform for users to create, manage, and manipulate databases without the need for extensive programming knowledge. At its core, Access allows users to design and create relational databases, consisting of tables, queries, forms, and reports, to organize and store data in a structured format. Tables serve as the foundation for storing data, with users defining fields to represent different data attributes and records to store individual data instances. Access also facilitates the establishment of relationships between tables, enabling users to enforce referential integrity and maintain data consistency across the database. The built-in query designer empowers users to retrieve and manipulate data using SQL (Structured Query Language) or a graphical interface, facilitating powerful data analysis and reporting capabilities. Additionally, Access offers a variety of tools for creating custom forms to streamline data entry and modification processes, as well as generating professional-looking reports to present data in a visually appealing manner. Furthermore, Access seamlessly integrates with other Microsoft Office applications, enabling users to import and export data, perform mail merges, and automate tasks, thereby enhancing productivity and interoperability. While Access is well-suited for small to medium-sized databases, it may have limitations in scalability and concurrent user support, making it less suitable for large-scale enterprise-level applications. Nonetheless, Microsoft

Access remains a popular choice for individuals and organizations seeking a flexible and user-friendly solution for database development and management. (Alexander et al., 2018)

2.3 Business Continuity Management

Business Continuity Management (BCM) emerges as a paramount strategic endeavor for organizations worldwide, tasked with the proactive anticipation and effective navigation of potential disruptions to mission-critical operations and processes. The Business Continuity Institute (BCI) offers a comprehensive definition of BCM, encompassing its multifaceted nature and core principles. At the heart of the BCI's definition lie three pivotal components, each essential for understanding the depth and breadth of BCM and its significance in modern business landscapes. Firstly, BCM is portrayed as a proactive process centered on foreseeing events that could pose a threat to organizational stability and resilience. This proactive stance necessitates a thorough assessment of hazards and risks, extending beyond traditional notions of disasters to encompass a diverse spectrum of incidents. These incidents encompass various scenarios ranging from natural calamities, such as floods or fires, to technological failures, supply chain disruptions, fraud incidents, reputational crises, and beyond. By embracing this holistic perspective, BCM enables organizations to cultivate a comprehensive understanding of potential threats and vulnerabilities, thereby empowering them to devise robust strategies to mitigate risks and ensure continuity in the face of adversity. Moreover, the BCI's definition underscores the imperative of focusing on major incidents that significantly impact fundamental operations, eschewing the temptation to solely address routine operational failures. This strategic emphasis on the bigger picture underscores BCM's role in safeguarding the overarching resilience of the organization, necessitating a proactive approach to risk management and crisis preparedness. While daily operational procedures remain integral, BCM encourages organizations to prioritize the broader continuity of critical functions, recognizing that resilience extends beyond isolated incidents to encompass systemic vulnerabilities and interdependencies within the business ecosystem. Furthermore, the BCI's definition emphasizes the importance of reacting to incidents methodical and practiced manner, underpinned by meticulous

planning, rigorous testing, stakeholder engagement, and organizational ownership of response plans. By institutionalizing BCM practices into the organizational culture and operational framework, companies can enhance their readiness, responsiveness, and adaptability in the face of adversity. This proactive stance not only minimizes the impact of disruptions but also fosters a culture of resilience and continuous improvement, positioning organizations to thrive amidst uncertainty and change. In essence, BCM serves as a cornerstone of organizational resilience, enabling companies to navigate through crises with agility, effectiveness, and confidence. By embracing the principles of foresight, strategic focus, and preparedness embodied in the BCI's definition, businesses can fortify their defenses against potential threats, thereby ensuring their sustained success and longevity in an increasingly complex and volatile business landscape. (Gallagher, 2003). Developing a Business Continuity Plan (BCP) for the Finance department is essential to ensure the organization's financial systems can operate seamlessly amidst potential risks or hazards. The primary objective of this plan is to uphold the functionality and integrity of financial operations by providing a systematic framework to mitigate risks and manage emergencies or system failures effectively. Central to the BCP's efficacy is its capability to sustain critical financial functions, thereby minimizing disruptions even in the face of severe challenges. To effectively address this task, adopting a project management approach infused with agile methodologies is crucial, enabling swift adaptation and response to evolving circumstances. By segmenting the BCP into smaller sprint activities, the Finance department can methodically tackle various components of risk mitigation and continuity planning. Each sprint activity serves as a focused initiative aimed at enhancing resilience, whether it entails reinforcing cybersecurity measures, establishing redundancy in systems, or implementing contingency protocols. Project management principles guide the allocation of resources, establishment of realistic timelines, and facilitation of collaboration among customer to execute the BCP proficiently. Moreover, sprint activities allow for iterative improvements, enabling the Finance department to refine strategies based on ongoing assessments and emerging threats. Embracing this iterative approach fosters a culture of continuous enhancement, bolstering the organization's preparedness to confront unforeseen challenges effectively. Ultimately, the integration of project management and sprint activities within the realm of business continuity

planning empowers the Finance department to navigate uncertainties with confidence, safeguarding financial stability and operational continuity in the face of adversity. (Gallagher, 2003)

3 Project Success

This project effectively shows how the Scrum framework method, a part of Agile methodologies, boosts resilience and efficiency in managing business continuity within financial operations. By using Scrum's well-organized sprint cycles and thorough planning, it underlines the crucial role of Scrum practices in building strong organizational responses to disruptions. Through regular sprint reviews, the project continuously tweaks and improves recovery strategies, making sure financial departments are ready to deal with potential crises. Each sprint provides a detailed assessment of progress and recovery planning, allowing for precise changes to workflows and priorities based on immediate feedback. This method not only keeps stability and continuity but also demonstrates how Scrum can enhance operational workflows and aid strategic business planning in changing conditions.
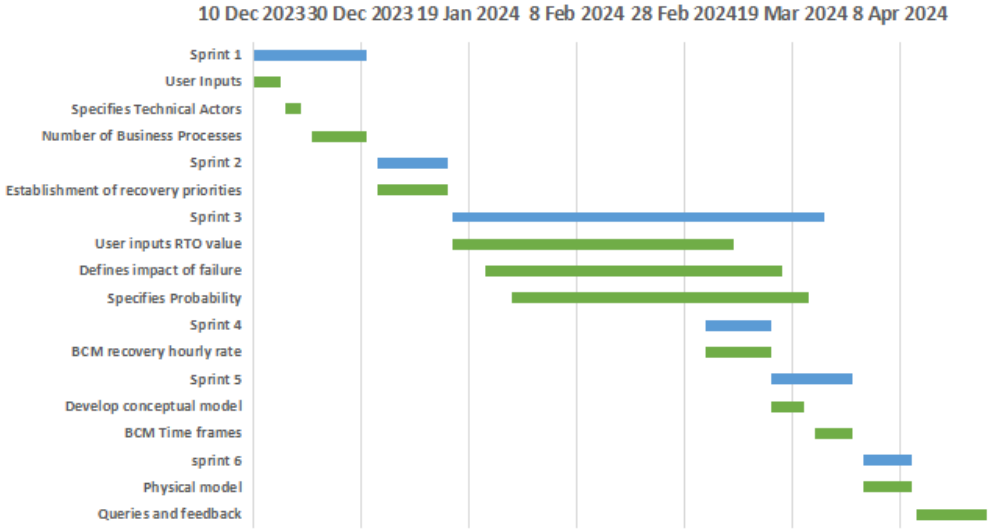
Gantt chart for the projects,

Figure 1.Gantt chart

Source: Own Contribution

3.1 Computing RTO

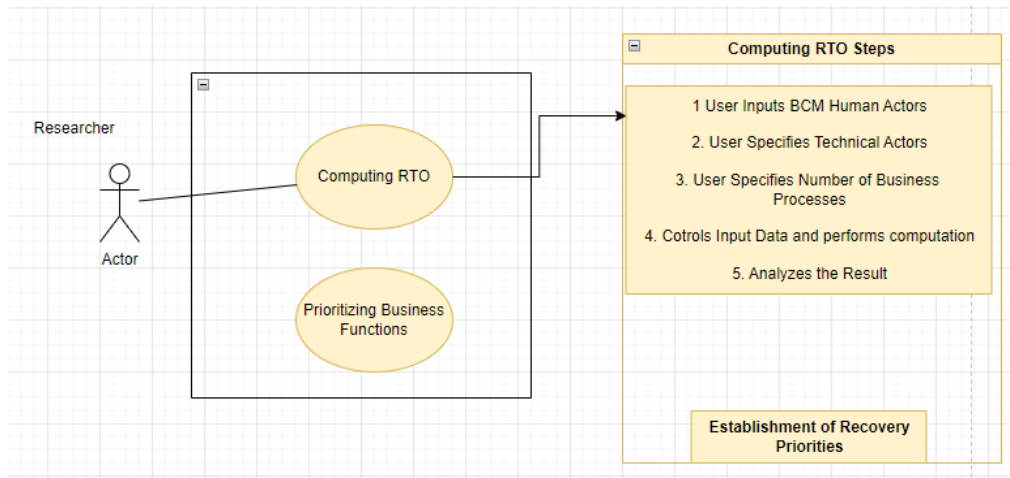This Iteration encompasses the entire process of computing RTO steps.

Figure 2.Computing RTO

Source: own contribution

3.1.1 Sprint Activities 1

Business Unit: These tasks encompass various responsibilities like the role of responsible, recovery measures, operation, activity, and identity within the finance department that are crucial for maintaining financial stability.

User Inputs BCM Human Actors: In this is a critical phase that involves locating and recording the organizational human actors who will be essential to carrying out the Business Continuity Management (BCM) plan. These people have distinct duties and responsibilities that are essential to helping the healing process. By clearly defining their roles, the company guarantees BCM execution efficiency and clarity, strengthening its resistance to interruptions. By identifying these essential individuals, corporate

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operations are protected and possible risks are reduced during times of crisis through efficient coordination and effective reaction.

User Specifies Technical Actors: Within the field of corporate Continuity Management (BCM), personnel connected to the finance department are essential to maintaining the robustness of corporate operations. In addition to overseeing financial recovery procedures, their duties also include managing financial resources and determining the financial effects of interruptions. These people manage the financial resources allotted to recovery activities. Their knowledge guarantees financial stability in times of crisis, allowing the company to continue operations and successfully overcome obstacles. It is essential to recognize and provide these workers with the necessary authority within the BCM framework in order to protect financial continuity and integrity in unfavorable situations.

User Specifies Number of Business Processes: This procedure comprises outlining the precise duties or obligations that a worker in the finance department is capable of handling. It entails evaluating the person's abilities to perform different financial tasks based on their knowledge, expertise, and abilities. Financial reporting, forecasting, budgeting, auditing, compliance, and strategic financial planning are a few examples of these. Organizations can optimize resource allocation, ensure task balance, and improve overall financial department efficiency by determining the talents and limitations of each person. A clear understanding of the employee's job description facilitates the alignment of duties with corporate objectives and the advancement of efficient financial management procedures.

Controls Input Data and Performs Computation: In this procedure establishes who among the financial department staff members has access rights to particular tools or systems. Access is usually offered to those who work in data administration, accounting, or financial analysis. They have been given the responsibility of entering and modifying confidential financial data for reporting and decision-making. To guarantee data security, integrity, and regulatory compliance, access is restricted. Establishing clear guidelines for access privileges helps organizations reduce the risk of unapproved data tampering or breaches. Identifying workers who meet access requirements increases workflow effectiveness and protects financial data, enhancing departmental operations

confidence and bolstering organizational resilience overall. Upon effectively determining the needs of customer, the finance division proceeds with the development of operating procedures. These procedures include a range of tasks necessary for resilient financial operations. Every task is carefully planned and categorized according to designated duties in the department. Within the operational framework, for example, treasury management, financial reporting, and exchequer services may each be considered an independent activity. Within the department, a responsible person is allocated to each task; these people are usually experts in the related field. These chosen people are responsible for carrying out the tasks effectively and making sure that the rules are followed.

sprint review 1: A crucial conference with the customer is to evaluate how well completed tasks align with their assigned requirements, a practice integral to monitoring cycle time in Agile methodologies. This meeting serves as a vital means to ensure that the work accomplished effectively, meets organizational objectives and customer expectations. Utilizing agile approaches, the conference facilitates a comprehensive analysis of the findings and employs iterative feedback loops to drive continuous development. Customers assess the outcomes of the activities, scrutinizing their alignment with predetermined goals and intended outcomes. Guided by agile principles, which prioritize teamwork, flexibility, and responsiveness to change, the conversation encourages customers to provide insightful opinions and feedback. This feedback aids the team in swiftly addressing any discrepancies or changes necessary to enhance performance in the future, thus optimizing cycle time and promoting iterative improvement.

Additionally, this weekly meeting promotes openness.

BusinessUni	Operation	Activity	Recovery Measures	Role of Responsible
BU01	Treasury Management	Daily Cash Management	Liaison with Bank to provide manual cash position to en	Principal Financial Accountant/Accounts Technicians
BU02	Treasury Management	Investments and borrowing	Liaison with Bank to provide manual cash position to en	Principal Financial Accountant/Accounts
BU03	Planning & Financial An	Strategic Financial Information e.g. Medium Term Fi	Finance Director to provide management support and c	Head of Financial Services
BU04	Planning & Financial An	Adhoc Financial Advice, Technical Consultancy & Su	Identify method to communicate with those affected b	Head of Financial Services
BU05	Planning & Financial An	Monthly Performance Indicators	Ensure that the internal and external stakeholders for t	Head of Financial Services
BU06	Management Accountar	Budgetary Preparation and Control (impact depend:	Finance Director to provide management support and c	Head of Financial Services
BU07	Management Accountar	Virement & Budget Adjustment Administration	Finance Director to provide management support and c	Head of Financial Services
BU08	Management Accountar	Asset Leasing	IT access to ensure all staff can work from alternative lo	Asset Manager
BU09	Management Accountar	Monthly Payroll Upload/Journals	IT access to ensure all staff can work from alternative lo	Accounts Technicians
BU10	Management Accountar	Monthly Third Party Payments	Liaison with Bank – If necessary, manual system operatc	Accounts Technicians
BU11	Financial Reporting	Final Accounts & Statutory Compliance (impact dep	IT access to ensure all staff can work from alternative lo	Principal Financial Accountant
Bu12	Financial Reporting	Financial Publications	Confirm any activities that can be delayed/stopped dur	Head of Financial Services
BU13	Financial Reporting	Reconcile Period Summary/Balance Sheet	Finance Director to provide management support and c	Head of Financial Services
BU14	Financial Reporting	Statutory & CIPFA Returns	Finance Director to provide management support and c	Head of Financial Services
BU15	Financial Reporting	Annual Partial Exemption Calculation and VAT Retu	IT access to ensure all staff can work from alternative lo	Principal Financial Accountant
BU16	Financial Reporting	VFM and NFI Reporting	Ensure that the internal and external stakeholders for t	Head of Financial Services
BU17	Financial Systems	Agresso Modular Management & Training	Continue with alternative work locations/review arrang	Head of Financial Services
BU18	Financial Systems	Agresso GL/AP/AR Set Up and Maintenance	IT access to ensure all staff can work from alternative lo	Finance Systems Manager
BU19	Financial Systems	Inventory Management/Reconciliation of Stock Acc	Ensure that the internal and external stakeholders for t	Head of Financial Services
BU20	Exchequer Services	Payment of Supplier Invoices	Liaison with Bank – If necessary, manual system operatc	Principal Financial Accountant/Exchequer Manager
BU21	Exchequer Services	Petty Cash Administration	Finance Director to provide management support and c	Finance Officer
BU22	Exchequer Services	Purchase Card Transaction Control	IT access to ensure all staff can work from alternative lo	Exchequer Manager

Figure 3.Business Unit

Source: Own Contribution.

The above data refers which we created in the end of first week.

3.2 Prioritizing Business Function

This second Iteration process encompasses the entire process of establishment of prioritize the business function.
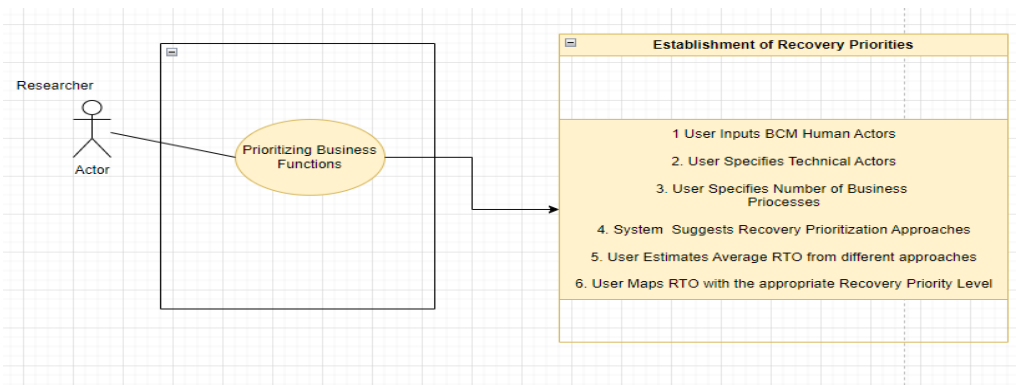

Figure 4.Recovery Priorities

Source: Own contribution

3.2.1 Sprint activities 2

Recovery Planning: This sprint encompasses the process of arranging priority levels within the recovery planning framework, assigning recovery planning IDs, providing detailed explanations for each priority level.

Establishment of recovery priorities: After the customer review of the iteration process, the financial department must prioritize business operations and define recovery priorities. 1. The department plays a crucial role in financial management and decision-making, so any disruptions can have a big impact on the stability and effectiveness of the entire business. Several recovery prioritization procedures that are especially suited to financial services are suggested as a solution to this. Business Impact Analysis (BIA), which focuses on topics like treasury management, financial reporting, and exchequer services is used to evaluate how important financial procedures are to preserving operational integrity. Prioritization also takes into account the possible financial repercussions of interruptions, including lost revenue, higher costs, and fines from the government. A risk-based approach ranks recovery planning according to the likelihood and seriousness of financial concerns within the financial department, a key tactic for determining recovery objectives is to perform a Business Impact Analysis (BIA). To do this, financial functions must be identified and ranked according to how important they are to the firm's overall operations. The BIA evaluates each financial function's criticality by looking at a number of variables, including revenue growth, customer satisfaction, and regulatory compliance. Functions are given greater recovery priorities if they have the biggest influence on these important areas. Prioritizing business operations for recovery planning requires a risk-based strategy. This entails evaluating the possibility and seriousness of threats to every financial function while taking operational weaknesses, cybersecurity risks, and market volatility into account. Recovery planning is given priority to functions that carry a higher risk, such as those vulnerable to fraud or market volatility, in order to minimize any potential effects on organizational integrity and financial stability. To ascertain the average Recovery Time Objective (RTO) for every function that has been given priority, customer work together. To find out how long it will take to get operations back up to par, this involves getting input from relevant users or

subject matter experts. For instance, customer evaluating financial reporting systems may evaluate the RTO according to the intricacy of data restoration ==procedures. And finally in order to ensure that resources are allocated effectively to minimize the impact of disruptions on crucial business processes, customer map the RTO with the appropriate recovery priority level. By taking a methodical approach, companies can improve their ability to withstand and adapt to unanticipated obstacles, ensuring uninterrupted operations and reducing possible damages. Levels of each activity are determined by customer requirements.

Minor : In this situation falls under the minor category, as the service can be provided within a timeframe exceeding 240 hours, or more than 10 days. Despite its extended duration, it necessitates attention to ensure timely resolution and main. While not urgent, it still demands careful handling to prevent escalation or dissatisfaction. Therefore, a structured approach with clear timelines and communication is essential. Assigning appropriate resources and monitoring progress intermittently ensures the task remains on track without undue strain on other pressing matters. By acknowledging its place within the priority scale and implementing a systematic approach, this minor issue can be effectively managed within the designated timeframe, contributing to overall operational efficiency.

Moderate: The establishment of local department business continuity plans, with a maximum permitted downtime of 240 hours, is required when a department is unable to provide a critical function for more than 168 hours. During this time, it's imperative to quickly initiate backup plans in order to lessen the impact on daily operations and prevent major service interruptions. To guarantee a smooth transition, this entails finding substitute resources, reassigning duties, and successfully interacting with customer. In-depth analyses should also be carried out to identify the failure's primary cause and put preventative measures in place to guard against recurrence. During extended periods of outage, prompt and efficient action is critical to reestablishing normalcy and preserving company continuity.

serious level 1: The Business Continuity Management (BCM) process, a maximum delay of 48 hours, categorized as serious level 1, is crucial. This timeframe represents a critical threshold for addressing and resolving priority issues. Within this period, organizations must implement strategic measures to mitigate risks and ensure the continuity of essential functions. The 48-hour window serves as a decisive timeframe for activating contingency plans, allocating resources, and coordinating response efforts. Failure to adhere to this timeframe can result in significant disruptions, financial losses, and reputational damage. Therefore, meticulous planning, swift decision-making, and effective communication are paramount in managing serious level 1 incidents. By promptly addressing issues within this timeframe, organizations can minimize the impact of disruptions and maintain operational resilience.

Major level: It is essential to follow the Business Continuity Management (BCM) approach and classify any delay as serious level 1, with a maximum of 24 hours. This period of time serves as a crucial cutoff point for addressing and resolving urgent problems. Organisations have to have strategic plans in place at this time to reduce risks and guarantee the continuation of critical operations. The 48-hour window provides a clear window of time within which to deploy backup plans, distribute resources, and coordinate reaction activities. There could be serious setbacks, monetary losses, and reputational harm if this deadline is missed. Therefore, handling significant level 1 crises requires careful planning, quick decision-making, and excellent communication. Organisations can reduce the effect of disruptions and preserve operational resilience by swiftly resolving issues within this window.

In the Business Continuity Management (BCM) process, a delay of one hour, categorized as catastrophic level 1, signifies a critical failure in emergency response. This timeframe is pivotal for activating full business continuity arrangements to mitigate the impact of the crisis. It marks the threshold where immediate action is imperative to safeguard essential functions and minimize disruption. Failure to initiate prompt and comprehensive measures within this hour can result in severe consequences, including financial losses, regulatory non-compliance, and reputational damage. Thus, organizations must have robust contingency plans and rapid response mechanisms in place to address

catastrophic level 1 incidents effectively. Swift decision-making, clear communication, and resource allocation are vital during this crucial timeframe to ensure the resilience and continuity of operations in the face of unprecedented challenges.
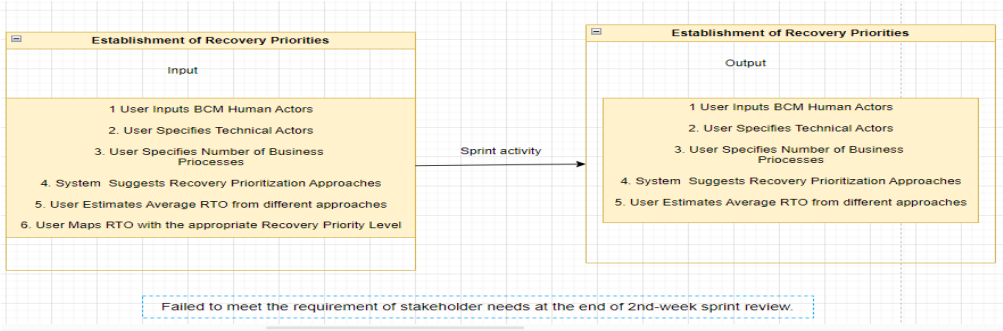
In sprint review 2,

Figure 5.Recovery priorities failing

Source: Own contribution.

Customer needs are still unfulfilled at the conclusion in sprint review because recovery priority levels are too low. Their request for more detail in recovery planning forces a review of the current structure. The inability to fulfill this need emphasizes how crucial it is to match customer expectations with recovery priorities. The prioritizing structure must be revised immediately in order to make sure that it appropriately takes into account the various needs and degrees of severity of potential disruptions.

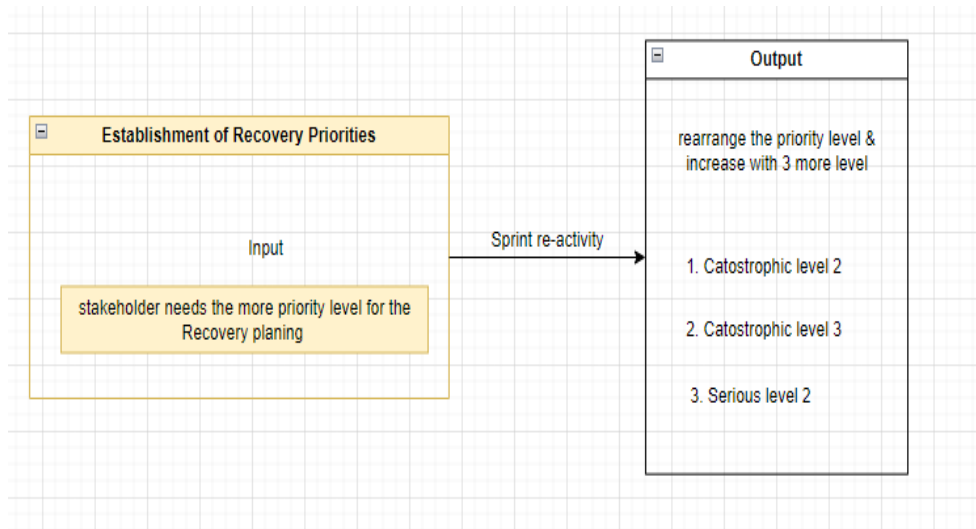### 3.2.2 Sprint activity 2 re-creation

Figure 6.Recovery priorities output

Source: Own contribution.

Sprint review 3: By the end of this sprint, the recovery planning framework's priority levels have been thoroughly rearranged to effectively meet the needs of the customer, a crucial indicator of customer satisfaction in Agile methodologies. Three additional priority levels are introduced to address their request for more detailed planning, each meticulously aligned with the severity of potential disruptions. Each priority level is assigned a distinct recovery planning ID, enabling clear identification and monitoring of recovery operations. Moreover, priority levels are accompanied by detailed explanations, providing team members and the customer with a clear understanding of their significance. For instance, Serious Level 2 signifies a department's failure to deliver a critical function within 168 hours, prompting the activation of local department business continuity arrangements. Conversely, Catastrophic Level 2 indicates a service failure requiring the activation of full business continuity arrangements within 4 hours. This restructuring ensures that resources are allocated based on the impact and urgency of recovery activities, efficiently prioritizing them. By integrating customer feedback and refining the recovery planning process, the organization enhances its resilience and readiness to navigate various disruption scenarios, thereby bolstering customer

satisfaction. Furthermore, the implementation of unambiguous IDs and descriptions streamlines decision-making and communication, fostering collaboration and trust between team members and the customer.

This table shows the results

RP_ID	Priority_Scale_	Description
RP01	Catastrophic L1	The failure of the Service to deliver an emergency response requiring the introduction of full business continuity arrangements (1 HOUR).
RP02	Catastrophic L2	The failure of the Service to deliver an emergency response requiring the introduction of full business continuity arrangements (4 HOUR).
RP03	Catastrophic L3	The failure of the Service to deliver an emergency response requiring the introduction of full business continuity arrangements. (8 HOUR)
RP04	Major	There can be a delay of a maximum of 24 hours.
RP05	Serious L1	There can be a delay of a maximum of 48 hours.

f the process.

Figure 7.Recovery planning

Source: Own contribution.

RP06	Serious L2	The failure of a department to deliver a key function (up to 168 HOURS) requiring the introduction of local department business
RP07	Moderate	The failure of a department to deliver a key function (more than 168 HOURS) requiring the introduction of local department business
RP08	Minor	the service can be delivered within a period of more than 240 hours (more than 10 days).

Figure 8.Recovery planning

Source: Own contribution.

3.3 Restoration Time process

This third Iteration process encompasses the entire process of Restoration time process.
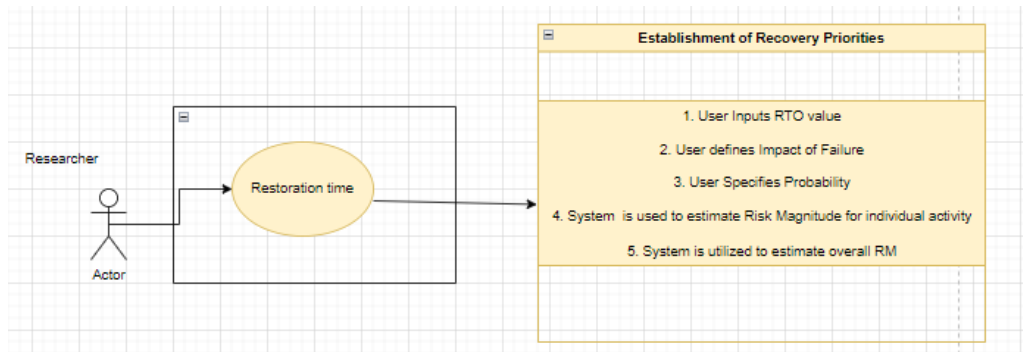

Figure 9.Restoration time

Source: Own contribution

3.3.1 Sprint activities 3

Restoration Time: In the third process, the customer requests to create or set the impact score for a certain level with a certain time and also includes the number of activities by giving the input of restoration time.

User inputs RTO value: The value which is the maximum permitted downtime for specific tasks or procedures inside the finance department, is entered by users. This critical metric establishes the window of time in which operations must be resumed in order to avoid major disruptions. Customers set clear expectations for the recovery of vital functions following a disaster by defining the RTO for each activity. This input ensures that efforts are concentrated on minimizing downtime and maintaining business continuity as it directs the creation of disaster recovery plans and resource allocation methods. When evaluating the financial department's operational resilience and the efficacy of risk mitigation strategies, one important metric to consider is the RTO.

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User defines impact of failure: User rate the impact of failures on various activities by classifying them and allocating impact scores that correspond to the seriousness of the repercussions that follow interruptions. These impact scores, which range from minor to catastrophic, provide a detailed picture of the possible consequences of disruptions in operations. To prioritize resources in the event of a disaster, customers obtain insight into the criticality of each process by methodically examining the impact of failure on numerous operations. Through this category, businesses can customize their response methods to meet the unique challenges presented by varying impact levels. This guarantees a focused and efficient approach to risk mitigation and preserves the continuity of critical financial department operations.

User specifies probability: To further analyze the potential impact of various situations leading to interruptions, users provide information about the Recovery Time Objective (RTO) number and the impact of failure for each activity. This step in the risk analysis process helps in understanding the severity of potential disruptions and how they might affect operations. Taking a proactive approach, businesses can identify vulnerabilities, implement preventative measures, and develop contingency plans to mitigate the effects of disruptions. While we don't currently have probability values, this risk analysis process still contributes to strengthening the financial department's resilience and preparedness to handle unforeseen circumstances. By integrating various parameters such as RTO and impact score, the system evaluates the risk magnitude associated with each activity, facilitating informed decision-making in risk management. Although probability values are not available, organizations can still allocate resources efficiently and customize mitigation techniques based on the estimated magnitudes of risks, improving the department's resilience against possible threats and interruptions.

System Utilized to Estimate Overall Risk Magnitude: The system completes the calculation of risk magnitudes for individual activities by integrating the Restoration Time (RT) process for all impact score levels. This means estimating the time required to return each activity to its pre-disruption state in accordance with its impact score. Shorter restoration times are required for activities with higher impact scores in order to efficiently reduce the total impact on business operations. The approach offers a full outlook on catastrophe recovery preparation by accounting for restoration time in addition to risk magnitude assessments. By taking a comprehensive approach, customer

may best allocate resources within the financial department's BCM framework and prioritize recovery efforts according to the importance of each task. Incorporating restoration time considerations ultimately strengthens the department's ability to quickly resume operations and reduce downtime during disruptions.
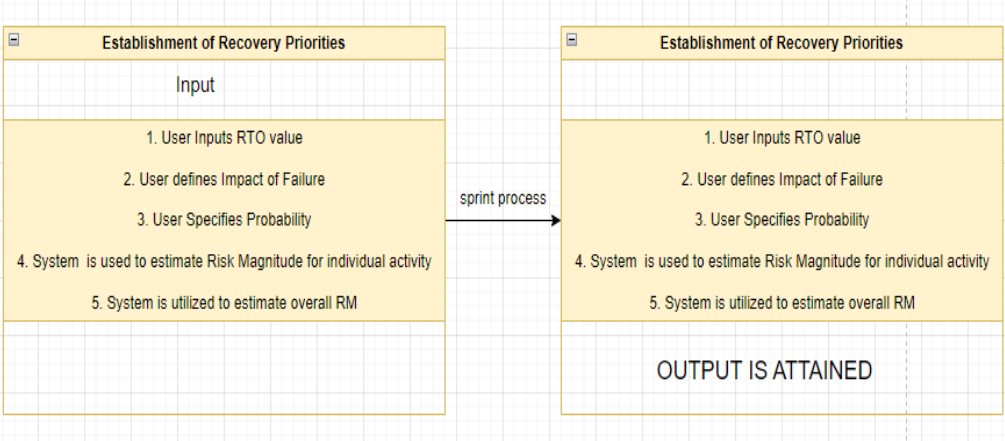

Figure 10.Restoration time fulfilled

Source: Own contribution.

Sprint review 4: At the end, customers express satisfaction with the implementation of a tailored time framework that aligns with the impact scores, integrating Restoration Time (RT) considerations. This framework effectively accommodates the varying severity levels of disruptions by allocating appropriate restoration times to each activity based on its impact score. Customer appreciate the system's ability to adapt and provide customized solutions, ensuring that activities with higher impact scores receive shorter restoration times to minimize business operation disruptions. The successful integration of restoration time into the disaster recovery process reflects the customer's confidence in the system's ability to address critical business continuity needs within the financial department. This outcome signifies a significant milestone in enhancing resilience and preparedness for potential disruptions.

Figure 11.Restoration time

Source: Own contribution

3.4 BCM recovery hourly rate computation

The task aimed to fulfill the customer's requirement for detailed cost analysis by integrating an "Hourly rate" column into the Business_Unit table. This column provides the hourly rate, essential for understanding the expenditure associated with each role. Additionally, an "Included in BCM" column was added to denote whether the operation is part of the BCM scope, aiding in clearer identification of relevant operations. By incorporating these features, the table facilitates easy access to cost information for each role. Moreover, the inclusion of the hourly rate enhances transparency and accountability in resource management. This comprehensive approach aligns with the customer's objective of accurately assessing costs and ensuring efficient utilization of resources. Overall, the recreated table fulfills the customer's requirements by providing detailed insights into operational costs while also enhancing organizational transparency and decision-making capabilities.

The two diagrams below illustrate the tasks completed during the sprint process. In order to ensure that the data was clearly visible, I divided the single table into individual rows.

BusinessUnit	Operation	Activity	Recovery Measures	Role of Responsible
BU01	Treasury Management	Daily Cash Management	Liaison with Bank to provide manual cash position to en	Principal Financial Accountant/Accounts Technicians
BU02	Treasury Management	Investments and borrowing	Liaison with Bank to provide manual cash position to en	Principal Financial Accountant/Accounts
BU03	Planning & Financial An	Strategic Financial Information e.g. Medium Term Fi	Finance Director to provide management support and c	Head of Financial Services
BU04	Planning & Financial An	Adhoc Financial Advice, Technical Consultancy & Su	Identify method to communicate with those affected b	Head of Financial Services
BU05	Planning & Financial An	Monthly Performance Indicators	Ensure that the internal and external stakeholders for t	Head of Financial Services
BU06	Management Accountar	Budgetary Preparation and Control (impact depend:	Finance Director to provide management support and c	Head of Financial Services
BU07	Management Accountar	Virement & Budget Adjustment Administration	Finance Director to provide management support and c	Head of Financial Services
BU08	Management Accountar	Asset Leasing	IT access to ensure all staff can work from alternative lo	Asset Manager
BU09	Management Accountar	Monthly Payroll Upload/Journals	IT access to ensure all staff can work from alternative lo	Accounts Technicians
BU10	Management Accountar	Monthly Third Party Payments	Liaison with Bank – If necessary, manual system operate	Accounts Technicians
BU11	Financial Reporting	Final Accounts & Statutory Compliance (impact dep:	IT access to ensure all staff can work from alternative lo	Principal Financial Accountant
Bu12	Financial Reporting	Financial Publications	Confirm any activities that can be delayed/stopped dur	Head of Financial Services
BU13	Financial Reporting	Reconcile Period Summary/Balance Sheet	Finance Director to provide management support and c	Head of Financial Services
BU14	Financial Reporting	Statutory & CIPFA Returns	Finance Director to provide management support and c	Head of Financial Services
BU15	Financial Reporting	Annual Partial Exemption Calculation and VAT Retur	IT access to ensure all staff can work from alternative lo	Principal Financial Accountant
BU16	Financial Reporting	VFM and NFI Reporting	Ensure that the internal and external stakeholders for t	Head of Financial Services
BU17	Financial Systems	Agresso Modular Management & Training	Continue with alternative work locations/review arrang	Head of Financial Services
BU18	Financial Systems	Agresso GL/AP/AR Set Up and Maintenance	IT access to ensure all staff can work from alternative lo	Finance Systems Manager
BU19	Financial Systems	Inventory Management/Reconciliation of Stock Acc	Ensure that the internal and external stakeholders for t	Head of Financial Services
BU20	Exchequer Services	Payment of Supplier Invoices	Liaison with Bank – If necessary, manual system operate	Principal Financial Accountant/Exchequer Manager
BU21	Exchequer Services	Petty Cash Administration	Finance Director to provide management support and c	Finance Officer

Figure 12.Business unit with hourly rate

Source: Own contribution

Hourly Rate	Included in BCM
70.00 €	☑
60.00 €	☑
80.00 €	☐
80.00 €	☐
80.00 €	☐
80.00 €	☐
80.00 €	☐
65.00 €	☐
50.00 €	☑
50.00 €	☑
60.00 €	☑
80.00 €	☐
80.00 €	☐
80.00 €	☐
60.00 €	☑
80.00 €	☐
80.00 €	☐
75.00 €	☑
80.00 €	☐
60.00 €	☑
80.00 €	☐

Figure 13.Hourly Rate

Soucre: Own contribution

3.5 Conceptual model

This fourth Iteration process encompasses the conceptual model for the above all activities.
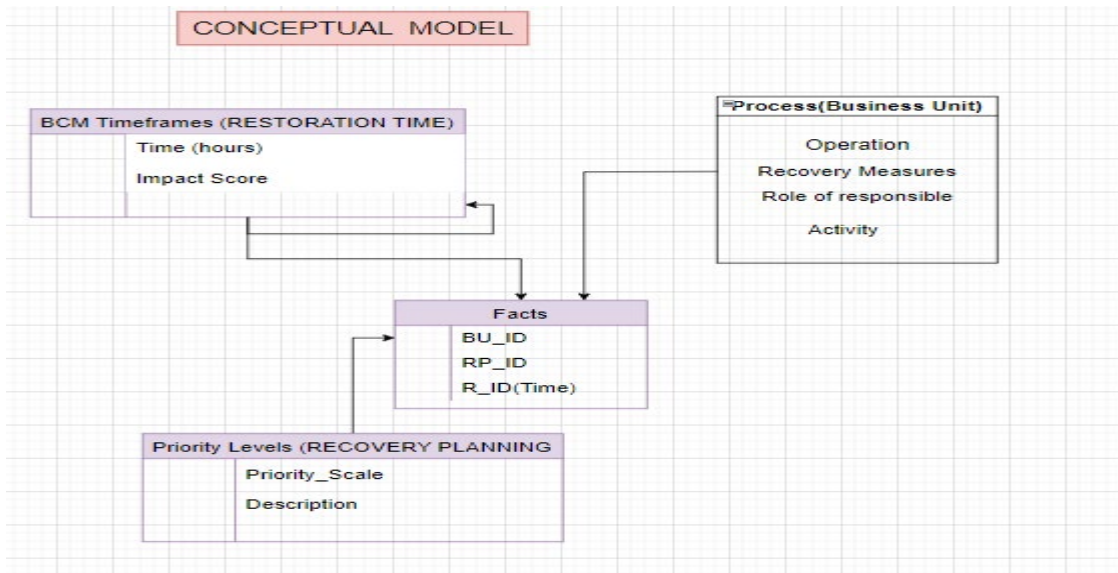
Figure 14.Conceptual model

Source: Own contribution.

The conceptual model for a recovery plan in an Agile project likely emerges from customer input, aiming to address project setbacks swiftly and effectively. It emphasizes rapid problem-solving, flexible resource allocation, and clear communication to minimize disruptions and maintain project momentum. By integrating customer insights, this model ensures alignment with project goals and enhances the project's resilience in the face of adversity. This conceptual model outlines specific processes within the Business Process unit, including operations, roles of responsible parties, recovery measures, and activities.

3.5.1 Sprint Activity 5

Conceptual model Facts: This term encompasses the process focused on creating a conceptual model for customer requests, incorporating customer inputs, and aligning project direction with customer expectations to ultimately deliver value.

Business unit: Operation comprises various management functions, each with its set of processes within the financial department. These processes likely encompass treasury

management, finance reporting, and exchequer service, among others, ensuring effective oversight and optimization of financial resources within the organization. Activity under each operation, there are various branches of activities listed under the activity section, delineating the specific tasks and actions required to accomplish the objectives outlined within the recovery plan. The role of responsibility entails individuals capable of fulfilling specific roles. These individuals possess the requisite skills, knowledge, and expertise to effectively manage their designated tasks, contributing to the successful execution of the recovery measures. Each mentioned operation is accompanied by corresponding recovery measures to address any potential issues that may arise, ensuring swift resolution and continuity of operations.

BCM Time frames: The Impact Score column quantifies the severity of disruption resulting from the incident necessitating recovery efforts. By assigning a numerical value or rating, it aids in prioritizing tasks within the recovery plan. This scoring system enables teams to focus on mitigating the most impactful disruptions first, ensuring efficient allocation of resources and timely resolution of issues. The time column indicates the timeframe within which each problem should be addressed based on its corresponding Impact Score. This approach ensures that higher impact disruptions receive prompt attention, aligning recovery efforts with the urgency of the situation. It facilitates efficient resource allocation and helps maintain project momentum by swiftly resolving critical issues.

Priority level: The priority scale denotes the risk level of each department, providing insights into their relative vulnerability to potential disruptions. This scale enables prioritization of recovery efforts based on the criticality of departments within the organization's operations. The description categorizes the risk level of each department, organizing them based on their susceptibility to potential disruptions. By assigning specific risk categories, it facilitates targeted mitigation strategies and allocation of resources to minimize adverse impacts on operations.

Facts: A common identifier is established for all other tables, consolidating them into a cohesive entity. This integration simplifies data management and analysis by centralizing relevant information. Relationships are then established between the Facts table and

other tables, enabling seamless navigation and retrieval of interconnected data. This approach enhances data consistency and facilitates comprehensive insights into the various aspects of the project or system under consideration.

sprint review 5: The 5th iteration process concludes, marking the end of the 5th sprint review, significant progress has been made towards meeting customer requirements. The iterative nature of Agile methodology allows for continuous refinement and improvement, with each sprint bringing the project closer to its objectives. Throughout the iteration and sprint, the focus has been on fulfilling customer requests, particularly regarding the development of a conceptual model. The completion of the requestization phase signifies a milestone in the project's evolution. Customer inputs have been thoroughly incorporated, ensuring alignment between the project's direction and their expectations. By showcasing a conceptual model, customer gain insight into the project's envisioned structure, functionality, and potential outcomes. This not only fosters transparency but also cultivates customer engagement and buy-in, essential for project success. This review serves as an opportunity to evaluate achievements, solicit feedback, and make necessary adjustments before proceeding to subsequent iterations. Any deviations from initial plans are addressed iteratively, allowing for agile responses to changing requirements or unforeseen challenges. By embracing this iterative approach, we maintains adaptability and responsiveness, key tenets of Agile methodology, ultimately enhancing the project's chances of delivering value to customer.

3.6 Physical model

This fifth Iteration process encompasses the physical model for the above all activities.
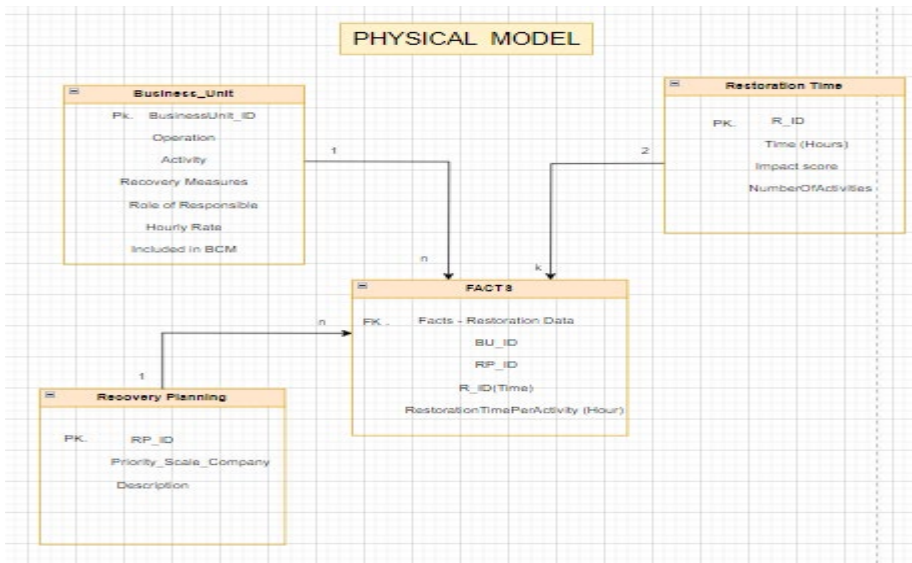
Figure 15.Physical Model

Source: Own Contribution

3.6.1 Sprint activity 6

Physical Model facts: This term encompasses the iterative process focused on fulfilling customer requests, incorporating customer inputs, and aligning project direction with customer expectations to ultimately deliver value.
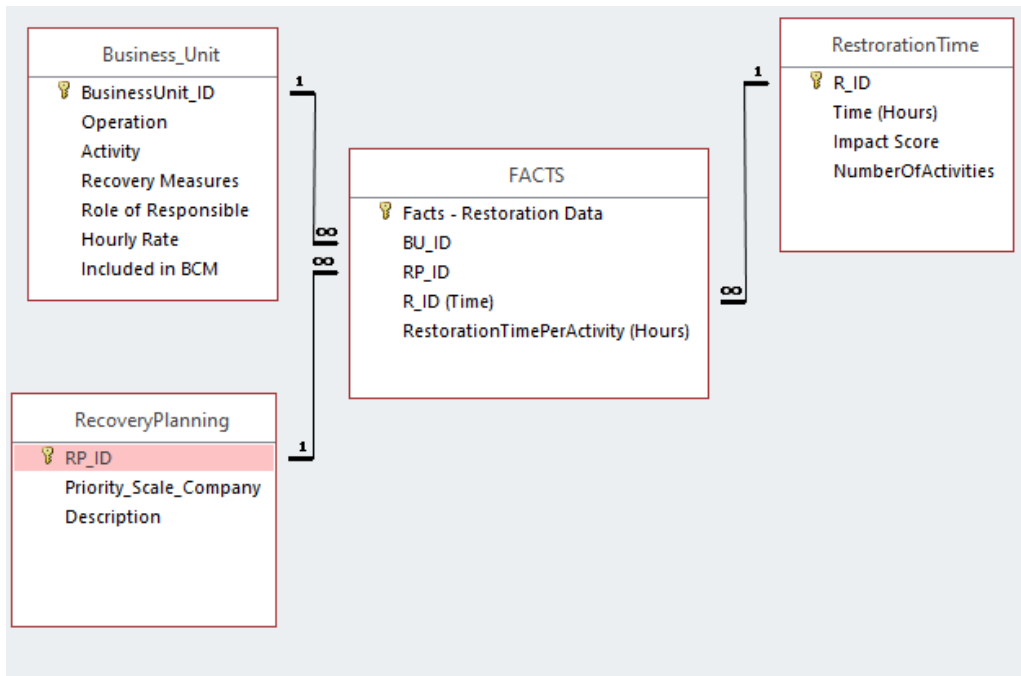
Figure 16.Combined process

Source : Own Contribution

Sprint review 6: In the end, our primary focus was on creating a comprehensive physical model that encapsulates the various components crucial to the project's success: Human actors, processes, and priority levels. Each element plays a pivotal role in the project's execution and requires meticulous attention to detail for effective integration within the system. First and foremost, we identified and delineated the Human actors involved in the project. These actors encompass individuals or entities contributing to or impacted by the project's outcomes. By mapping out the roles and responsibilities of each actor, we gained clarity on their interactions and dependencies within the project ecosystem. This understanding was instrumental in shaping the relationships between Human actors and other elements in the physical model. Next, we addressed the processes inherent to the project's workflow. Processes represent the series of steps or activities required to achieve specific objectives within the project. We meticulously documented each process, outlining its inputs, outputs, and associated tasks. Furthermore, we analyzed the interdependencies between processes to identify potential bottlenecks or areas for optimization. This holistic view of processes enabled us to establish meaningful

relationships between them and the other components of the physical model. Priority levels emerged as a critical aspect of the physical model, guiding decision-making and resource allocation throughout the project lifecycle. These levels categorize the importance or urgency of various processes or tasks within the project. By assigning priority levels to processes, we delineated their relative significance and provided a framework for prioritizing actions during project execution. This facilitated efficient resource utilization and ensured alignment with project objectives and customer expectations. Central to the integration of Human actors, processes, and priority levels within the physical model is the Facts table. The Facts table serves as a central repository, consolidating essential information and providing a common naming convention for all processes. This standardized approach enhances data consistency and simplifies data management tasks. Moreover, the Facts table is meticulously structured with proper data types for each process, ensuring data integrity and facilitating seamless data manipulation and analysis. By establishing robust relationships between the physical model components and the Facts table, we enhance the project's clarity, efficiency, and reliability. Customer can easily navigate the interconnected information and derive actionable insights for informed decision-making. This integrated approach not only streamlines project management but also fosters collaboration and alignment among project customer, ultimately driving the project towards successful outcomes.

4 Queries and Feedback

The fourth chapter contains all the queries which are created and analyzed by the customer and also suggests the feedback for Average_Cost_Per_Responsible_Team_Leaders, Average_Time_For_All_Activities_per_Cost_role, Average_Time_Operations_BFs, Sum_Time_Operations-BFs and each of these process are comes under the category of sprint activity.

4.1 Average _Cost_Per_Responsible_Team_Leaders

The purpose of this query was to assess the average cost associated with the role of a responsible person, providing insights into the financial commitment required per individual based on their respective hours worked. To determine the cost rate accurately, the query utilized a grouping strategy. This approach was necessary due to the dual responsibilities often held by individuals in the responsible person role, where they are simultaneously assigned to other operational tasks. Without grouping these calculations, it would have been impractical to isolate the average cost per responsible person per hour.By implementing a grouping mechanism, the query effectively streamlined the computation process, facilitating a comprehensive evaluation of the average cost per responsible person. This enabled the customer to gain a clear understanding of the financial obligations tied to each individual fulfilling the responsible person role, considering their specific hours worked. The resulting total average hourly rate of 615 euros encapsulates the combined expenditure incurred by responsible persons across various roles and operational domains.In essence, this query provided valuable insights for budgeting and resource allocation purposes, ensuring transparency and accuracy in financial planning. By considering the multifaceted nature of the responsible person role, the query offered a holistic perspective on the associated costs, empowering decision-makers to make informed choices regarding resource allocation and optimization.

AVG_COST _PER_RESPONSIBLE_TEAM_LEADERS_75eurperhourcost		
Role of Responsible	Hourly Rate	Time (Hours)
Principal Financial Accountant/Accounts Technicians	70.00 €	48
Principal Financial Accountant/Accounts	60.00 €	168
Accounts Technicians	50.00 €	168
Accounts Technicians	50.00 €	48
Principal Financial Accountant	60.00 €	168
Principal Financial Accountant	60.00 €	168
Finance Systems Manager	75.00 €	168
Principal Financial Accountant/Exchequer Manager	60.00 €	48
Exchequer Manager	70.00 €	168
Principal Financial Accountant/Exchequer Manager	60.00 €	48
*		
Total	615.00 €	

Figure 17.Average cost

Source: Own contribution.

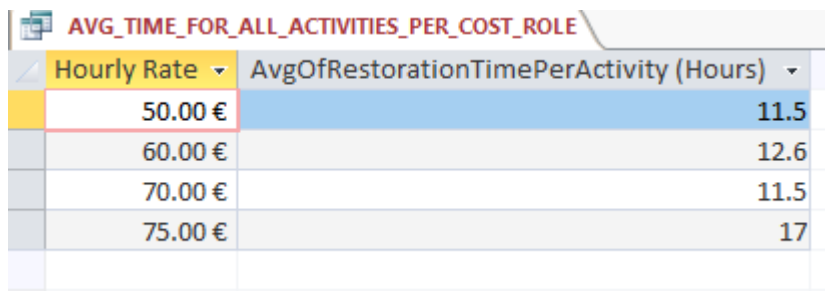The SQI view of the process which helps to find the average cost per responsible team leader is ,

SELECT RestrorationTime.[Time (Hours)], Business_Unit.[Role of Responsible], Business_Unit.[Hourly Rate], [AvgOfTime (Hours)]*[Hourly Rate] AS Výraz1

FROM RecoveryPlanning INNER JOIN (Business_Unit INNER JOIN (RestrorationTime INNER JOIN FACTS ON RestrorationTime.R_ID = FACTS.[R_ID (Time)]) ON Business_Unit.BusinessUnit_ID = FACTS.BU_ID) ON RecoveryPlanning.RP_ID = FACTS.RP_ID;

4.1.1 Feedback

This query effectively met the customer's requirements for assessing the average cost associated with the responsible person role. By utilizing a grouping strategy to account for dual responsibilities, the query provided valuable insights into financial commitments per individual. The resulting average hourly rate of 615 euros offers transparent and accurate information crucial for budgeting and resource allocation. Overall, this approach demonstrates a comprehensive understanding of the role's complexity and facilitates informed decision-making.

4.2 Average_Time_For_All_Activities_per_Cost_role

In this query, we focused on determining the average restoration time for a specific role, correlating it with the hourly rate for responsible persons. Employing a grouping method, we analyzed restoration times for activities within the financial department, considering the various roles outlined in the data statement. The hourly rate varied among roles, reflecting differences in activity levels across operations. Some roles required more or fewer hours to complete tasks, reflecting the complexity and workload involved. By incorporating this nuanced understanding of role-specific responsibilities and time requirements, the query provided a comprehensive assessment of average restoration times. This approach ensures accuracy in estimating downtime and facilitates effective planning for resource allocation and operational efficiency within the financial department.

AVG_TIME_FOR_ALL_ACTIVITIES_PER_COST_ROLE	
Hourly Rate	AvgOfRestorationTimePerActivity (Hours)
50.00 €	11.5
60.00 €	12.6
70.00 €	11.5
75.00 €	17

Figure 18.Average Time

Source: Own contribution

SELECTBusiness_Unit.[HourlyRate],Avg(FACTS.[RestorationTimePerActivity(Hours)])AS [AvgOfRestorationTimePerActivity (Hours)]

FROM RecoveryPlanning INNER JOIN (Business_Unit INNER JOIN (RestrorationTime INNER JOIN FACTS ON RestrorationTime.R_ID = FACTS.[R_ID (Time)]) ON Business_Unit.BusinessUnit_ID = FACTS.BU_ID) ON RecoveryPlanning.RP_ID = FACTS.RP_ID

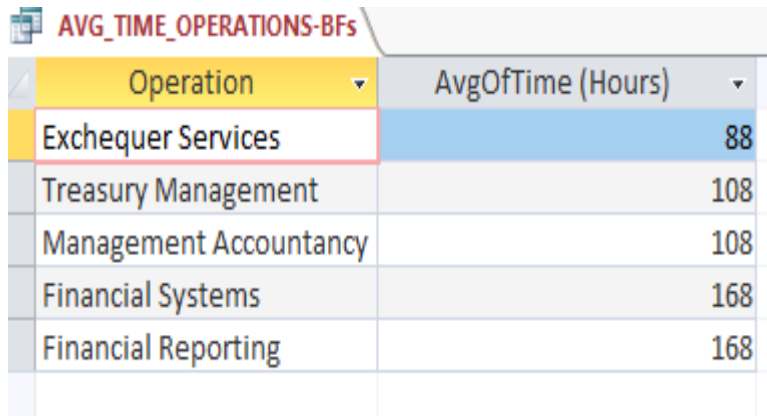GROUP BY Business_Unit.[Hourly Rate];

4.2.1 Feedback

The method employed in this query effectively addressed our need to determine average restoration times for specific roles in correlation with hourly rates for responsible persons. By employing a grouping approach and considering the varying complexities and workload differences across roles, the query provided valuable insights into downtime estimation. This comprehensive assessment facilitates informed resource allocation and enhances operational efficiency within our financial department. Overall, the approach demonstrates a thorough understanding of our requirements and supports effective planning.

4.3 Average_Time_Operations_BFs

Customer examine the average hourly time for operations in a grouped framework while evaluating the third inquiry. The need for this strategy stems from the fact that different processes involve different quantities of activity. While some processes require numerous activities, others just require two. In addition, some jobs are delegated to people who might also be in charge of other things in the business. This overlap in responsibilities makes analysis more difficult, but it also emphasizes the need for a more sophisticated method of performance evaluation. The average operation time hour, which ranges from 88 , 168 and 108, highlights the wide range of operational lengths. Aiming to gather pertinent data without needless complication, customer group operations according to the business unit, which consists of seven different operations. This grouping technique supports a more targeted assessment, in line with the particular needs and goals of the customer. Customer can obtain insights into resource allocation and operational efficiency within each business unit by using the grouped approach. It offers a unified perspective that expedites decision-making procedures and makes it possible for customer to successfully spot trends, patterns, and areas in need of improvement. By using a rigorous approach, customer can be empowered to drive strategic initiatives and improve overall organizational performance by extracting valuable insights from the data.The SQL view formula efficiently calculates the average time for operations, considering their diverse activities and personnel responsibilities.

It provides customer with a clear and concise representation of operational performance, enabling informed decision-making and strategic planning

Figure 19.Average time per operation

Source: Own contribution.

The SQL view of the above table which helps to find the average time operations,

SELECT Business_Unit.Operation, Avg(RestrorationTime.[Time (Hours)]) AS [AvgOfTime (Hours)]

FROM RecoveryPlanning INNER JOIN (Business_Unit INNER JOIN (RestrorationTime INNER JOIN FACTS ON RestrorationTime.R_ID = FACTS.[R_ID (Time)]) ON Business_Unit.BusinessUnit_ID = FACTS.BU_ID) ON RecoveryPlanning.RP_ID = FACTS.RP_ID

GROUP BY Business_Unit.Operation;

4.3.1 Feedback

The grouped framework utilized in the third inquiry effectively addresses the diverse nature of operational activities and personnel responsibilities. By averaging hourly operation times across different processes and business units, it streamlines data

analysis and facilitates targeted insights into resource allocation and operational efficiency. This approach empowers decision-making by providing a unified perspective, enabling the identification of trends and areas for improvement. Overall, the SQL view formula efficiently captures operational performance, supporting informed decision-making and strategic planning.

4.4 Sum_Time_Operations-BFs

The query "Sum_Time_Operation-BFs" was crafted to ascertain the variance between the sum of time hours and the proposed time suggested by BCM consultants for efficient task completion. Due to the presence of multiple activities within each operation, calculating the total sum of time hours for all activities was impractical. Instead, the query computed the sum of time hours for each individual operation specified in the data statement. This approach enabled a focused comparison of the proposed time by BCM consultants against our proposed time for each operation. By analyzing the differences between these two sets of time estimates, the query provided valuable insights into potential efficiency gains or resource adjustments required to align with BCM's recommendations. Overall, this methodology facilitated a detailed examination of operational time requirements and supported informed decision-making regarding task scheduling and resource allocation.

Operation	SumOfTime (Hours)	ProposedTimeByBCMConsultants
Exchequer Services	264	240
Financial Reporting	336	240
Financial Systems	168	240
Management Accountancy	216	240
Treasury Management	216	240

Figure 20.Sum time for operation

Source: Own contribution.

The SQL view for the above tale is given below,

SELECT Sum(RestrorationTime.[Time (Hours)]) AS [SumOfTime (Hours)], Business_Unit.Operation, 240 AS ProposedTimeByBCMConsultants

FROM RecoveryPlanning INNER JOIN (Business_Unit INNER JOIN (RestrorationTime INNER JOIN FACTS ON RestrorationTime.R_ID = FACTS.[R_ID (Time)]) ON Business_Unit.BusinessUnit_ID = FACTS.BU_ID) ON RecoveryPlanning.RP_ID = FACTS.RP_ID

GROUP BY Business_Unit.Operation, 240;

4.4.1 Feedback

The "Sum_Time_Operation-BFs" query precisely met our needs by comparing proposed time estimates from BCM consultants with our own for efficient task execution. Its approach of calculating sum of time hours for individual operations allowed for focused analysis, offering valuable insights into efficiency gains and resource adjustments. This method greatly aids in informed decision-making regarding task scheduling and resource allocation, aligning our operations more closely with BCM's recommendations.

5 Limitation and Discusssion

The limitation of this thesis regarding the inability to conduct a complete risk assessment due to the absence of probability data and the availability of only impact scores can be emphasized by discussing how this impacts the overall effectiveness of Business Continuity Management (BCM) processes. In the BCM process, without probability, planning may overly focus on high-impact scenarios that are very unlikely, potentially diverting resources from more probable, albeit less impactful, risks. This can lead to inefficiencies in resource allocation and preparedness.

Impact	Probability		
	1	2	3
1	1	2	3
2	2	4	6
3	3	6	9

Figure 21.Probability/impact table

Source: Own contribution.

The above tabular column can be used as an example of a possible way of risk assessment, if a risk has a high probability and a high impact, it would score a 3. Use these scores to prioritize risks that require more immediate attention or more robust mitigation and recovery strategies. For each risk, especially those with higher scores (e.g., 2 or 3), estimate recovery times based on the potential impact and the resources available. High-impact, high-probability risks might require more extensive and quicker recovery efforts, which could translate into longer planned recovery times. Understanding that high-impact scenarios may also involve complexities in recovery, plan for additional delays beyond the estimated recovery time. For example, if a critical system failure risk is rated high, it might add a buffer to the recovery time to account for unforeseen complications in restoring services. Use the matrix to help design specific response strategies for risks based on their score. For instance, risks scoring a 3 might

need both proactive and immediate reactive measures, including pre-defined action plans.

RTE1 = RTE+[RTE(RM/100)] (Podaras a Nejedlová, [s. a.])

TimeDeviation = RTE * RM/100 (Podaras a Nejedlová, [s. a.])

For example, To calculate the risk assessment, substitute the impact and probability assumed value in the above formula by taking 264 from the experts in BCM consultant value from exchequer services, it is performed to be

Impact and probability value (2,2) which is multiplied and becomes 4,

RM = I*P

264 + [264(4/100)]

=274.56 hours.

The above value or hour is the one which shows the estimated hour for the recovery time based on the impact with the probability value.

6 Conclusion and future recommendation

The thesis outcomes illustrate how important flexibility and teamwork are to the success of information technology projects through an investigation of Agile Project Management technologies. Organizations can effectively manage the complexity of IT projects with agility by utilizing continuous improvement processes and effective sprint activities. The significance of making decisions based on data and adhering to industry standards is highlighted by contrasting the suggested time estimates with the BCM recommendations. Going forward, companies should place a high priority on continuing education, encourage open communication, and take advantage of new technology to improve Agile methods even more and guarantee the long-term success of IT projects. Organizations should engage in extensive training programs to provide team members with the skills and information they need to support Agile project management methods. Establishing a transparent and open communication culture will encourage customer engagement and collaboration, leading to more seamless project execution. Moreover, adopting cutting-edge technology like automation and artificial intelligence can improve project productivity and optimize Agile procedures. To drive innovation and stay competitive in the ever-evolving IT market, Agile frameworks must be continuously evaluated and adjusted depending on industry trends and project-specific demands.

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