Assignment Brief and Front Sheet PGT

This front sheet for assignments is designed to contain the brief, the submission instructions, and the actual student submission for any WMG assignment. As a result the sheet is completed by several people over time, and is therefore split up into sections explaining who completes what information and when. Yellow highlighted text indicates examples or further explanation of what is requested, and the highlight and instructions should be removed as you populate 'your' section.

This sheet is only to be used for components of assessment worth more than 3 CATS (e.g. for a 15 credit module, weighted more than 20%; or for a 10 credit module, weighted more than 30%).

To be <u>completed</u> by the <u>student(s)</u> prior to final submission:
Your actual submission should be written at the end of this cover sheet file, or attached with the cover sheet at the front if drafted in a separate file, program, or application.

Student ID or IDs for group work	**5597768**

To be <u>completed</u> (highlighted parts only) by the <u>programme administration</u> after approval and prior to issuing of the assessment; to be <u>consulted</u> by the <u>student(s)</u> so that you know how and when to submit:

Date set	3/2/2025
Submission date (excluding extensions)	3rd March 2025 at 12pm UK time
Submission guidance	To be submitted electronically via Tabula.
Late submission policy	If work is submitted late, penalties will be applied at the rate of **5 marks per University working day** after the due date, up to a **maximum of 10 working days** late. After this period, the mark for the work will be reduced to 0 (which is the maximum penalty). "Late" means **after the submission deadline time as well as the date** – work submitted after the given time even on the same day is counted as 1 day late. For **Postgraduate** students only, who started their **current course before 1 August 2019**, the daily penalty is **3 marks** rather than 5.
Resit policy	If you fail this module and/or component, the University allows students to remedy failure (within certain limits). Decisions to authorise resits are made by Exam Boards. These will be issued at specific times of the year, depending on your programme of study. More information can be found from your programme office if you are concerned. If this is **already a resit** attempt, this means you will not be eligible for an additional attempt. The University allows as standard a maximum of two attempts on any assessment (i.e. only one resit). Students can only have a third attempt under exceptional circumstances via a Mitigating Circumstances Panel decision.

To be <u>completed</u> by the <u>module owner/tutor</u> prior to approval and issuing of the assessment; to be <u>consulted</u> by the <u>student(s)</u> so that you understand the assignment brief, its context within the module, and any specific criteria and advice from the tutor:

Module title & code	WM9J2-15 Managing the Multi-project and Programme Environment.
Module leader	Tilimbe Jiya
Module tutors	Tilimbe Jiya; Guy Pearson; Denis Chapman
Assessment type	Written Assignment
Weighting of mark	70%

Assignment brief

Choose **ONE** topic area from the list below and answer the following questions in detail.

Topic areas:

1) Stakeholder Management
2) Performance Management, including EVM.
3) Governance
4) Resource Management
5) Risk Management

Question 1.

Critically analyse the chosen topic area by comparing and contrasting its application in project and portfolio management. Discuss the key similarities and differences and provide real-world examples to illustrate your points. Ensure your analysis reflects an understanding of the theoretical frameworks and practical implications. (30 marks).

Question 2.

Building on your analysis from Question 1, critically evaluate the main challenges associated with managing your chosen topic area within a multi-project environment. Focus on issues that arise from the interdependencies between projects. (20 marks)

Question3.

Propose and justify specific tools, methodologies, and approaches that can help portfolio teams address the challenges identified in Question 2. Your recommendations should be grounded in best practices from appropriate literature. (20 marks)

Notes:

1) *Clearly show in your answer the topic that has been chosen for the assignment.*
2) *The assignment structure should include a brief introduction section to provide context for the answer and a brief conclusion section to summarise the main discussion points and findings.*
3) *One overall references list should be provided at the end of the assignment.*

<table>
<tr><td>Word count</td><td>Recommended Length 2,800 words (excluding references, tables, etc). Word counts should be met to within a 10% lenience – i.e. going over or under the word count by 10% of that word count results in a sanction.</td></tr>
<tr><td>Module learning outcomes (numbered)</td><td>1) Critically evaluate appropriate factors that affect the successful management of the multi-project environment.
2) Analyse and apply relevant principles and approaches for managing portfolios, programmes, and projects in a multi-project setting.
3) Reflect on and assess issues influencing team performance in complex, uncertain multi-project environments, considering workplace scenarios and/or previous learning outcomes where relevant.
4) In a group setting, contribute creatively and systematically to managing complex issues within P3M, using sound judgement and established project and change management tools.</td></tr>
<tr><td>Learning outcomes assessed in this assessment (numbered)</td><td>1,2,3</td></tr>
<tr><td>Marking guidelines</td><td>
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<tr><th>Criteria</th><th>Exceptional (90-100%)</th><th>Excellent (80-89%)</th><th>Very Good (70-79%)</th><th>Good (60-69%)</th><th>Satisfactory (50-59%)</th><th>Pass (40-49%)</th><th>Marginal Fail (30-39%)</th><th>Fail (0-3%)</th></tr>
<tr><td>Critical Comprehension & Analysis</td><td>Demonstrates exceptional comprehension and critical analysis with highly original insights and thorough evaluation of evidence.</td><td>Shows excellent comprehension and critical analysis with original insights. Evaluates evidence thoroughly.</td><td>Demonstrates very good comprehension and critical analysis with some original insights.</td><td>Shows good comprehension and critical analysis with minor gaps. Evaluates evidence competently.</td><td>Demonstrates adequate comprehension and analysis. Evaluates evidence with some limitations.</td><td>Shows basic comprehension with minimal analysis. Limited evaluation of evidence.</td><td>Lacks comprehension and critical analysis. Poor evaluation of evidence.</td><td>Fails to demonstrate comprehension or critical analysis. No evaluation of evidence.</td></tr>
<tr><td>Research and Evidence</td><td>Utilizes an extensive range of high-quality academic sources. Demonstrates outstanding research skills and integrates evidence seamlessly.</td><td>Uses a wide range of relevant academic sources. Demonstrates excellent research skills and integrates evidence well.</td><td>Uses a good range of relevant academic sources. Demonstrates very good research skills and integrates evidence effectively.</td><td>Uses a satisfactory range of sources. Demonstrates good research skills and integrates evidence adequately.</td><td>Relies on a basic range of sources. Shows adequate research skills and some integration of evidence.</td><td>Uses limited or less relevant sources. Basic research skills and minimal integration of evidence.</td><td>Inadequate use of sources. Poor research skills and little to no integration of evidence.</td><td>Fails to use academic sources appropriately. Lacks research skills and evidence integration.</td></tr>
<tr><td>Cohesion, Structure, and Grammar</td><td>Exceptionally well-organized, cohesive, and structured. Clear, logical flow with excellent grammar and style. Core themes and discussion points are clearly evident.</td><td>Well-organized and structured. Clear flow with minor errors in grammar or style. Core themes and discussion points are mostly evident.</td><td>Adequately organized with some logical structure. May have minor inconsistencies and errors in grammar or style. Core themes are somewhat evident.</td><td>Basic organization and structure. Some sections may lack clarity or logical flow. Noticeable errors in grammar or style. Core themes are minimally evident.</td><td>Poorly organized and structured. Lacks clarity and logical flow. Significant errors in grammar or style. Core themes are not evident.</td><td>Disorganized and lacks coherence. Major errors in grammar and style. Core themes are unclear.</td><td>Severely disorganized and incoherent. Numerous errors in grammar and style. Core themes are absent.</td><td></td></tr>
<tr><td>Effort and Presentation</td><td>Demonstrates exceptional effort and a high level of professionalism in presentation. Clear, visually appealing, and engaging.</td><td>Shows excellent effort and presentation with minor areas for improvement. Clear and mostly engaging.</td><td>Demonstrates very good effort and presentation with some areas for improvement. Generally clear and engaging.</td><td>Shows good effort and presentation with minor areas for improvement. Clear and mostly engaging.</td><td>Adequate effort and presentation with some areas for improvement. Generally clear but may lack engagement.</td><td>Basic effort and presentation with noticeable areas for improvement. Some parts may lack clarity or engagement.</td><td>Poor effort and presentation. Lacks clarity, visual appeal, and engagement.</td><td>Very poor effort and presentation. No clarity, visual appeal, or engagement.</td></tr>
<tr><td>Adherence to Guidelines</td><td>Fully adheres to all assignment guidelines and exceeds expectations.</td><td>Adheres to guidelines with minor deviations.</td><td>Mostly adheres to guidelines with some deviations.</td><td>Partially adheres to guidelines with noticeable deviations.</td><td>Fails to adhere to assignment guidelines.</td><td>Fails to adhere to assignment guidelines.</td><td>Fails to adhere to assignment guidelines.</td><td>Fails to adhere to assignment guidelines.</td></tr>
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<tr><td>Academic guidance resources</td><td>Further help may be received through links to a reading list, face-to-face sessions, feed-forward, workshops, seminars, etc.</td></tr>
</table>

Where to get help:

1. Talk to your module tutor if you don't understand the question or are unsure as to exactly what is required.
2. There are also numerous online courses provided by the University library to help in academic referencing, writing, avoiding plagiarism and a number of other useful resources. https://warwick.ac.uk/services/library/students/your-library-online/
3. If you have a problem with your wellbeing, it is important that you contact your personal tutor or wellbeing support services https://warwick.ac.uk/services/wss

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List of Abbreviations

CCPM – Critical Chain Project Management

WIP – Work in Progress

CRP – Control Resource Process

MPSH – Multi-Project Scheduling Heuristics

MMPE –Managing Multi-Project Environment

RBS – Resource Breakdown Structure

1 INTRODUCTION

Resource management is an important aspect of project, programme, and portfolio management that ensures people, finances, and materials are allocated efficiently to reach the goal (Reiss and Rayner, 2013). Effective resource management helps organizations optimize productivity, minimize waste, and maintain project timelines and budgets (Rajegopal, 2007). However, the complexity of managing resources can vary significantly between individual projects and portfolios. This report aims to critically analyse resource management in project and portfolio levels, by using some theoretical frameworks and examples. This discussion will also highlight the challenges and the tools and methodologies to mitigate the challenges.

2 RESOURCE MANAGEMENT IN PROJECT VS. PORTFOLIO CONTEXTS

2.1 Introduction: Defining Resource Management

Resource management is best defined as the process of identifying, acquiring, planning, allocating, and controlling various resources including people, money, and materials to achieve a specific goal in a project (PMBOK Guide, 2017; Angliss and Harpum, 2023; Rajegopal, 2007). Effective management of these resources is crucial for a project's success. Rajagopal (2007) states that inefficient resource management often results in insufficient or over-utilization of the resources in the project. Additionally, he adds that improper delegation or allocation of tasks could lead to skills shortages. This inefficient management could potentially cause delays in projects and cost overruns. This analysis will use theoretical frameworks like CCPM to compare and contrast resource management in project and portfolio contexts.

2.2 Overview of Critical Chain Project Management (CCPM)

Critical Chain Project Management is a project scheduling and planning process that replaces the traditional critical path with the critical chain and is strongly protected by buffers (Meredith et al., 2018). Leach (2014) states the critical chain is the longest sequence that takes account of time, task dependencies, and resource constraints that include time, cost, people, equipment, etc. To manage the uncertainties caused by these constraints project buffers are added at the end and the feeding buffers are added to prevent non-critical tasks from affecting the critical chain due to uncertainties like student syndrome (Bergland, 2016; Meredith et al., 2018).

In addition, CCPM also focuses on resource prioritization and resource levelling for tasks (Meredith et al., 2018). In this way, CCPM helps to produce more realistic schedules by focusing on resource constraints. However, this method could be risky in dynamic projects that require frequent changes. Since the CCPM

focuses on the availability and utilization of resources, strict plans need to be implemented and followed, and frequent changes will cause disruption to the whole critical chain. Additionally, resource levelling ensures that resources are neither overbooked nor insufficient. CCPM is just one of the theoretical frameworks that is helpful in resource management. Other frameworks that are mentioned in the below table 1 are also widely used in resource management in both projects and portfolios.

Theoretical Framework	Description
Probability-Based Resource Forecasting Framework	Involves assigning percentage likelihoods to resource requirements to plan for uncertainties and avoid over-commitment (Reiss and Rayner, 2013).
Centralized Resource Management Framework	Advocates for a unified, centralized system to oversee resource allocation across projects, providing real-time visibility to align resource distribution with strategic goals (Angliss and Harpum, 2023).
Role-Based Visibility and Communication Framework	Uses role-specific dashboards and communication channels to ensure transparency in resource allocation, enabling proactive management of conflicts (Lazar, 2019).
Integrated Project Portfolio Management (PPM) Framework	Integrates project-level management with portfolio-level oversight by mapping resource capacity and aligning project schedules with strategic priorities (Rajegopal, 2007).

Table 1 : Theoretical Frameworks

2.3 Resource Management at Project Level

Resource management at the project level often involves strategically allocating tasks based on time, availability, and prioritization to meet the project deadline (Meredith et al., 2018). However, the effectiveness of resource management depends on how well a project can respond to uncertainties, changes, or delays that might disrupt the project flow. In this context, Meredith suggests that CCPM, derived from the theory of constraints, helps a project optimize resource utilization by focusing on bottleneck resources and behavioural inefficiencies, particularly in human resources. By preventing overburdening and minimizing multitasking, CCPM reduces the risk of burnout and promotes a more balanced workload, ensuring sustained productivity throughout the project.

Additionally, CCPM also promotes two types of buffers to account for uncertainties in a project. For instance, considering the project simulation from the module MMPE in a real-world scenario, as shown in the figure 1 below, adding the project buffers at the end of the project, which is before the final inspection (I026) critically accounts for project delays and uncertainties (Leach, 2014). Most importantly, feeding buffers ensure that the tasks from the noncritical path do not affect the critical path (Bergland, 2016). By considering Module 1 as the critical path, feeding buffers are best added before Task A720, ensuring the safety of the critical chain. However, equal importance must be given to Module 5, which is also subject to task dependencies and resource constraints. In this case, the best place to add the feeding buffer is before Task A721. Though there are some benefits, overlooking non-critical tasks and overreliance on the critical chain could be riskier in terms of changes and lesser prioritization of other tasks.

2.4 Resource Management at Portfolio Level

Resource management at the portfolio level involves sharing available resources across multiple projects simultaneously, improving efficiency. However, Rajegopal (2007) states that resource management at this level is often done poorly, as most organizations focus on one project at a time, disregarding the impacts on others.

In the project management simulation at the portfolio level, four projects share the same network diagram with varied lead times. Resource constraints for all four projects are identical, but only 24 designers, 10 assemblers, 8 testers, and 1 inspector are available per period. Since lead times range from 130 to 160 days, all projects must start simultaneously and cannot wait for one to be completed.

CCPM extends its principles to portfolios by addressing resource conflicts, multitasking inefficiencies, and uncertainties. Taking the simulation as an example, each project has its own critical chain but competes for shared resources. CCPM tackles this by prioritizing and assigning the bottleneck resources or drum resources to critical tasks that require the resource first in each project (Meredith et al., 2018). For instance, designers' tasks like D102 and D106 are prioritized over the other designers' tasks, where the designers are in demand in period 1 in the portfolio level. Bergland also adds that resource levelling will help to maintain a balance of shared resources among the projects.

Additionally, capacity constraint buffers are added at points of extreme resource constraints (Leach, 2014). CCPM faces challenges like multiple resource dependencies, overlapping deadlines, and burnout. Overcoming these requires strategic planning, task sequencing, effective prioritization, clear communication, and continuous monitoring to resolve conflicts efficiently (Bergland, 2016).

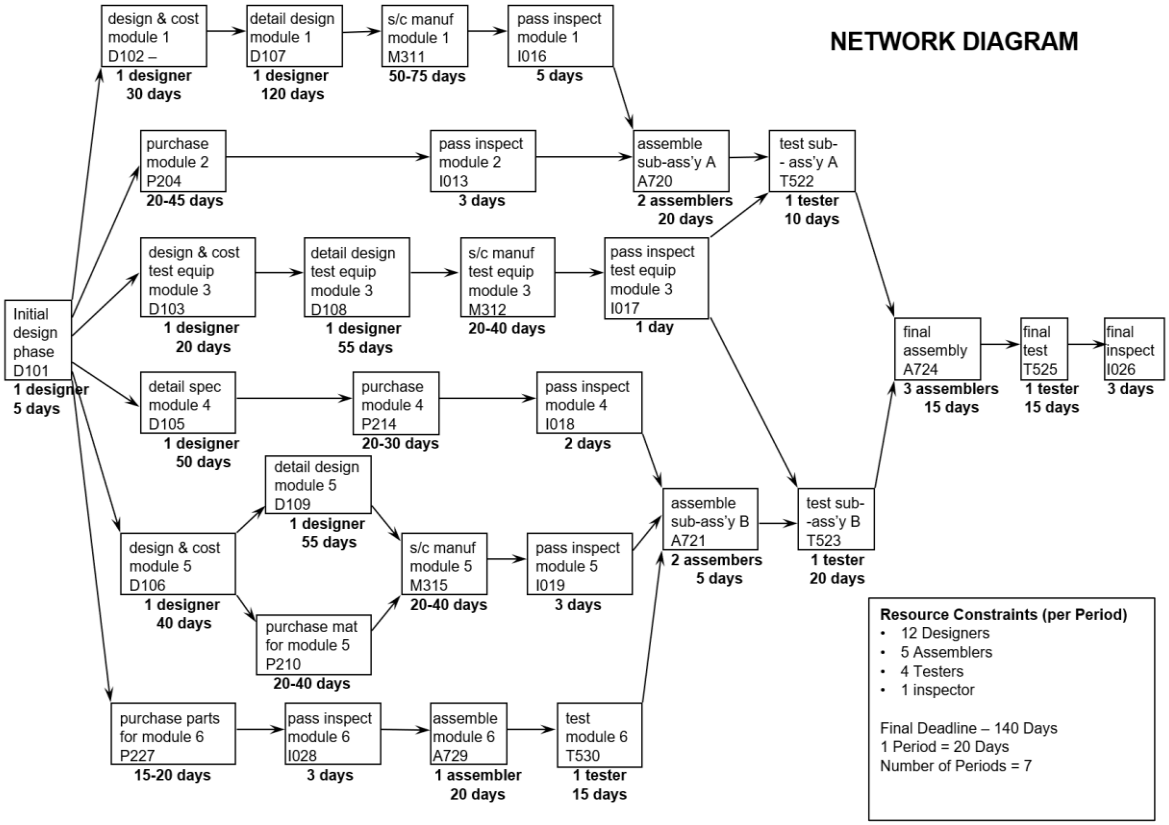

Figure 1 : Network Diagram for the Portfolio (University of Warwick, 2025)

2.5 Similarities and Differences of project and portfolio

From the above discussion, it is evident that both at the project and the portfolio level, the common aim was to optimize resource utilization that focuses on reducing the multitasking and prioritization of tasks (Leach, 2014; Bergland, 2016). Additionally, both used buffers like project buffers, feeding buffers, and capacity constraint buffers (portfolio level) in anticipation of uncertainties (Leach, 2014; Bergland, 2016). Moreover, resource levelling is used in both circumstances to ensure that neither resources are over-allocated nor underutilized (Meredith et al., 2018).

Accounting for the difference between project level and portfolio level, there is only one critical chain that needs to be given the most attention to complete at the project within the deadline. However, at the portfolio level, there might be two or more critical chains, with multiple projects competing for the drum resources, due to overlapping deadlines and in turn conflicts among the projects (Bergland, 2016). Hence, resource management at the portfolio level requires strategic planning, sequencing, and prioritization of resources and tasks. Additionally, capacity constraint buffers are specifically used at the portfolio level (Bergland, 2016).

Though both contexts benefit from improved predictability and efficiency through CCPM, portfolio-level management is more complex and can probably benefit from other frameworks like Project Portfolio

management (PPM). It prioritizes mapping resource capacity, balancing resource requirements, and align project schedules with strategic goals, which is essential for portfolio success (Rajegopal, 2007). PPM could be more flexible in terms of resource allocation, more efficient in managing multiple critical chains and also provides strategic oversight, which is comparatively lesser in CCPM.

3 KEY RESOURCE MANAGEMENT CHALLENGES AT THE PORTFOLIO LEVEL

At the portfolio level, there can be numerous challenges, but when focusing specifically on resource management, the key issues can be more easily identified. This section aims to discuss some of the most critical resource management challenges that must be addressed efficiently.

3.1 Resource Allocation Conflicts

Starting with the resource allocation conflicts, Reiss and Rayner (2013) state that resource conflicts are the root cause of many project management problems, and they have a direct impact on workload distribution and scheduling efficiency. At a portfolio level, multiple projects may rely on some scarce resources, where the portfolio team might distribute the resources to one or two projects, and the rest of the projects are put on hold. This causes delays and prioritization issues. For example, Reiss and Rayner (2013) illustrate how two concurrent projects requiring the same skilled resource (painter) create scheduling bottlenecks. Without proper management, organizations must delay and risk compromising the quality of another project. Angliss and Harpum (2023) suggest establishing a project management office (PMO) can help in creating an overall view of resource management. This eagle view enables real-time visibility into available resources and schedules each project according to resource availability, enhancing coordination among the projects.

3.2 Multitasking Inefficiencies and Employee Burnout

Another challenge is the multitasking inefficiencies and the burnout caused by inefficient resource allocation (Reiss and Rayner, 2013; Meredith et al., 2018). Anavi-Isakow and Golany (2003) state that these inefficiencies are caused due to employees working on multiple projects at the same time. For instance, if a designer (Human) handles multiple projects with unique design plans, the designers could potentially lose working efficiency and may mishandle the projects causing errors, delays, and employee burnout. However, these inefficiencies can be managed by balancing the workloads, establishing clear roles, and using resource allocation tools to ensure that employees are neither overburdened nor underutilized (Lazar, 2019).

Moreover, studies show that more than 20 to 30 minutes are wasted every time employees switch between tasks (Milosevic et al., 2010). Switching tasks not only consume time but could also hinder the cognitive

ability of humans. The success of a project depends on the quality of work and efforts an employee puts forward. When an employee does multitask, it only causes burnout but also leads to mental pressure and reduced interest in working, which directly affects the success of the project.

3.3 Improper Queue Management and Poor Prioritization

Improper management of project queues leads to poor prioritization, which in turn delays project activations and further worsens resource conflicts (Anavi-Isakow and Golany, 2003). This impacts the overall strategic goals of the portfolio. Anavi-Isakow and Golany further justify using an example, where a backlog list is used to hold incoming projects. They state that if the list is not effectively managed, the system can experience significant delays and misallocation of resources. This highlights how poorly managed queues could lead to chaos. Especially in a portfolio level, if the backlogs are not managed well, it could cause massive disruptions causing delays both inside and between the projects. Additionally, Rajegopal (2007) argues that improper prioritization of resources leads to the less important tasks getting executed first and the important ones being delayed. This is evident that the prioritization of the project is directly proportional to queue management.

3.4 Poor Visibility and Communication Gaps

One of the core reasons behind all the challenges discussed above is poor visibility and communication gaps between projects. This lack of visibility negatively impacts coordination in a multi-project environment. Martinsuo and Geraldi (2020) state that unclear communication leads to resource conflicts, scheduling delays, and prioritization issues. They emphasize the importance of aligning project portfolios with both internal and external contexts, ensuring robust information flows.

For instance, in a project management simulation at the portfolio level, different teams used separate documents such as Gantt charts, manpower plans, and decision sheets. Since each project managed its documentation independently, other projects had no insight into ongoing activities. Additionally, the absence of proper communication between the portfolio team and individual project teams led to resource conflicts. However, once structured communication channels were established and all documents were required to be strictly published or edited within shared platforms, visibility improved, and coordination issues were resolved.

4 ADDRESSING RESOURCE MANAGEMENT CHALLENGES AT PORTFOLIO LEVEL

4.1 Introduction to the Case Study

Every challenge can be addressed through well-defined tools methodologies and approaches. This section will address the ways to overcome the identified challenges in Chapter 3 with the help of a LorryMer case study. LorryMer Corporation, a North American motor vehicle leader, realigned its IT programs with its business strategy during a severe financial crisis in the early 2000s (Milosevic et al., 2010). By focusing on cost efficiency and operational improvements, the company transformed its IT initiatives to enhance competitiveness and support strategic objectives (Milosevic et al., 2010).

4.2 Addressing Resource Allocation Conflicts

Starting with resource allocation conflicts, tools like multi-project scheduling heuristics (MPSH) and Resource breakdown structure (RBS) can be used to tackle this challenge. MPSH integrates all the projects in a portfolio into one single scheduling model allowing optimized resource distribution across all projects (Turner, 2016). Turner adds that the usage of RBS also improves resource allocation and planning by categorizing the resources hierarchically.

In the case of LorryMer IT, which focused on cost-saving initiatives and prioritizing high-value IT programs, could have benefitted in using either of the two tools (Milosevic et al., 2010). MPSH would have helped in prioritizing high value projects over the other projects by efficiently allocating resources across multiple projects. However, MPSH lacks flexibility and has a static scheduling environment, which means unexpected shifts in priorities could lead to resource allocation inefficiencies (Turner, 2016). If a high-priority project suddenly changes its scope or a new urgent task or project emerges, redistributing resources within the MPSH framework could be slow and disruptive. Additionally, there is a high chance that MPSH unintentionally leaves low-priority projects under resources while focusing on high-priority projects.

4.3 Minimizing Multitasking Inefficiencies and Burnout

Multitasking inefficiencies and burnout stand out as another crucial challenge that limits the working efficiency of the employees. To tackle this challenge, a methodology like work-in-progress limits (WIP) can be best used. WIP is used to identify unfinished tasks that are currently utilizing the resources but are yet to be completed (Turner, 2016). WIP is widely used in agile environments, which prevents the overburdening of employees and focuses on the quality of the work (Turner, 2016). This helps employees and teams focus on completing one task and then move on to the next tasks, reducing burnout, stress, and work inefficiency.

Though WIP limits work well in an agile environment, it might be harder at the portfolio level, where multitasking is necessary. For example, using WIP limits in LorryMer IT would have helped reduce employee stress and inefficiency by ensuring that high-value IT projects were completed before starting new ones. However, since LorryMer was managing multiple concurrent strategic initiatives, a strict WIP limit could have slowed down some lower-priority projects, potentially delaying overall portfolio objectives. Hence, this could be effectively used in minimizing multitasking, but not completely.

4.4 Improving Queue Management and Resource Prioritization

Improper management of project queues is an important concern that needs to be addressed either using tools or methodologies. The control resource process (CRP) is one of the methodologies that could be used to address this issue. CRP focuses on ensuring that allocated resources are available as planned at the right quantity and are used throughout the project (PMBOK Guide, 2017). This ensures that the projects do not face delays and that resources do not overlap with other projects in a portfolio. Monitoring the utilization of planned and actual resources can stop projects or tasks from getting queued up or accumulated.

Additionally, the frequent performance reviews that are done to evaluate the efficiency of the resource allocation help in maintaining the balance between the availability of the resources and the project execution (PMBOK Guide, 2017). In the case of LorryMer IT, where projects were frequently queued up due to conflicting priorities between cost-saving initiatives and high-value IT transformation programs (Milosevic et al., 2010). This could have been resolved by having frequent reviews on the availability of the resources would have provided them with an idea of how the resources could be utilized effectively.

If more resources were allotted to high-priority projects, the CRP methodology would have helped in pointing out the unfair allocation to lower-priority projects. Moreover, this methodology could also help in resolving resource conflicts by preventing the tasks or projects from getting stalled and clashing with another project for resources.

4.5 Enhancing Visibility and Communication

Abrantes and Figueiredo (2015) state that poor visibility of resource availability often leads to potential conflicts and inefficiencies. Martinsuo and Geraldi (2020) pinpoint that fragmented resource tracking across different projects in the portfolio is the main reason for the lack of visibility. Open and shared communication platforms enhance visibility (Abrantes and Figueiredo, 2015). Abrantes and Figueiredo add that combining the resource plan with different teams working on the same project provides transparency in staffing.

For instance, in the MMPE simulation, combining all Gant charts, manpower plans, risk registers, and inspection days at both the project and portfolio levels provided transparency in the recruitment of

resources and a clear visibility of every project's plans. Moreover, Martinsuo and Geraldi also state having a centralized resource repository helps in the visibility in a portfolio. Additionally, Martinsuo and Geraldi add that implementing visual dashboards enhances the transparency of what is happening. In addition to these, having continuous communication both inside projects and portfolio will also enhance visibility by openly discussing what is required, what are the issues the project faces, etc.,

5 CONCLUSIONS

Effective resource management is crucial in both project and portfolio, however, it is most important at the portfolio level, because of the competing and interdependent nature between the projects. As discussed in the report, though theoretical frameworks, tools, and methodologies like CCPM, multi-project scheduling heuristics, WIP limits, control resource processes, and centralized communication platforms help in effective resource management, everything has its own pros and cons. Hence, the integration of two or more tools or methodologies can complement each other to address their respective limitations and be used for efficient resource management at the portfolio level.

6 REFERENCES

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