

**THE EFFECTS OF SCHEDULE-DRIVEN PROJECT MANAGEMENT ON
PRODUCTIVITY IN A MANUFACTURING COMPANY IN CAPE TOWN**

BY

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DEDICATION

This paper is dedicated to my family as well as to all factory workers who tirelessly give themselves up to ensure that their production boards look good on the efficiency columns, your work does not go unrecognized. I dedicate this paper to Emihle Itumeleng Mlotha, my sister. Here is your baton; run with it and do more exploits than I am doing, and to the Lord God of my covenant, once again, you have shown yourself to be faithful. Thank you.

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CHAPTER 1

Introduction

Project management is the most fundamental aspect of any project. We can build projects at a faster rate in multi-project contexts than we can in traditional project management. In other words, more project completions can be achieved with the same number of resources in multi-project environments and this insight can be interpreted as the possible increase in productivity. Because according to Singh & Singhal (2016), productivity can be enhanced by producing more output with the same amount of input or with fewer inputs. As this research sought to uncover the effects of schedule-driven project management on productivity in a manufacturing company in Cape Town, the previous statement partially brings a link of understanding to the topic of this research study.

Lack of project management or management of any task causes delays in individual project timelines and subsequent sub-projects, if any are present, emphasizing the need to learn and comprehend project management in multi-project environments, in this case the manufacturing company in Cape Town is the multi-project environment of reference for this research study. According to Steyn et al (2007), several projects are done simultaneously while using resources from a common resource pool or more specifically, the projects are integrated into the management control and reporting system of some common resource pool owner. This can cause delays in completion of projects on time especially if anything goes wrong during the project cycle or resources being overly committed to other projects.

Customers who request projects are normally concerned about the deadlines for completing the tasks successfully. The restrictions in schedule-driven project management with variables such as resources, workforce, and project improvisations, are discussed in this study to bring forth an understanding to the reader of why customers would be concerned about the completion of their project from multi-project environments.

Chapter one covers the introduction to the study, literature review, research objectives, questions and research methodologies used in this study.

Because major organizations rarely manage just one project, business trends need front-line managers to incorporate multi-project principles with those of traditional single-project management. A typical scenario involves a limited pool of resources being applied to managing multiple projects, with personnel moving between different

responsibilities in different projects. However, just a few project management studies have begun to look into how to manage an organization with several inter or intra-departmental projects.

Understanding the aspects that contribute to success is only the first step toward better multi-project management. However, the findings are consistent with other developing research in product development environments and provide insight into how the most critical multiple-project success determinants in this context differ from factors of success in traditional single-project management.

Background

Resources are the most expensive investment for any business and are also limited. Therefore, an organization's return on investment directly depends on how it makes use of its limited resources. If the right resources are not allocated to the proper projects, project delivery will suffer according to Saviom (2022). In multi-project environments, resources are unavoidably shared across the different project teams, according to Geraldi (2008), these environments can be challenging when observed from a project management perspective.

The core problems are disparities in resource allocation and flexibility. Some factors, such as machinery, human skill level with reference to specific actions or operations they must conduct throughout the project, and communication, take on additional dimensions compared to a single project. It has been discovered that the division and assignment of resources, prioritizing, and specialized management style, which are of little importance in single projects, significantly impact the effectiveness of multi-project management Patanakul (2010). One of the main business drivers the firm is working on daily is to increase is productivity.

The declining productivity problem is not new; it has always been a major concern for many manufacturing companies, particularly manufacturing businesses. However, the Toyota manufacturing corporation took the lead in addressing this common concern by inventing the Toyota Production System. This productivity improvement system was created to provide well-researched productivity improvement concepts that, once adopted, would result in unavoidable improvements Ahmed, Baloch & Ghani (2015).

It is impossible to increase productivity without engaging project management. The goal of project management, according to Cartlidge (2017), is to ensure that projects are finished on time and within budget. According to Ziek & Anderson (2015), the

definition of project management includes the research's objective, so we are interested in learning more about the influence of schedule-based project management on productivity. Efficiency, according to Gehringer, (2022), refers to the quality and effectiveness of the work done, and many businesses may only be working at 60% to 80% efficiency. The organization mentioned in this research study is a multi-project manufacturing organization that requires rigorous work management. As a result, scheduling is essential to the success of each project that the company undertakes.

The organization has 26 production lines with sewing machine operators producing several garment types (projects). The manufacturing floor is divided into divisions based on the machine operators' skill sets. There is a high standard minute garment division. This division deals with assembling of all garments that require a special skill in order to assemble. There is also a low minute garment division that makes all basic garments which require basic to medium sewing skill machine operators. Production supervisors and managers must work relentlessly daily to manage the project of providing a high-quality final product to the customer (retailer in this case) on time and in total quantities as required. The retailer will sell the final product to the consumers, all of this needs to happen in such a fast pace in order not to risk any financial loss nor quality of the product. Critical problem-solving skills, particularly the ability to handle many projects simultaneously, are required for primary production managers. Multiple projects are referred to in this scenario because distinct styles are produced in different production lines. The factory is in charge of multiple projects at the same times. When moving from one project to another, one hour is set aside for the transitioning procedure to be completed. The production line's efficiency will be adequate after accounting for those so-called line adjustments, but it will fall short of the threshold. According to Paolo (2010), multi-project environments usually have a department that deals with new projects coming into the business and that department is the new product development department. The new product development is described as taking place in a multi-project setting where diverse teams must share some competent and scarce engineering and design resources.

According to Hagel et al (2015), the environment for manufacturing is changing drastically as a whole. Consumer desires, product characteristics, production and distribution economics are all changing. This sets manufacturers in competitive marketplaces under pressure to speed up product development and minimize time to market in order to fulfil customers' changing wants and demand or risk losing customers due to failure to react quickly to the changing market. Projects are scheduled based on the availability of resources such as raw materials, human

resources, and factory minutes, and production managers and supervisors are responsible for facilitating and managing project delivery. As the planners arrange the projects to be finished each day for production continuity, the planning department determines the number of line changes the production lines will have daily.

Projects are scheduled based on raw material and component availability. This study illustrates how productivity is affected by schedule-based project management.

This study aimed to examine the consequences of using project management techniques in a manufacturing environment or industry. As a result, this study elucidates the significance of the project manager's position in the manufacturing business, as ignorance may be why the industry fails to recognize it.

Schedule-driven project management in manufacturing is generally a topic that has not yet been fully explored and thus requires more studies. The success of a project-based organization is dependent on its projects. A number of tools, including the project excellence model, project management model, project management maturity model, and the earned value method, have been developed in this regard; however, project delays persist due to the project's dynamic nature, which includes non-linear relationships and feedback processes throughout the project life cycle Salehizadeh (2020).

The realization that the single-project paradigm is so deeply embedded in scholarly literature that scholars may fail to recognize it as a simplifying assumption has long fuelled debate (Paolo, 2010). In manufacturing, projects are often referred to as production units or products as they result from processing different raw materials to get an end product. During the conversion process, resources are provided; in most cases, these resources are shared across the different concurrently running projects. According to Nethathe (2012) concurrent projects are frequently interwoven due to interdependencies between inputs and outputs and the sharing of specialized resources whilst running concurrent projects in manufacturing settings. Due to resource limitations, the common challenge that manufacturing companies face is determining how to allocate resources and set a completion time for a new project that is added to an existing set of running projects. This is a planning matter.

When these projects are analysed, with an eye of project management, it cannot be denied that chaos sometimes cannot be escaped in such environments, especially if the events are not planned carefully and effectively, since disruptions from one project due to unforeseen occurrence can ripple through the performance of concurrent

projects, Pavlak (2004). This can be validated by the results obtained while collecting responses with a questionnaire prepared and used in this study. Often, a project delay can be traced to poor resource planning, the late arrival of resources or no availability of resources for production lines to process the work planned. To support this statement, Watt (2014) rote that any delay in any of the critical path activities will cause the entire project to be delayed.

In some manufacturing companies, recruiters would argue why there is no project managers employed to oversee projects, but somewhat functional managers are delegated with the responsibility to oversee projects that run in their departments; the argument will be in trying to defend the company budget. This encourages overburdened teams to fight intensely for personnel, resulting in some projects running late. Manufacturing projects are challenging to manage since these methods are based on a rationalistic decision-making paradigm, which can be at odds with the politically correct rationale; tense negotiations influence project decisions.

Material Resource Planning (MRP I)

Material Requirements Planning (MRP) is a production planning and inventory control system that is used to manage the flow of materials through an organization. MRP is a computer-based system that helps organizations plan their production schedules and manage their inventory by analyzing the demand for materials and determining the necessary actions to meet that demand (Rao, 2020). MRP systems are designed to provide real-time data on inventory levels and production schedules, which allows organizations to make informed decisions about production planning and inventory management (Javalgi et al, 2018).

One of the key components of MRP is the bill of materials (BOM), which is a list of the raw materials, subassemblies, and components that are required to manufacture a finished product (Rao, 2020). MRP systems use the BOM to calculate the requirements for each component and subassembly and then generate purchase orders or production schedules to meet those requirements (Javalgi et al, 2018).

As it is essential to plan before executing any action, the same principle applies to manufacturing companies. Before the production process of converting raw materials to actual goods can begin, resources need to be procured according to the need to fulfil a particular order. According to Buma (2021), Materials Requirements Planning (MRP I) is a resource planning used to manage inventory, gather information on customer

demand, and finalize a product's bill of materials. This data is used to develop a purchasing strategy and a manufacturing schedule.

When it was first created, the information focused solely on the required commodities and their quantities. However, production and purchase schedules were improved when this approach was broadened to include other data elements (such as sales estimates). As a result, this becomes a golden tool in driving schedule-driven projects in manufacturing.

Material Resource Planning (MRP II)

According to Buma (2021), MRP II includes financial and operational planning and contingency planning, which outlines alternate courses of action if issues arise. Many possibilities are accessible because manufacturing resource planning does not employ proprietary software.

MRP II (Manufacturing Resource Planning) is a computer-based system that is used to plan and control the production process in manufacturing organizations. It is an extension of the original MRP (Material Requirement Planning) system, which focuses on the management of inventory and production scheduling. MRP II is a more comprehensive system that integrates various business functions such as production, inventory, scheduling, and financials (Javalgi et al, 2018).

According to (Yi et al, 2018) MRP II is designed to help organizations improve their production efficiency and reduce inventory costs by providing real-time data on production schedules, inventory levels, and capacity utilization. This allows organizations to make informed decisions about production planning, inventory management, and capacity utilization. MRP II is a powerful tool for organizations looking to improve their production efficiency, reduce inventory costs, and make better-informed decisions (Javalgi et al, 2018).

MRP II systems are typically implemented in stages, with the focus on the production, inventory, and scheduling functions in the initial stages and then expanding to include the integration of other business functions, such as financials, in later stages (Javalgi et al, 2018). According to (Cooper et al, 1997) MRP II systems provide a comprehensive view of an organization's production and inventory processes and enable the integration of various business functions.

Implementing MRP II systems does require a significant investment in terms of software and hardware, as well as the training and development of employees to use

the system effectively. (Sarveswaran and Rajendran, 2020) suggests that the success of MRP II implementation depends on the level of support from top management, the readiness of the organization and the involvement of employees.

Manufacturing Schedule

It is essential to have a schedule in manufacturing. This sequence of how the projects will run brings a structure to the activities that drive the production day.

Why is it important to plan for resources in manufacturing?

Manufacturing resource planning enables a more productive and cost-effective production schedule. However, it gives critical data from the production floor that can be used to address issues that have hindered manufacturing in the past, so it will not be necessary to deal with them again Buma (2021). According to Repenning & Sterman (2001), there is something that can be done to reduce a reactive activity known as firefighting, which managers resort to when issues arise in production. If resources are planned for effectively, there will be no need for swift allocation of scarce resources to handle unanticipated difficulties or 'fires' detected late in the product development cycle to prevent projects from running late in a multi-project scenario.

Problem Statement

The current challenge at the manufacturing company in Cape Town mentioned in this research study is the declining productivity rate in delivering projects. As this is a manufacturing organization, projects that are running at the same time share resources.

Production machinery and skilled labour are some of the shared resources. The daily production schedules and product lead times are affected by sharing these resources.

As a result, production managers are concerned since their vision of favourable gains if factory productivity is not realized.

According to Yaghootkar & Gil (2012), previous research has shown how important it is to study project management in multi-project setups. When project management is schedule-driven and resource capacity is fully committed, difficulty arises from the necessity to share skilled resources across many projects.

The gap that needs to be covered is the cause of multi-project organization's productivity declining or being unstable as the impact of the dilemma could be resulting from resource planning stage and the supply of resources.

Research Objectives

According to Jowah (2015) the research objectives, which are sometimes articulated as particular research questions, are fundamentally the topic of inquiry and the problem statement. It is the objective for which the research is undertaken, and it must be unambiguous questions about the situation and what is to be researched. On the other hand, it should not be too broad because it becomes challenging to study and must clearly state why the research is needed.

The researcher's expectations for undertaking the study are known as research objectives. The objectives have an impact on the design that will be employed to meet the research's expectations. The research aims here are separated into two categories: primary research objective and secondary research objective.

1.1.1 Primary Research Objective

- To identify the schedule-driven project management techniques that can improve productivity in a manufacturing set-up.

1.1.2 Secondary Objectives

- To identify the relationship between scheduling and productivity in a manufacturing set-up.
- To provide recommendations on how productivity-related issues can be resolved by applying effective scheduling tools in project management.

Research Questions

The research questions are divided into two categories: primary and subsidiary (sub-questions) research questions.

These questions direct the creation of the research instrument and help define the scope of the investigation. In addition, these enable the collection of data relevant to the research challenge and objectives.

1.1.3 Primary question

- Which project management techniques can improve productivity in a manufacturing set-up?

1.1.4 Secondary research questions

- What is the relationship between scheduling and productivity in a manufacturing setup?
- How can productivity-related issues be resolved in a multi-project environment by applying an effective scheduling tool in project management?

Research Design and Methodology

According to McCombes (2021) a research design is a plan for employing empirical data to address the research issue. A research design requires choices regarding:

- the general objectives and strategy
- the chosen research methodology
- the subject selection criteria or sampling techniques
- the techniques for gathering data
- the steps you will take to gather data
- the approaches to data analysis

Research methodology is the process through which researchers must perform their research. It demonstrates how researchers define their problem and objective and then provide their findings based on the information gathered over the study period. The chapter on research design and methodology also demonstrates how the study's goal will be satisfied by the research output at the conclusion Sileyew (2019). Among the research methods which are commonly used in research, in this research, the researcher has used the quantitative research method. The accuracy of desired results was maximised by obtaining a deeper understanding of the respondents' results. The qualitative approach is known as the anti-positivist approach. These phenomena may include but are not limited to how people perceive different aspects of their lives, how people behave individually or in groups, how businesses run, and how interactions affect interpersonal relationships. The researcher is the primary data-gathering tool in

qualitative research. The researcher investigates the causes of events, what transpires, and what those occurrences signify to the persons under investigation Grad (2015).

Target Population

This study was based in the Cape Town region. The target population included production manufacturing qualified individuals who were treated as project managers in their various levels of interaction with the daily projects concurrently running in the manufacturing company being observed.

Data Collection Method and Instrument

The questionnaire was utilized as the data collection tool in this study.

According to Cleave (2021) questionnaires are advantageous for research since they reduce expenses. The questionnaire was distributed via internal email from the company after obtaining ethical clearance.

This enabled the desired opportunity to narrow the search for production managers within the organization and send an email requesting their participation in the study using the internal email addresses of the personnel. The questionnaire was administered by the researcher directly without additional assistants. In order for the production managers to answer the questions, the aforementioned was followed by a link to a questionnaire designed to answer the research questions and satisfy the research objectives.

1.1.5 Data analysis

The responses were being monitored as the research instrument provided a tracking system to track the number of responses received and the data analytics that allow for visualization of the data status. Respondents sent their responses. The results were analysed and presented in graphical form and pie chart for some to interpret the responses. The tool used to present the finding was a Google document that provided all the data analytics required and was presented further in the paper.

Ethical Consideration

All participants were voluntary and willing to participate as permission was obtained from them first. The study was explained to them before participation. All responses were kept private, and respondents were also given this assurance. The candidate's

identity was not revealed in any section of the questionnaire. The responses were, therefore, anonymous. Permission was secured from the company's contact person before sending out any correspondence, and consent was signed by the researcher to ensure that the information gathered about the firm would not be utilized outside of this research for personal gain.

Chapter Classification

Chapter One: Background information on the subject and an explanation of the overall goal of the study is covered in this chapter. This chapter also provides an overview of the study, discusses the literature used to identify the study gap, and discusses the problem statement, research objectives, research questions, and methodology. It also discusses the research instrument, data collection techniques, ethical issues, and considerations.

Chapter Two: This chapter covers these subtopics:

- Project management in manufacturing
- the review of what schedule-driven projects are in multi-project environments
- the factors that affect and influence multi-project environments
- a review of productivity and what affects it as far as projects are concerned
- how schedule-driven project management impact overall company performance in the manufacturing industry.

Chapter Three: This chapter defines the research methodologies, approaches, and designs employed throughout the study. This chapter will examine the benefits and drawbacks of the research's methodologies. The qualitative data collecting approach will be used to collect the data co-joining it with the quantitative data collection approach expressed in a form of a questionnaire that is divided into three sections. This chapter will define the research techniques, tactics, and strategies employed throughout the study.

Chapter Four: This chapter consists of data recording, analysis and interpretation of the results acquired from conducting fieldwork for the study. The data in this chapter is presented in graphical form for visual and better analysis.

Chapter Five: This chapter presents the summary of all findings, conclusions and recommendations.

Summary

It is becoming a reality for many managers now that firefighting project-related issues in daily production runs are not a productivity solution. Something that many organizations have run away from in the past, which is investing in visual systems and ensuring a dedicated project manager is present on site daily, is becoming a particular need to ensure meeting customer expectations. This study has proven that there is a cry for project managers to be recognized in manufacturing settings, especially those dealing with concurrent projects. We have also realized that schedule-driven project management is not ideal as it tends to frustrate daily production while taking priority for due projects or even having a late start. This approach has the ability to cause serious chaos to a perfectly running production floor just by pulling out specific resources in trying to aid an almost late project, which is not an effective way of doing things.

CHAPTER 2

LITERATURE REVIEW

Introduction

Production project management is the planning and oversight of all tasks necessary to create a variety of goods. As a result, crucial tasks, including planning and developing products, controlling, maintaining equipment, and improving processes, are all part of production management Markotic (2021). According to Markotic (2021) production management is described as the process of implementing the project management tenets to the manufacturing process. The level and extent of this obligation are comparable to those of other disciplines like marketing, human resource management, or finance management. Production management is responsible for designing products and processes, planning and controlling operations, including capacity and quality, and organizing and supervising the workforce Markotic (2021).

In today's industrial situations, efficient production management is essential. Production procedures cannot achieve the company's objectives without this. Nevertheless, businesses can profit in several ways from efficient production management regardless of size Sweetprocess (2021). Project management for production refers to the methodical use of tools and processes that enable managers to oversee the production and delivery of goods at the best possible prices without compromising on quality and accomplishing organizational goals. No matter the size of the business, it can be applied in any plant and enhanced with the aid of production management software.

This chapter covers project management in manufacturing. A review of what schedule-driven projects are in multi-project environments. This chapter will also look at reviewing productivity and what affects it as far as projects are concerned, how schedule-driven project management impact the overall company performance in the manufacturing industry.

Project management in manufacturing

A manufacturing project management team looks at the methodologies, systems, software and other aspects of a particular project and through a process of analysis, planning, coordination and execution meets a set of established goals. Common goals in manufacturing are to reduce waste, increase efficiency, and meet budget, schedule

and safety goals Design systems (2022). Common goals in manufacturing are to reduce waste, increase efficiency, and meet budget, schedule and safety goals.

Schedule-Driven Projects in Multi-Project Environments and the Factors that Affect and Influence Multi-Project Environments.

Suppose decisions about priorities are not formally established at a high enough organizational level; in that case, lower-level managers and occasionally Chief Executive Officers tend to transfer resources back and forth between projects in a fire-fighting manner, especially when one project runs behind schedule. The impact on productivity and project throughput rate is negative, Yaghootkar and Gill (2012)

As a result of this impact, lower-level managers prefer to move resources between projects in a fire-fighting manner. Projects are not being organized on formal priorities and key resource schedules; this is according to Yaghootkar and Gil (2012). According to Chen et al., (2019), traditional project management is incapable of adequately coordinating several projects since it is primarily concerned with the performance of individual projects. In this event, project management in a multi-project context, which is the basis of this study, would suffer.

2.1.1 Manufacturing project management method

According to Yaghootkar & Gil, (2012), multi-project management methods have been widely used to assist project managers in systematically managing various projects with varying scopes, complexities, and timelines; this approach can deliver better results than when projects are managed independently.

Furthermore, according to Yaghootkar & Gil, (2012), the struggle for limited resources across projects is the most prominent feature of multi-project scenarios, which might lead to resource conflict risk. Research shows that projects in manufacturing environments under time constraints frequently become delayed. This type of occurrence has a detrimental impact on the entire business

The underlying cause of schedule pressure in manufacturing facilities is frequently moving specialized resources across project settings Jonas, Canonico, & Söderlund (2010).

In addition, if the organization has no available specialized resources and replacement staff with adequate skills is not hired, those in senior roles in the manufacturing plant may be tempted to reallocate resources from other concurrent projects in order to

accelerate a business-critical project that started late, according to Yaghootkar (2010). This is presently taking place, with select competent operators being shifted from one production line to another to do a more vital role.

An effective schedule management plan, according to Suresh & Sivakumar (2019), includes outlining the work breakdown structure, identifying interdependencies among activities, sequencing them, estimating task duration, identifying risks involved, and finally, developing a project schedule management plan.

Although the Gantt chart, a type of bar chart that depicts a project schedule, is one of the most important tools used in schedule management planning. For complex projects, separate Gantt charts can be prepared for each key stage Beleiu, Crisan & Nistor (2015). Unfortunately, a Gantt chart is rarely seen or prepared for any daily managed projects as a preparatory phase tool to manage the project in the manufacturing company studied in this paper.

This is practically ineffective as it should be because the production line supervisors, who are the first-level project coordinators for multi-projects, rarely follow it to the letter. As a result, much time is wasted on activities that are not even listed on the style breakdown sheet. This makes achieving and displaying an accurate reflection of what is happening on the production floor hourly, daily, weekly, and monthly impossible.

Aside from the seldom use of the offered project management technology, other factors also impact the effectiveness of project management. Therefore, the elements determining project management effectiveness are viewed as primary variables that influence project success and levers that project managers can utilize to improve their chances of achieving the desired outcome Westerveld (2013).

According to Zou, Kumaraswamy, Chung, & Wong, (2014), all projects go through several life cycle phases, which substantially impact project management effectiveness. Conceptualization, planning, execution, and termination are the four fundamental phases of any project.

Project managers must understand the life cycle in order to execute projects on time and within the budget since it aids in comprehending the logical sequence of events that occur as the project progresses. This statement is supported by Anantatmula (2010), who states that it is critical to clearly define roles and responsibilities in project management in order to ensure that they are implemented successfully.

In the manufacturing company referred to in this paper, delivery dates drive the production schedule; they remain unchanged. According to Morris, Pinto, and Soderlund, (2011), the production schedule depends on the delivery dates, as the project managers must adhere to the deadlines fixed for the completion of projects. Therefore, a production schedule must be prepared to guarantee well-timed delivery to the consumers.

In other circumstances, the production personnel are forced into firefighting mode due to a lack of raw materials for styles that are planned to run on specific days. The availability of raw materials and human resources affect scheduling. It has been found that appointing untrained or inexperienced staff results in the organization's inability to execute its project successfully.

The schedules must create provisions to adapt these adjustments into their plan to ensure smooth execution. In addition, having a consistent supply of supplies allows the organization to operate on a regular schedule. On the other hand, if the supply of materials is not standard, the schedule must be adjusted accordingly to avoid delays.

According to Mouri, (2011), the goal was to determine the amount of time lost on projects and the reasons for it. His research also revealed that the amount of time and money lost is significant, with various important factors at play. Inadequate fund flow, poor budget allocation, improper schedule management planning, changing scope of work, and pricing variations are some of the causes. In addition, many organizations are perpetually in firefighting mode, where short-term results frequently trump long-term plans and strategies. While this can make realizing the benefits of good project management practice more complex, there are techniques to accommodate a high-drama culture throughout the project life cycle Wrona (2016).

Continuously having to be putting out fires harms an organization's performance since it can lead to exhaustion, burnout, turnover, and an increased risk of other mistakes. In order to avoid this catastrophic business mistake, a designated project manager would follow the process on figure 2.1.

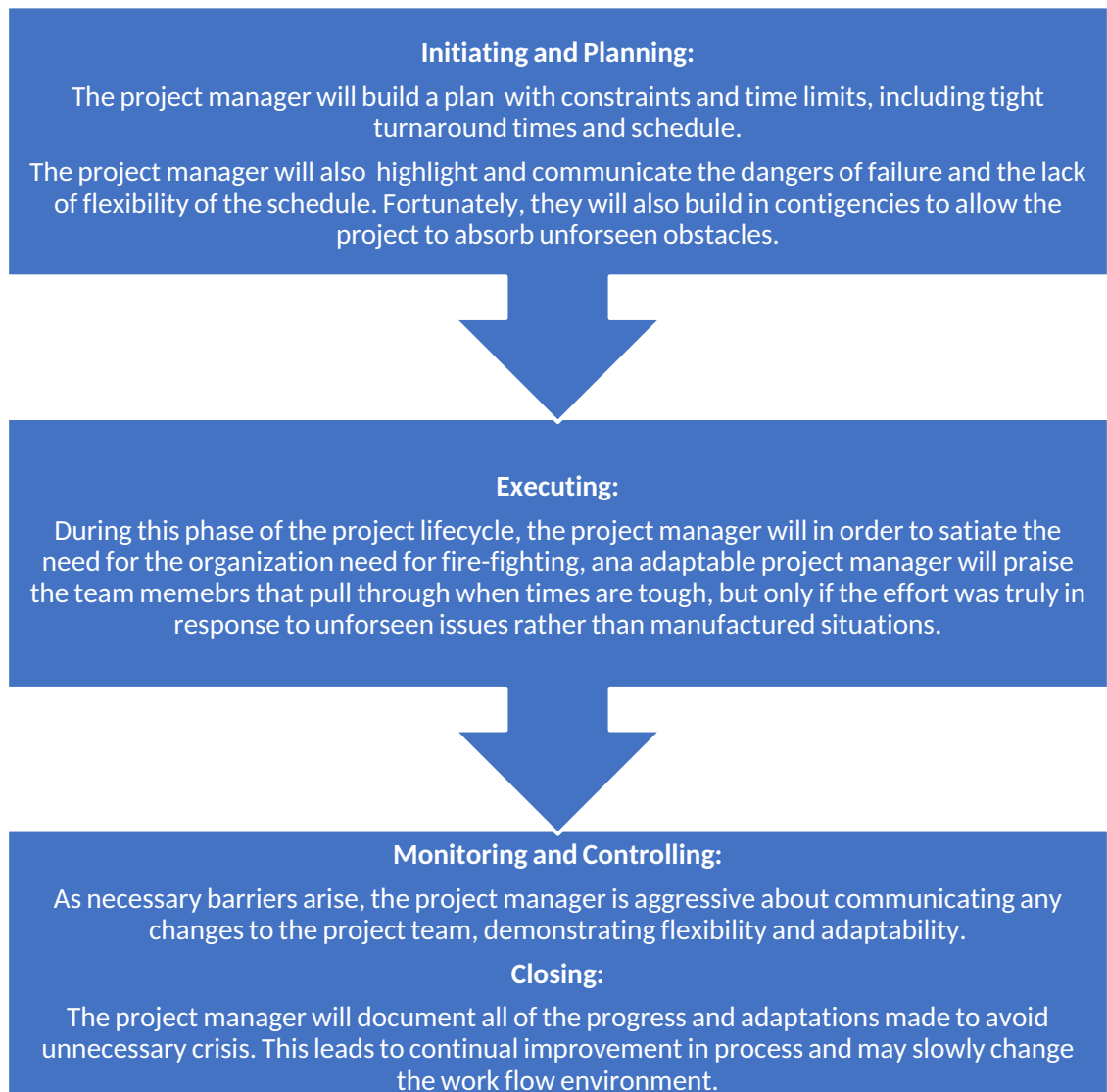


Figure 2-1: Avoiding a 'firefighting' mode of management Coursera (2022).

Our focus, however, is different. Schedule pressure results from a schedule-driven project management policy to finish projects deemed business-critical on the anticipated completion date, even if they started late and there is no free resource capacity, rather than a result of emergent late problems owing to poor front-loading.

Late starts are attributed to a conflict between project and senior management, a common problem in multi-project organizations Soederlund (2010).

In terms of planning and allocating project resources before execution, the manufacturing firm mentioned in this study struggles to get functional managers to collaborate.

The project team's human capital is its most valuable resource. Depending on the milestones being delivered or the individual phase of the project, projects require specific expertise at specific points in the schedule. Over the course of a financial year, an organization may host multiple strategic projects concurrently, meaning that its staff may be engaged in multiple projects simultaneously. In contrast, a worker might be transferred from a position inside an organization to a project team because the worker has a specific area of competence. Projects frequently call for skills and resources that can only be obtained through contract work and outside contractors. Obtaining and coordinating these human resources, together with effective time management of the project, are essential to its success Watt (2012).

Even still, the authors acknowledge that this is easier said than done, particularly if a large number of concurrent initiatives push the organization's resource capacity to potentially excessive levels. This encourages overburdened teams to fight intensely for personnel, resulting in some projects running late Laslo and Goldberg (2008). This is, without a doubt, the company's greatest obstacle. Across essential projects, there is fierce competition for skilled labour. The most pressing question that remains unsolved is how project timetables affect productivity. It is recognized that increasing productivity has long been a concern for many businesses, and therefore the Toyota production system was developed Hamed and Soliman (2015).

Previous research has demonstrated that a high percentage of schedule-driven projects is detrimental to a company's overall performance Kulkami (2015). Projects driven by a schedule are more likely to have high prices, cost overruns, and even safety concerns.

There is no daily plan in place at the stated manufacturing company in this study to get outsourced labour support to push out work due for completion. According to this research study, projects are driven by cost rather than a schedule. The main goal is to finish all tasks as cheaply as possible, even if it means overworking the current workforce.

The lowering of break times is the first step. According to the South African Basic Conditions of Employment Act, employees should take a 60-minute break after every 5 hours of work. These breaks have been decreased to 20 minutes for lunch and 10 minutes for tea, resulting in only 30 minutes of relaxation for an 8, 5-hour workday.

In competitive marketplaces, producers are also under pressure to speed up product development and minimize time to market in order to fulfil changing customer

expectations and demand for cutting-edge technologies. In addition, for manufacturers to remain competitive, they need to minimize total costs while being quick to develop and market new products Thompson (2012). Previous research has revealed a lack of interest in the subject matter, which has sparked attention. The single-project paradigm is so deeply embedded in scholarly literature that scholars may fail to recognize it as a simplifying assumption that has sparked calls for more significant research on multi-project contexts for a long time. According to Manjula et al. (2016) lack of project management causes delays in individual project timelines and subsequent sub-projects, if any are present, emphasizing the need to learn and comprehend project management in multi-project environments.

According to Krishna et al (2016), a schedule pressure situation is defined as the tension created by the difference between the project's expected work schedule based on the resources allocated at the outset and the actual work schedule delay. When a project is completed on time, and the leftover work does not cause the team to raise their workload, schedule pressure is low; nevertheless, at the manufacturing plant under investigation, the opposite is true. According to existing research, projects in high-pressure production environments are routinely delayed, significantly impacting the firm's overall business.

The Factors that Affect and Influence Multi-Project Environments

The factors which affect and influence multi-project environments are discussed in this section.

2.1.2 Sharing of resources for projects that run concurrently.

The resources which are currently being shared in the multi-project environment referred to in this write-up are the skilled personnel, machinery including specialised machinery, which is often not enough in the factory, raw materials such as fabric, cotton, needles for sewing machinery as well as facility space and restrooms for the workers. These factors contribute to long waiting time, which often results in production time delays known as machine downtime or employee downtime for a worker. Of course, specialised resources are not restricted to those stated, nonetheless, specialized machinery and skilled staff are crucial in the cited plant. The lack of these two resources is enough to throw the entire project timetable into disarray as the production rate will be compromised, if not the quality of the project.

A core law drawn from multi-project organizations is sharing specialized resources among projects, which is the root cause of schedule pressure Manjula (2016). These factors which affect and influence multi-project environments are often caused by delays frequently caused by the firm's inability to appropriately handle the pressure, which sometimes results from planning and scheduling work to be produced within the production floor. Even though a lack of skilled labour and machinery can put a strain on a project's schedule, senior management staff finds it particularly appealing to borrow resources from a concurrent project to use in a business-critical project that started late and for which the organization is short on staff and unable to hire new staff or acquire resources.

Organizational Culture

According to the Solutionformatics (2019) article, an organizational culture that promotes communication is important in schedule-driven project management environments and that management should create a working environment that encourages organization members to communicate with each other for a mutual goal within the organization. This includes creating a useful means by which knowledge and experience can be shared across different projects and effective communication channels to support information- and knowledge sharing. Organizational culture should also support teamwork. Furthermore, according to Blismas et al. (2004) there are 10 main factors that affect multi-project environments: project uniqueness, site geographical disparity, owner indecisiveness, owner's corporate drivers, business volatility/economic environment, legislative processes, property supply, project prototyping, lead times, and third-party intervention

Productivity and the Factors that Affect Projects' Productivity in Multi-Project Environments/Manufacturing Industry.

2.1.3 Productivity defined

Being productive is crucial to project management because it promotes organizational success. Researchers describe productivity as the cooperative work done by management and staff to enhance individual performance. It also necessitates comparing input and output across various industries Ahmed et al (2020).

The value of assessing productivity is widely recognised, given the current rise in global competition. It is stated that there is a direct correlation between productivity and money or resources for the business Bureš and Stropková (2014). Simply expressed,

productivity grows when the same amount of inputs results in more outputs or when the same amount of output is generated with fewer inputs. Numerous criteria have been recognized as factors that affect the productivity of projects in multi-project setups after examining various kinds of literature on the subject. For example, the overall volume of production units during a specific period is important when evaluating labour productivity. However, neither the type of waste they generate, nor its quantity is. Therefore, even if the products are so poorly constructed that more returns and consumer complaints result, a staff that produces twice as many goods in the same period is nevertheless regarded as more productive in the manufacturing project settings Manufacturing productivity guide (2022). This is the current state of the multi-project organization where this study is being conducted.

Not using high-quality components or raw materials, streamlining and standardizing the process, and other factors can affect the project delivery, negatively impacting the project's productivity Manufacturing productivity guide (2022).

According to Manufacturing productivity guide (2022), each person should have their roles well defined to avoid conflict and work overlap. In addition, there should be specialization and a division of labour as well in order to guarantee that the production line runs efficiently and quickly. The project's productivity suffers when these are not adequately defined.

2.1.4 Factors affecting projects' productivity in manufacturing/multi-project organizations

Project leadership in multi-project organizations is identified as one factor affecting the project's productivity. Generally, a leader is referred to as a person who can influence one or more followers and motivate them to work towards specific objectives Chetty and Phung (2018).

-How the team performs to meet the project's objectives depends on how an appointed project leader leads his or her team. The capacity to recognize the project team's strengths and shortcomings in order to discover opportunities to strengthen the team's inadequacies and enhance performance is one of the many responsibilities that project leaders must perform Bo et al (2020). In addition to this is made by Yang et al. (2011) have that not only leadership affects a project's productivity, but also leadership style has a significant impact on productivity. However, there is no ideal style to apply because different approaches work for various organizations depending on various variables, including organizational culture.

Furthermore, other factors that previous studies have cited that affect project productivity. Without a doubt, the world is advancing in technology, and continuous adaptation to newly developed systems to support day-to-day project activities in multi-project environments could be the most vital action to take towards business success. According to Yang and Ying (2013), for multi-project organizations to thrive in a new competitive climate and stay up with new trends and creative services that other competitors may be adopting, manufacturers must respond quickly to the rapid development of technology. Failure or delays in migrating to new technology equipment and systems is a limiting factor towards a company's achievement of its desired productivity level.

Time to market or on-time delivery is a crucial component, among many others, in today's highly competitive market, where technological innovation and growth are vital. This is necessary to attain a high level of product success. Increase project pace, profitability, client satisfaction, and overall sales volume while introducing new products more quickly. These project initiatives must be technologically supported to be delivered when the end user requires them. Successful projects must be completed on schedule, within budget, and with the required level of technical competence. The capacity to deliver a project rapidly is becoming an increasingly crucial factor in winning a bid in the present because projects tend to be bound by time, cost, and quality specifications. This is crucial in manufacturing, where third parties, such as suppliers and contractors, are frequently involved. Numerous manufacturing projects, such as batch and job shop production lots, have been characterized by project deliverables that do not satisfy the required specifications, ineffective execution procedures that lead to delays, and schedule slippage. Delaying the launch of new or requested products can have detrimental effects on the project's productivity, including decreased market share, decreased profitability, capital loss, and perhaps most importantly, diminished consumer goodwill.

According to Yang and Ying, (2013), technological variables are effects that relate to the tools employed in the organization's environment and affect how the organization runs. Due to a greater reliance on technology, technological considerations now have a much more significant impact on a business's success than they did in the past. These technological elements can include materials, machinery, and procedures that can offer benefits and drawbacks, but they are essential for gaining a competitive edge and are an effective force in globalization. The interests of the industries they support are directly reflected in technological advancements within every area. In the fiercely competitive world of fast-moving consumer goods (FMCG), technological

advancements have made it possible for businesses to be alert to market trends and adaptable to them Thorvaldsdóttir, Robinson and Mesirov (2013). Technological considerations impact all operations in a company's value chain, but manufacturing productivity and competitiveness are particularly impacted. Each of these components of the technology in use—items created and sold to customers, processes used to create the products, and information systems used to connect the various parts of a business—should affect how well the manufacturing system performs. Technology opens the door for better products.

Worldwide manufacturing productivity is impacted by technological variables, which calls for a behaviour change. When demand for a project is growing, the manufacturer must constantly adjust and improve the project rather than unwind. New technology, such as robotics, has the ability to work around the clock, complete tasks without breaks, and continuously perform more accurately. Only technological advancements can lead to sustained increases in productivity Gorman (2014). The newest technology and innovations significantly increase project productivity in multi-project environments. It is possible to improve material handling, storage, communication systems, and quality control with the aid of automation and information technology Ubani (2012).

Additionally, technological advancements have significantly increased productivity. For instance, energy harvesting approaches have significantly improved efficiency while freeing up man-hours. Similarly, industrial equipment, communication, and logistics in their different places have considerably improved. Technological developments may give manufacturers various benefits that boost productivity, such as cost savings, increased effectiveness reduction, increased reliability, broader reach, faster speed, better market access, and transactions and processes Blanke and Marcus (2014). To add to this Gorman (2014) explains that the National Bureau of Economic Research noted that the robust performance of productivity growth in the second half of the 1990s was related to accelerating technical development, not to poor measurement or transient causes. The productivity of manufacturing enterprises is frequently adversely affected by the often appalling and inadequate ratio of output derived from input resources. Due to poor productivity brought on by inferior technological capabilities, manufacturing companies are hampered by the inability to satisfy requested quantity needs on schedule, within budgeted cost and quality parameters. This causes schedule pressure in manufacturing projects and thus leads to a major decline in productivity due to the failure to deliver projects on time. The factors that affect productivity in terms of working conditions or environment include the air, temperature,

light, space, sound, and colour of the workspace, among many others. Where the project team is based is crucial when looking at productivity in a multi-project environment.

How Does Schedule-Driven Project Management Impact Overall Company Performance in the Manufacturing Industry?

Project management is not an easy task in an industrial organization. It does not improve the current system's scheduling capabilities. Its adoption necessitates changing the current management system and everyone's workplace conduct Rajkumar (2010).

The challenges and pain points faced by the manufacturing sector are quite specialized. Schedule, cost, scope, and quality are the primary sources of discomfort. Project management experts will likely recognize this because these are the four corners of the Devil's Quadrangle, the triple constraint or the iron triangle Berg (2015).

Making a high-quality product in the least period is the most challenging difficulty for producers. Therefore, a shorter time to market may be crucial for businesses to obtain a competitive edge, maintain low production costs, and control scope. However, as product quality is directly tied to consumer satisfaction and profitability, this cannot be done at the expense of quality Tran, Dang and Tournois (2020). One can deduce from this that schedule-driven projects can cause a problem to the company's performance because in cases whereby the projects are not on schedule, all resources are compromised to go and meet the most required project, so it is completed on time and in full. In this case, even quality can suffer. However, multi-project organizations can benefit from implementing project management in terms of the following:

- Increased flexibility – The production team is able to work more flexibly while minimizing pointless steps in the process thanks to techniques like lean project management. In lean, these pointless operations are sometimes referred to as "wastes," implying that they do not contribute any value to the manufacturing process. Lean enables the firm to streamline its manufacturing procedures, which boosts productivity and results in higher-quality output. In addition, reducing unnecessary processes increases the ability to respond quickly to unanticipated situations. Organizational teams can immediately adjust production to meet consumer demand as needed, avoiding expensive shortages or overproduction.

- Better risk Management – Risk management is one of the most important aspects of project management. Every project manager knows that even the best-planned project can be thrown off track by an unforeseen event. As manufacturing involves many processes built upon one another, the slightest inconsistency, such as a loose screw, can throw the production schedule off. Automation has helped manufacturing increase the efficiency of production and output, but automation is also prone to malfunction. A machine can always break down, and organization teams need contingency plans for that and other events; risking a complete production halt can be very costly.

Table 2.1: Steps to effective risk management Gupta (2022)

Steps to effective risk management	
Identification of risk	Identification of all possible risks that could affect the production schedule, budget and quality.
Risk assessment	Assessment and prioritization of which risks are more likely to occur, and which will have the most significant or negative impact on the project.
Risk response plan	Deciding on steps which will be taken to avoid or eliminate the risk or how the impact will be mitigated on production.
Risk status monitoring	Circumstances can change, and so do risks, which is why it is necessary to constantly monitor and control risks and make adjustments to the risk management plan if necessary.

- Easily track progress – Time is the most important component of schedule-driven project management. Project management includes planning, monitoring, and overseeing a project's development. Manufacturers can structure the process and keep track of the project's progress using classic project management tools like the Gantt chart and work breakdown structure to plan production. It enables them to spot any timetable delays and determine what must be done to deliver the product effectively.
- Effective tool utilization – Tools that enable more effective and efficient product production are standard in the industrial sector. Making better production plans, controlling production processes, managing risks, and measuring and quantifying success are all made easier for manufacturers when the proper project management tools are used. Additionally, it makes it possible for better departmental and team collaboration. Retaining knowledge and best practice

lessons for upcoming projects is attainable with the aid of a project management tool with a document management system.

- Continuous Improvement – In project management and manufacturing, continuous improvement is a top goal. It is essential to improve the usage of production processes, products, and tools. Project management methods must be used in conjunction with tried-and-true manufacturing methods in order to improve the efficacy and efficiency of processes and products. Change and advancement are inextricably linked. Although finding change can be challenging and time- and resource-intensive, it is essential for a company to grow. Manufacturers can improve, or, to put it another way, get better by streamlining processes, closely monitoring and measuring the progress of the production, strictly managing risks, and making the most of the project management tools at their disposal.

After numerous consultations with various literature sources, a representation of factors which affects labour productivity in multi-project environments was developed. This is represented in Table 2.2

Table 2.2: Factors which affect labour productivity in multi-projects environments Mefi & Asoba (2020).

Factor	Detailed description
Working environment	According to a literature source by (Almaamari & Alaswad, 2021), Conflict, camaraderie, inventiveness, and goal clarity were the organizational culture's most potent productivity-enhancing elements.
Factor	Detailed description
Salaries and wages	It has become a famous saying that employees should be paid for their worth. However, according to Jun, Liu, & Liu (2013), who have analysed the evolving pattern of the relationship between wages and labour in China's manufacturing sector, the study indicated the ownership

	structure of capital, firm size, capital-labour ratio and the export to sales ratio of enterprises all matter when deciding on the wage rate.
Company HR policies	Other organizations are opting to have more part-time workers in their factories in order to increase the productivity of the business. This means that projects can be completed quicker and cheaper while increasing the company's financial in this success. However, Kunn-Nelen, Grip and Fouarge (2013), argues that factories with a large pool of part-time workers are more productive than factories with mostly full-time workers.

Concurrent Projects and Resource Sharing in Manufacturing

The Manufacturing sector can be envisioned as a multi-project environment, with different interlinking operations being viewed as little projects. The projectization of the manufacturing industry refers to the shift towards a project-based approach to managing the production process in manufacturing organizations. This approach involves breaking down the production process into smaller, more manageable projects and assigning specific teams to manage each project.

2.1.5 The Projectisation of the Manufacturing industry- The Advantages

The projectization of the manufacturing industry has several advantages. It allows for greater flexibility in managing production schedules and inventory levels, as well as improved communication and coordination between different departments and teams. According to (Yi et al, 2018) It also allows for better management of resources and reduces lead times for materials and finished products.

Additionally, projectization of the manufacturing industry enables organizations to better manage the costs associated with their production process by breaking it down into smaller, more manageable projects. This allows them to more effectively control and allocate resources, such as time and money (Javalgi et al, 2018).

2.1.6 The Projectisation of the Manufacturing industry- The Challenges

Projectisation comes with its own set of challenges. For example, it can be difficult to ensure that different teams are working towards the same goals and that communication and coordination between teams is effective. It also requires a significant investment in terms of time, money, and resources to implement and maintain the project-based approach (Sarveswaran and Rajendran, 2020).

According to Nunn (1994) in the manufacturing industries, projects routinely use shared resources. This draws the project manager and the line managers of functions into continual negotiations over the performance of work. It appears as that short-term projects benefit from capturing resources from ongoing projects to advance critical efforts. However, the quality of the project is negatively impacted by expanding the project team since the learning curve is halted when resources are shared among several teams working on different projects, to support this, Jardin (2021) states that lack of resources (such as uneven allocation resources) contributes to quality failure in manufacturing environments. It has been determined that switching qualified personnel to fill shortage gaps in business-critical efforts is risky for project quality. Manufacturing companies frequently use this method.

This work significantly contributes by shedding light on the justification for decisions to take resources allotted to other concurrent projects in the short term and their unfavourable effects in the long term. By bringing them to light, management in these companies will be better able to concentrate on finding long-term solutions to such underappreciated business decisions. Moreover, this notion can ensure that an overdue project is delivered on schedule in the short run by making the proper decisions and fixing the relevant issues rather than putting out fires in every late project. This could be crucial for the firm, for instance, if the project's output does not reach the market by a deadline or before a competitor launches a comparable product. Resource capturing approach in an environment without free dimensions puts concurrent projects under schedule strain. In the long run, this has a ripple effect Chaitanya, Krishna and Manjula (2016). Chaitanya, Krishna and Manjula (2016). in order to avoid running late in a multi-project environment, managers often resort to fireside fighting — a reactive method involving the rapid allocation of scarce resources to resolve unanticipated issues or 'fires' discovered late in the product development cycle. Few project management studies have begun to look into how to manage an organization with several inter or intra-departmental projects

2.1.7 Project Effectiveness in the Manufacturing Sector

The goal of project management is to plan, coordinate, and control the project's completion in the most effective way possible, taking into account the needs of all stakeholders Harris, McCaffer and Edum-Fotwe (2013). The degree to which the objectives have been met is characterized as project management effectiveness Hyväri (2016). It is the degree to which a system can be expected to meet precise requirements or the amount to which a project's goals are met. Several elements must be addressed in order to ensure that objectives are met. It is considered effective if all operations have been completed, the project's objectives have been fully attained, and all parties involved, including the project's sponsor and initiator, have formally acknowledged and ended the project.

The measurement of project management effectiveness is significant because it aids project managers in confirming the efficiency with which the process' output matches the restrictions of the input, as well as how well the efficiency of the suppliers is dealt with by the process' limits Wysocki (2011). The practice of allocating the required number of resources identified in the planning stage to each activity identified in the plan is known as resource allocation or resource loading. It has been observed in practice that a given action might be attributed to more than one type of resource, necessitating schedule management planning by project managers. It is not necessary to have a fixed resource allocation for resource allocation because some activities may demand fewer resources at one time but more resources at a later stage of the project Muller and Jugdev (2012). For the development and integration of innovative approaches, as well as the timely completion of the project, exceptional leadership is critical. A lack of well-educated project leadership and the team has a detrimental impact on schedule management Hyväri (2016).

Improper leadership can result in increased expenses or delayed project completion due to a lack of resource planning prior to project execution.

The delivery dates also influence the production timeline since project managers must adhere to the deadlines set for project completion. Therefore, a production schedule must be established to guarantee timely delivery to customers Morris, Pinto and Söderlund (2011).

Scheduling is impacted by the availability of raw materials and labour. It has been discovered that hiring untrained or inexperienced people makes it impossible for the

company to carry out its project correctly. For instance, the corporation reported that two projects failed due to poor production quality.

Before the project begins, raw materials are not supplied in full; this damages the project timetable, especially when there is no single machinery for a specific activity or certain raw materials are awaiting delivery from suppliers. According to Kulkarni (2015), a high rate of schedule-driven initiatives harms a site's overall performance. Projects driven by a schedule are more likely to have high prices, cost overruns, and even safety concerns. The average cost of a schedule-driven project is 5% greater than a non-schedule-driven project. This may not appear to be a significant sum, but a typical project portfolio adds up to millions of dollars spent on time.

2.1.8 Schedule-driven project management

In project management, a schedule-driven project is finished and carried out by exerting total and complete control over time. The risk-based process includes the timeline, timeframe, and critical dates. It is the managerial responsibility to make the time a crucial requirement for project success. It becomes crucial while making decisions on project management. Time has an incalculable value. The term "schedule-driven" refers to situations where time is the primary motivating factor. Other project criteria like cost, resources, quality and risk come second to the project timeframe. Quality is frequently the first to suffer, then poor cost management and a string of scope changes.

Project scheduling is just as important as cost budgeting in determining the timeline, resources needed, and actuality of project delivery. Project managers with more experience can better outline the tasks, time, and resources required to complete a project.

If a project schedule is appropriately created, it can be utilized for planning, executing, monitoring, controlling, and conveying the scope delivery to stakeholders. The main objective of project scheduling is to outline the timeline for completing the project's scope.

In its most basic form, a project schedule could be a chart of work elements with associated schedule dates for when work elements and milestones (often the completion of a deliverable) are scheduled to occur.

Along with directing the work, the project schedule is utilized to inform all stakeholders when specific work pieces and project events are expected to be finished.

Additionally, the project schedule acts as a link between the work components of the project and the resources needed to complete them Scott (2020).

The project timeline should, at a minimum, include the following components, according to Scott (2020):

- Every activity
- A project start date
- Activity start dates
- Activity finish dates
- Project finish date
- Resource assignments
- Calendar based
- Activity durations
- The "flow" (sequence) of the various activities
- Activity relationships
- Critical path(s) identified
- Total and free float

All of these exist at the observed company, but the structure for following the flow of the sequence to ensure successful project delivery is nearly non-existent. The lack of systems implementation to regulate projects could damage the company's productivity.

Studies show that most projects do not meet client expectations since they are not finished on time or a budget Bhat, Gijo and Jnanesh (2014). Business organizations pay a high price when project managers fail to integrate project management practices with business strategies Rijke, Herk, Zevenbergen, Ashley, Hertogh and Heuvelhof (2014). Misaligning project management processes with company strategy can result in the following:

- Lower profitability,
- Loss of market share and reputation,
- Increased management and labour turnover,
- Lower productivity, and
- Higher costs Confonto, Salum, Amaral, Silva and Almeida (2014).

Project schedule and project planning

Project schedules are created during the project planning phase and are crucial to creating a project plan, where the schedule plan, schedule baseline, deliverables and requirements are identified. The project schedule is designed to guide the project team throughout the execution phase of the project, Manjula, Geetha, Nama, and Krishna (2016). Argues that managerial insights and product outputs could effectively persuade multi-project organizations to stop rewarding top management for their capacity to make short-term remedies despite their detrimental long-term effects on the organization's performance. Instead, our findings demonstrate that multi-project businesses must implement incentives and rewards to ensure top management maintains a holistic perspective. This perspective can help ensure that senior management understands the need to negotiate project budgets and resource allocations within the intended timeframes to prevent delaying new initiatives.

Top management wants to maintain specific specialized resource capacities available in advance. Organizations could view investments in free resource capacity as insurance against future events, similar to expenditures in product flexibility Neufville and Scholtes (2011). This investment will then pay off when a crucial project is suddenly put under pressure to meet a deadline. These findings suggest that enterprises should supplement their training, processes, and education investments to improve single-project management with corresponding investments in multi-project management.

Baldwin and Bordoli (2014) simplified the objective of planning and scheduling as that the main objective of planning is to ensure that things happen successfully. This requires objectives to be established, tasks to be identified and progress to be monitored. The project schedule provides the basis for measuring progress, the basis for regular review and an updating of the plan, Baldwin and Bordoli (2014). Also according to Dvir et al. (2003), there is a strong correlation between successful project planning and the success of a project from the perspective of project stakeholders. These authors also indicated that clear definitions of functional and technical specifications in project planning can lead to more effective execution of projects.

Regarding project scheduling, the development of a good project schedule is vital to an understanding of project performance and control. Good scheduling represents a roadmap for project managers, planners and schedulers in monitoring and tracking critical activities and milestones during the progress of a project. Good project planning

and scheduling can provide tangible benefits for key project stakeholders, Wolejszo (2020).

2.1.9 Implementation of schedule-driven project management

According to Manjula, Geetha, Nama, and Krishna (2016), a poorly implemented schedule-driven project management policy can lead to dissatisfaction among project staff who, frustrated by (and powerless to change) top management's attitudes, have no choice but to become accustomed to reactive but ineffective project management practice.

Because most project management research focuses on a single-project paradigm, there is a scarcity of studies on managing numerous projects in an organizational setting Yaghootkar and Gil (2012). A project's success is determined by its resource capacity, which includes the quantity, timeline, and quality of the resources needed to complete it Brown (2022). If an organization's resource capacity is insufficient, a project cannot be completed on schedule Yaghootkar and Gil (2012). Berssaneti & Carvalho (2014) discovered that senior management support and a dedicated project manager had a substantial impact on time success but not customer satisfaction.

The resource capacity of a project, which comprises the number, schedule, and quality of the resources required to finish it, determines its success Brown (2022). A project cannot be finished on time if an organization's resource capacity is insufficient Yaghootkar and Gil (2012). Senior management assistance and a dedicated project manager, according to, had a significant impact on time success but not on customer satisfaction. However, in such a schedule-driven workplace, there is a "vicious loop" of drawing personnel onto the on-time execution of business-critical projects Yaghootkar (2010). However, doing so necessitates faster and more frequent task switching, which reduces productivity Yaghootkar (2010). Indeed, many companies overwork their employees by requiring them to work on multiple projects simultaneously Schnetler, Steyn and Staden (2015).

Research has confirmed that motivation is another human resource function that engages the behaviour of workers, ultimately increasing the profitability and productivity of firms Puplampu (2013). Employees are driven when they believe their actions will achieve a goal and receive a prestigious reward. As a result, understanding how to encourage staff is critical if the organization is to meet its goals Bisharat, and Ghaleb Sweis (2014). The following statement can be true in the classroom and witnessing what happens daily, particularly in a high-pressure situation like a multi-

project scenario. Therefore, motivation and ongoing training are two tools that can be utilized to improve employee morale.

Furthermore, although planning and resource allocation are important challenges when many projects are conducted simultaneously, there is little extant research on multi-project organizational contexts Yaghootkar and Gil (2012). Resources, funds, people, facilities, and equipment allocated realistically, a plan is nothing more than intent, a dream that could well turn into a nightmare. Prior research has also shown that leaders' priorities and power can impact the interests of attaining project goals with low resources and budget, according to Scott (2020) in order to avoid project schedule pressure, the project budget estimate needs to be consistent and reliable.

Different stakeholder interests and priorities in addition to having a detrimental impact on communication and teamwork, juggling multiple tasks and resources across projects can also result in stress and a lack of focus Yaghootkar and Gil (2012) According to Turner and Miterev (2019) on project-based organizations, project schedules can be compromised due to employees being overly committed to multiple concurrently running projects. However, doing so necessitates faster and more frequent task switching, which reduces productivity.

According to Steyn and Schnetler (2015), companies overwork their employees by requiring them to work on multiple projects simultaneously. It should be noted that the aforementioned methodological approaches to evaluating an organization's project performance each have their pros and disadvantages, which are discussed in several scientific studies 24. This research focuses on the issues that a production business would face if it failed to complete these several projects that were operating concurrently daily.

The perception of time as a key constraint is linked to scheduling pressure, which is defined by Yaghootkar and Gil (2012) as the difference between the project manager's assumptions about the time required to complete the project as well as the resource allocation planned at the start of the project, and the actual number of days required to complete all project activities. Some reasons for scheduling pressure in a multi-project context are frequent, unplanned transfers of specialized personnel between projects, which are targeted at resolving the issue regarding project delays on a fire-extinguishing basis. To add on this, according to Karasek and Theorell (1990), High levels of schedule pressure require that project teams work long hours, which can cause staff to experience stress and health problems over time that harm productivity.

In addition, it often appears as though close attention to the drafted plan prior to beginning the project was not paid attention to or that the plan and schedule of operations was not placed at high value. As a result of the momentum created by these disturbances, numerous resource conflicts emerge as projects compete for resources, particularly human resources, Jonas (2010). The most challenging responsibility on the production lines is managing human resources. Since employee absenteeism is at an all-time high, the corporation is forced to put pressure on those who continue to show up for work, making it a serious problem Sayed (2022). The primary justification offered by managers is that a lack of available skills makes outsourcing labour hardly feasible. However, for every problem acknowledged, there must also be a solution, and this research study illustrates why finding those solutions is so crucial.

When it comes to project scheduling, creating an appropriate schedule is essential to understanding project performance and control. Good scheduling can be used as a road map by project managers, planners, and schedulers to keep track of crucial tasks and milestones as a project develops Karaca and Onargan (2007). Those crucial to the project can understand the advantages of effective planning and scheduling. Planning and scheduling methods and tools are essential elements of project planning and scheduling. It might be argued that poor project schedule performance warrants a closer look at the efficiency of the procedures and tools in place for controlling production timelines.

2.1.10 Project Planning, Monitoring and Control Methods

Various project planning, monitoring, and control methods and technologies, both conventional and innovative, are used in current practice. For example, traditional procedures like line-of-balance, the critical path method (CPM), and the program evaluation and review technique (PERT) are used with modern methods like critical chain project management and the Last Planner System NetMBA (2002). Project scheduling can be divided into two categories based on these methodologies and tools: resource-driven scheduling and time-driven scheduling. Line-of-balance and the Last Planner System are instances of resource-driven scheduling, defined as a timetable driven by and constrained by available resources (i.e., technical and human resources). The traditional scheduling of project tasks based on expected duration and dependence linkages, regardless of resource restrictions, is known as time-driven scheduling; examples include CPM and PERT.

Despite advancements in many scheduling strategies, producing a fit-for-purpose schedule within the allowed time and available resources utilizing various methods and

tools remains a challenge Yang (2007). These findings suggested that more relevant processes might be needed to grasp the underlying concepts of various methodologies and instruments. Simple activity lists, bar charts with dates, and network logic diagrams are all examples of how project schedules can be presented and communicated. It is not easy to plan a project. The goal is self-evident - to be on time, on schedule, and on budget - but the path to get there is everything but straightforward. Of course, achieving that aim entails much work. Even the best-laid plans can alter, and there is no assurance that the "project" you start will be the one you finish; that is why having a comprehensive, consistent, and adaptable scheduling plan is critical, which is what strategic project scheduling entails.

Different methods to project sizing and scheduling can be employed depending on the nature of the project and relevant management directives. The scheduling trigger drives scheduling tactics (the circumstance driving the scheduling approach). Scheduling triggers necessitate either a forward or backwards planning approach, depending on individual needs and circumstances. Planning should be in place to achieve a successful project timetable. When there is no specific project deadline, forward planning tactics are applied, and the tasks are used to generate the timetable and related completion deadlines. The manager determines a starting point and a plan to work through the project. The total expected duration of all anticipated jobs determines the project timeframe. These durations are combined, taking into account dependencies and requirements, to generate an overall project timeframe.

2.1.11 Factors affecting effective schedule planning

According to Snoo et al. (2011) who assessed the factors (or criteria) affecting the performance of scheduling from the perspectives of a number of project stakeholders. The author revealed that project schedules did not seem to be properly considered by both project managers and their planners/schedulers, as many criteria were ignored while developing and executing the project schedule.

Few studies have investigated and analyzed factors affecting project planning processes. Yang and Wei (2010) assessed factors causing delay concerning the planning and design stages of projects. They found that changes in the requirements of project stakeholders, especially owners, poor scope definition and an unrealistic initial or baseline plan were the top factors causing delay to a project. Consequently, there is a need to focus on factors affecting project planning, which in turn have a negative impact on the performance of the project.

Dvir et al. (2003) examined the relationship between project planning and project success from the perspectives of project stakeholders. They found that the effective definition of project scope at the early planning stages is significant to the success of a project. The authors further revealed that the inadequate involvement of project stakeholders will negatively affect the effectiveness of planning.

Backwards planning solutions are utilized when a completion deadline has been set in advance, and the project must be managed and scheduled to achieve that deadline. In this situation, planning begins with the end date and works backwards, analysing and organizing tasks and events based on their separate end dates in an "if-then" manner until a start date is determined. According to the literature, a schedule cannot be optimized without breaking down all the resources and tasks that must be done. According to previous research, practitioners know that a schedule-driven management approach can jeopardize an organization's long-term ability to deliver projects efficiently Kaulio (2008). With all this being said, running schedule-driven projects in a manufacturing company in Cape Town seems to be a no-good investment, especially in a factory setting.

If the labour resource is in shortage due to absenteeism, rebalancing the workforce to ensure production efficiencies are kept afloat seems to be a non-attainable goal. The company has to compromise being productive constantly and project quality to ensure that the delivery dates are adhered to as per agreed-upon schedules. Schedule-driven projects seem risky if we consider all the facts mentioned by past studies. The question of interest will always be what can be done to mitigate this issue, especially in the growing manufacturing space. Project-based manufacturing is a broad term that encompasses all sorts of production carried out on a schedule or driven by lead time.

Benefits of ERP systems in manufacturing project management

According to Decision Resources (2020) journal, more than any other benefit, the real-time information that ERP provides helps in the allocation of project resources. It also allows the project team to take corrective actions that could end up saving the project. And cloud-based ERP will be there to assist throughout the life of the project.

Engineering-focused manufacturing has a specialization known as "engineer to order" (ETO). As repetitive high-volume production has been offshored to China, Vietnam, and other places, many manufacturers have switched toward mass customization (also known as "made to order") for the consumer market, Simonite (2011). Typically, these begin with a base product that the customer can modify. On the other hand,

project-based items have advanced significantly now that the technology can support them because they are created from the bottom up to be distinctive for each consumer.

Examples of project-based industries include the production of wind turbine equipment, aerospace and defence, biotechnology, and contract pharmaceutical development. These are typically difficult, lengthy projects. Make-to-stock producers do not have to cope with the challenges that project-based manufacturing and procedures face. To manage materials and tools for high-volume production, high-volume companies that participate in repetitive or mass manufacturing employ enterprise resource planning (ERP) software.

In those situations, the supply chain's purchase and production schedules are well-known, largely predictable, and managed by the same system. On the other hand, the Spanish retail chain Zara as an example has a cutting-edge integrated manufacturing system that enables it to quickly respond to customers' swiftly shifting fashion preferences. The supply chain management has been strengthened such that the consumer pulls the design. Modern information technology and distribution technologies are used by Zara to gather data on trends every day so that new designs may be produced fast. Utilizing stock materials and an automated delivery system with more than 200 kilometers of subsurface tracking and optical reading equipment, Zara reduces costs Mukherjee et al. (2009).

A project-based manufacturer's core business is focused on projects rather than goods, and the technologies that support those projects are often independent of the ERP system. Project-based solutions cannot be easy, if at all, integrated with the current ERP. This usually results in businesses using a variety of tools, applications, and systems to carry out tasks that their ERP system by itself was unable to do. The backbone of business projects, yet the overarching strategy neglects them. Project businesses frequently utilize an ERP to manage crucial areas of their operations Wei and Wang (2004).

On the other hand, the primary project elements are managed separately from the rest of the business operations and outside the ERP. Team members that use different technologies and collaborate in silos experience delays and information sharing that is not appropriate frequently. When problems occur, it is frequently too late to fix them because no one always knows what is happening with the projects at any time.

As a result, most of the time, these businesses merely attempt to report what occurred after the fact. It is too late; clients are dissatisfied, and margins have been lost. This

lack of knowledge is especially prevalent at the upper levels of management because these executives only get weekly or monthly reports on what is happening. The only way to solve this issue is to build a single system that oversees all of the company's processes from beginning to end. All parts of the business are visible in real-time on a single platform, and previously fragmented procedures are viewed as one corporate operation. That is what a project business automation system is meant to accomplish. Adeaca coined the term "project business automation" in 2019.

It combined the terms "project business" with "automation" to describe the systemization of the former, which was first used by Karlos Artto and Kim Wikström in a research article published in the International Journal of Project Management. The term "project business" describes all businesses that use projects to deliver goods and services to clients. Project business automation is business-process management software that integrates all essential project business activities into a single end-to-end system. It is intended primarily for project-based businesses. Forrester has identified project business automation as the next area of software solutions for project-driven companies. According to Mong (2021), project business automation gives a unified, real-time view of fundamental project business operations that are often controlled in separate systems. There are five basic functional areas in which these core processes can be classified:

- Accounting and financials for the project. This pertains to the financial management of projects and project portfolios.
- Project costing, cost breakdown structures, budget management, estimate at completion, budget at completion, the cost to complete, month-end reporting, cash flow management, revenue predictions, and revenue recognition are just a few things covered. The ERP, additional accounting tools, and other spread sheets are typically used to manage these functions.
- Operations and project management. This is the project's operational component. Work breakdown structures, project scheduling, risk and problem management, milestone management, resource management, and subcontract management are all included at a minimum. Project management/planning/scheduling tools, custom-built apps, and various spread sheets are typically used to manage these functions.
- Insight and analytics for the project include the real-time study of projects, portfolios, and the company. Project business automation generates time-phased operational and financial threshold data since all functional areas are integrated, allowing project-based firms to operate their projects with real-time

visibility and control over procedures, costs, and risks. It offers real-time operational and financial analytics like cash flow, margins, estimate at completion, earned value analysis, and deviations on various key performance indicators. These types of analysis are typically performed on a sporadic basis in spread sheets and independent business intelligence programs and thus are not performed in real-time.

- The fundamental benefit of project business automation is that all of these areas are connected to a single system, delivering real-time data streams that allow for process acceleration and automation that is impossible to achieve when operations are managed in separate applications.

In every project environment, there are risks involved, and some are inevitable. This applies to a schedule-driven project set-up as well.

A schedule-driven project's risk-based process centres on the timetable, timeframe, and critical dates. Making time a critical condition of project success is a managerial mandate Fargo (2015). When making project management decisions, it takes on greater importance. The value of time is immeasurable. According to Asana (2022), the project timetable takes precedence over other project factors like cost, resources, quality, and risk. In many cases, quality is sacrificed first, followed by inadequate cost control and a series of scope shifts. Past studies in the manufacturing sector have mentioned that some productivity problems arise from a non-effective project schedule plan.

According to Van Heerden (2017), a schedule-driven project will surely be more expensive than a cost-driven one, but if reaching a specific market window is necessary for company success, this is the proper route. One of the most fundamental problems is that quality is not defined or understood as its whole, which adds to the confusion. The most common definition of quality is compliance with predetermined standards. While this is correct, it falls far short of describing excellence in its entirety. According to van Heerden (2017), quality in terms of the five points below:

Accurate: Information/deliverables should be accurate and free of bias. There should be no technical, arithmetical, or grammatical faults in it.

Complete: The accuracy of data and deliverables is insufficient. It should also be complete, which implies that no information or numbers should be left out or hidden. It is pointless to tell the truth but not the complete truth. All relevant factors should be

considered. The importance of key aspects pertaining to the project's nature should not be overlooked.

Reliable: Reliability refers to a high level of consistency in quality; information, deliverables, and project performance should all be dependable.

Timely: Plan the work (with milestones and holding points) and execute the plan to provide a high-quality result on time. It should be available whenever needed (information, deliverables, resources). Deliverables should not be overdeveloped or underdeveloped with respect to what is required at any particular stage of the project life cycle.

Conformance: Quality also entails adhering to predetermined guidelines and criteria. Durability should be based on business requirements throughout all project stages and disciplines. According to Watt (2014), conformance is a combination of the standards and criteria to which the project's products must be delivered for them to perform effectively.

If this is not the case in terms of the project meeting the minimum acceptable quality level by the business and client, it leads to rework, increased operating expenses, missed deadlines and budgets, and even low team morale. Client satisfaction will suffer due to the final product failing to match the business strategy. Frequently, the top-down project deadline is set without regard for resourcing, and this failure to "put one's money where one's mouth is" can be demotivating from the outset. It is presumptively true that the project is doable. It creates an immediate tension between adequate planning, risk management, and scoping, as well as the need to reduce critical steps and quality to meet the deadline. In short, Pinto claims that this strategy fails far too often. How do product development and manufacturing companies stay afloat in a competitive market?

Good planners try to sequence overall works so that each element can be done as quickly and realistically as possible. As a result, the project is no longer optimised once work deviates from the original plan. The new state will be suboptimal, with lower productivity than anticipated. The focus will then shift to how the delay can be made up. Schedule slippage and the pressure to recover from it have several common implications. Specialist plant or human resources, such as heavy plant or a technical specialist, that were expected to be available for a particular activity is not available when the delayed work begins. Other less effective alternatives to perform the work may be sought in addition to generating a simple timetable slip.

If there is no concerted effort to step back and replan the project as meticulously as planned at the start, it is unlikely ever to be as efficient as it was intended. Replanning usually entails setting new goals and may necessitate conscious and explicit cost-schedule trade-offs. This type of root-and-branch re-evaluation is uncommon. Significant initiatives have their own momentum, and there are obstacles to admitting that they have run into problems, not least personal and political shame. According to Duggan (2018), you must meticulously schedule tasks to arrange and execute them in a timely, high-quality, and cost-effective manner.

Conclusion

The success of a project is dependent on effective project scheduling. Set realistic time frames, assign resources accordingly, and monitor quality to reduce product defects to keep projects on schedule. This usually leads to lower expenses and higher customer satisfaction. Financial, paperwork, managerial, and quality assurance are all important considerations. The complete financials of a project are influenced by project scheduling, Scott (2020). Due to time restrictions, project managers must adequately allocate resources. This is especially true when completing work requires highly specialized skills and knowledge or when expensive materials are necessary. Due to the requirement for additional resources or accelerated materials, completing a job in a short time usually costs more.

This being said, based on the literature cited in this chapter, this statement is valid and furthermore to say that for positive results in the overall productivity of a manufacturing company, effective schedule plans need to be implemented and investment in ERP systems need to be prioritised in order to aid the project management process in manufacturing as mentioned in the literature in this chapter.

Last-minute orders that drive up expenses are avoided through accurate project scheduling, realistic estimates, and accurate projections Duggan (2018). According to a recent study Duggan (2018), project scheduling guarantees that the work is done to a high standard before moving on to the next step; this ensures that managers and team members solve problems as they develop rather than waiting until the end by ensuring that quality measurements match expectations at every step of the route. An ERP system ensures that this process is achieved effectively.

Because quality controls have been implemented from the start of the scheduling process, no serious concerns should arise after completion, Watt (2012). Effective project managers recognize that maintaining quality control entails controlling risks and taking advantage of chances to accelerate the schedule when possible to beat the competition and gain or maintain a competitive advantage with a more reliable product. However, this is defeated by schedule-driven project management as it prioritizes deadlines more than the quality of the delivered project Ray (2021).

CHAPTER 3

RESEARCH DESIGN AND RESEARCH METHODOLOGY

Introduction

Research methods, approaches and designs used throughout the research will be defined in this chapter. The advantages and disadvantages of approaches used in the research will be discussed in this chapter. Data collection will take place using the quantitative data collection method.

Problem Statement

According to Jowah (2012), the research objectives, which are sometimes articulated as particular research questions, are fundamentally the topic of inquiry and the problem statement. It is the objective for which the research is undertaken, and it must be unambiguous questions about the situation and what is to be researched. It should not be too broad because it becomes too challenging to study and must clearly state why the research is needed.9=

According to Yaghootkar and Gil, (2012), previous research has shown how important it is to study project management in multi-project setups. When project management is schedule-driven and resource capacity is fully committed, difficulty arises from the necessity to share skilled resources across many projects.

The current challenge at the manufacturing company in Cape Town mentioned in this proposal is a lack of product development, which the management team wants to see. Projects that are running at the same time share resources. Production machinery and skilled labour are shared resources. The daily production schedules and product lead times are affected by sharing these resources. As a result, production managers are concerned since their vision of favourable gains in factory productivity is not realized.

A series of arguments or logical basis that explains to the reader why the research topic or study is necessary to add to the relevant field of study is referred to as rationale this is according to Moola (2017). According to Manjula, Geetha, Nama and Krishna (2016), schedule-driven project management should be used in multi-project contexts since it increases project management complexity more than in other multi-project environments. The primary motivation for undertaking this study is to resolve productivity issues related to project delivery plaguing industrial companies in Cape Town.

Research Objectives

The researcher's expectations for the study undertaking are known as research objectives. The objectives have an impact on the design that will be employed to meet the research's expectations. The research aims here are separated into two categories: primary research objective and secondary research objective. The primary research objective led to "answering" the problem statement, and the secondary research objective led to "answering" the problem statement.

3.1.1 Primary research objective

- To identify the schedule-driven project management techniques that can be used to improve productivity in a manufacturing set-up.

3.1.2 Secondary research objectives

- To identify the relationship between scheduling and productivity in a manufacturing set-up.
- To provide recommendations on how productivity-related issues can be resolved by applying effective scheduling tools in project management.

Research Questions

- The research questions are divided into two categories: main (primary) and subsidiary (sub-questions) research questions.
- They direct the creation of the research instrument and help to define the scope of the investigation. In addition, these enable the collection of data relevant to the research challenge and objectives.

3.1.3 Primary question:

- Which project management techniques can be used to improve productivity in a manufacturing set-up?

3.1.4 Secondary questions:

- What is the relationship between scheduling and productivity in a manufacturing setup?

- How can productivity-related issues be resolved in a multi-project environment through the application of an effective scheduling tool in project management?

Difference between research design and methodology

3.1.5 Research design

The research design is the overarching method adopted to combine the various components of the study in a logical and cohesive manner, ensuring that the research problem will be effectively addressed; it is the blueprint for data collecting, measurement, and analysis. It is important to remember that the chosen design is determined by the research challenge.

The data collection instrument that was used in this research is a questionnaire. According to Cleave (2021), using questionnaires for research is beneficial because costs are saved. The path or road map that the researcher will follow, as well as the procedures, stages, and techniques used in the project, is referred to as research design. Research technique, on the other hand, refers to how the processes identified by the research design will be affected.

According to Streefkerk (2019) when collecting and analyzing data, quantitative research deals with numbers and statistics, while qualitative research deals with words and meanings. Both are important for gaining different kinds of knowledge.

Qualitative methods are commonly employed in social sciences, but quantitative methods are also used in natural sciences, merging the two. As a result, only the desired aspects will be utilized without wasting the available resources Thattamparambil (2020).

According to McCombes (2021), a research design is a method for using empirical data to answer your research question. Choosing a research design necessitates deciding on the following:

- The general objectives and strategy
- The study design that will be employed
- The subject selection criteria or sampling methodologies
- Strategies for gathering data
- The techniques used to gather information
- Ways of analysing data

The questionnaire was compiled as to address the research objectives and translated into an easy-to-follow link on Google Docs. The questionnaire was distributed to the targeted population through internal staff email – Microsoft Outlook; results were automatically captured on the Google drive dashboard for analysis. Research design, according to Pranas Zukauskas (2017), is the structure of the research that is followed in order to address problems or clarify research questions. The quantitative research approach was used, and it was based on the positivist research paradigm chosen for this study. Quantitative data-gathering methods are less expensive to deploy and may be implemented in a shorter amount of time than qualitative data-collection methods, and they are easy to compare findings. The road plan or path followed by the research process is termed research design outlining the actions taken. It defines what should be done during the study process and what should be avoided. The questionnaire was designed so as to unpack the research questions further.

3.1.6 Research Methodology

The research methodologies utilized to generate results and the study's conclusions are the focus of this chapter. Other topics covered in this chapter include the study's target audience and sample, sample size, data collection method, data interpretation system, research assumptions, and the study's scope and limits. The ethical criteria for professional research in the social sciences involving human participants were observed and followed at all times during the study's execution. The exact steps or methods used to find, pick, process, and analyse information on a subject are known as a research methodology. The methodology section of a research paper gives the reader the chance to assess a study's general validity and dependability. The methods section responds to two key inquiries: How were the data gathered or produced? How was it examined?

3.1.7 Population of the study

The population studied was the production professionals who were considered most familiar with the company's value chain process. This group was specifically those working at the company in Cape Town where this study was conducted.

3.1.8 Advantages and disadvantages of approaches

The qualitative and quantitative approaches are two different methods used in research to collect and analyse data. A qualitative approach is focused on understanding and interpreting human behaviour and experiences through the collection of non-numerical data, such as observations, interviews, and open-ended surveys. This approach is often used in fields such as sociology, anthropology, and psychology, and is particularly useful for studying complex social phenomena and understanding the subjective experiences of individuals. According to Creswell (2018), the quantitative approach is a research method that aims to test objective theories by examining the relationship among variables. A quantitative approach is thus focused on measuring and analysing numerical data, such as statistics and numerical measurements. This approach is often used in fields such as business, economics, and the natural sciences, and is particularly useful for understanding patterns, relationships, and trends in large datasets.

According to Edit911 (2022), quantitative research is expressed in numbers and graphs. It is used to test or confirm theories and assumptions. This type of research can be used to establish generalizable facts about a topic. Common quantitative methods include experiments, observations recorded as numbers, and surveys with closed-ended questions whereas qualitative research is expressed in words. It aims to help people understand experiences, thoughts, and concepts. Academics engaged in qualitative research enable us to gather in-depth insights into highly complex topics. Common qualitative research methods include observations explained in words, literature reviews exploring complex theories and concepts, and interviews with open-ended questions, Streefkerk (2017).

Both approaches have their own strengths and weaknesses, and in some cases, a mixed method approach, combining both qualitative and quantitative methods can be used.

Case study

This research study was approached in a case study approach as it was carried out on a single organisation. The case study research approach is defined as a study strategy used to produce a comprehensive, multifaceted understanding of a complicated subject in its actual environment, Crowe et al (2011). Case studies can be used to explain, describe or explore events or phenomena in the everyday contexts in which they occur Yin (2009) thus this study sought to seek the what effects that schedule-driven project management have on productivity in a manufacturing company based in Cape Town.

The chosen research approach for this research study and the reason

For this study, the chosen research approach was the quantitative research approach. Quantitative studies are often fast, focused, scientific and relatable. The speed and efficiency of the quantitative method are attractive to many researchers. Data computing equipment makes it possible to process and analyze data quickly, even with large sample sizes, Formplus (2020). Also according to Sage (2017), quantitative researchers aim to create a general understanding of behaviour and other phenomena across different settings and populations. Therefore the approach was chosen because it is also relatively cost saving to carry out, focused and much quicker to achieve and especially with the results analysis and presentation.

3.1.9 Population sample and reason for sampling

The product life cycle, which is treated as a project in this research, is received by the planning department first before the project starts on the production floor. Planners and schedulers are the key drivers in allocating the projects to various lines on the production floor and also determining the start and finishing dates of those projects based on the resource capacity that the company has. 30 Production managers are overseers of the entire production process. They manage the resources at a higher level and ensure the production process runs optimally. The 10 Industrial Engineers support the production process by implementing process improvement projects. In the cases of projects facing delays or any problems, Industrial engineers are the ones to resolve such problems which relate to processes overall. 5 Business Process and Intelligence Analysts the business process and intelligence analysts specialize in monitoring, measuring and providing feedback on process performance. This is

important for the research as this paper investigates the effects of schedule-driven project management on productivity. It is vital to know and experience the company's performance and what drives the performance in order to arrive at conclusions regarding the findings.

Research Methodology

The research methods that were used in this research study are both quantitative and qualitative methods and they were expressed in a questionnaire divided into three sections. Herbst and Coldwell (2004) define quantitative research as the use of numerical values to describe, deduce, and solve issues. Because quantitative data collection methods have a high level of uniformity, they are less expensive to implement and may be implemented in a shorter period than qualitative methods, and it is simple to compare findings Dudovskiy (2018). The goal of this study is to see how schedule-driven project management affects productivity, as well as to infer and solve problems using numerical data. The acquired data was used to make inferences.

3.1.10 Sample method/technique and sample size

The sample was constructed on various individuals who hold various titles in the manufacturing company: production managers, planning managers, supply chain managers and industrial engineers. The company that was selected for the study and fieldwork was one of the leading clothing manufacturing companies in Cape Town.

3.1.11 Sampling methods

Purposive sampling was used for this research. Purposive sampling, also known as judgmental, selective, or subjective sampling, is a type of non-probability sampling in which researchers pick individuals from the public to take part in their surveys based on their judgment Alchemer (2021). All selected participants fit a particular profile stipulated in the research mentioned above sample.

3.1.12 Sample size

The company has between 700 to 900 employees 50 to 100 are management staff or hold administrative positions. In this research, 51 personnel were selected for the study and the questionnaire as sent out to them, however 31 responded to the questionnaire.

Significance of the Study

A series of arguments or logical basis that explains to the reader why the research topic or study is necessary to add to the relevant field of study is referred to as rationale this is according to Moola (2017). According to Manjula, Geetha, Nama, and Krishna (2016), schedule-driven project management should be used in multi-project contexts since it increases project management complexity more than in other multi-project environments. The primary motivation for undertaking this study is to resolve productivity issues related to project delivery plaguing industrial companies in Cape Town.

Target Population

The population which was targeted for this study is working professionals. This study requires in-depth experienced individuals in the field with extensive working experience in the manufacturing industry. It is more of an experience opinionative study as one would be unable to effectively tackle the research questions without deep background knowledge of the practicality of working in the manufacturing setups running projects.

Sample Frame

According to Lusithi (2020), a sample frame can be defined as the total number of people who qualify for the study. Therefore, the total number that qualifies to satisfy this study's requirements was 51 professionals.

3.1.13 Sampling method used

According to Firchow and MacGinty (2017), a sampling method is essential to design quality research. Critical questions are provided to help researchers choose a sampling method. Table 3.1 details the reason for sampling for this research study.

Table 3.1: Reason for sampling

Population sample	Reason for sampling
Production Planning and Scheduling Managers - 5	The product life cycle, which is treated as a project in this proposed research, is received by the planning department first before the project starts on the production floor.

people	Planners and schedulers are the key drivers in allocating the projects to various lines on the production floor and also determining the start and finishing dates of those projects based on the resource capacity that the company has.
Production Managers – 31 people	Production managers are overseers of the entire production process. They manage the resources at a higher level and ensure the production process runs optimally.
Industrial Engineers - 10 people	Industrial engineers provide support in the production process by implementing process improvement projects. In the cases of projects facing delays or any problems, Industrial engineers are the ones to resolve such problems which relate to processes overall.
Population sample	Reason for sampling
Business Process and Intelligence Analysts - 5 people	<p>Business process and intelligence analysts specialize in monitoring, measuring and providing feedback on process performance.</p> <p>This is important for the research as this paper is aimed at investigating the effects of schedule-driven project management on productivity. In order to make conclusions about the findings, it is vital to know and see how the company is performing and what drives the performance.</p>

People to receive the questionnaire were identified by job description. Having obtained permission from the company to utilize the database in the company's internal email directory made the task very easy to complete. The selection was made randomly from the pop-up search of job titles that were searched while selecting the sample for the study. Not all those who were approached honoured the request to participate in the study; however, the method was undeniably effective.

Sampling technique

Out of the 51 people, 31 responded to the questionnaire hereby only 1 respondent from the 31 did not answer one of the questions in the questionnaire but the rest were

answered, and their level of service in the related field was longer than three years, making it highly probable that the study will be accurate regarding the responses analysed. This is supported by Mouton (2017) who agrees that 20% of a population may be sufficient to allow for statistically meaningful generalization.

The sample was constructed on various individuals who hold various titles in the manufacturing company: production managers, planning managers, supply chain managers and industrial engineers. The company that was selected for the study and fieldwork was one of the leading clothing manufacturing companies in Cape Town.

Sampling methods

Purposive sampling was used for this research. Purposive sampling, also known as judgmental, selective, or subjective sampling, is a type of non-probability sampling in which researchers pick individuals from the public to take part in their surveys based on their own judgment Alchemer (2021). All selected participants fit a particular profile stipulated in the research mentioned above sample.

Data Collection Instrument

The data collection instrument that was used in this research was a questionnaire. This tool was chosen as it is cost-effective. According to Cleave (2021), using a questionnaire for research is beneficial because of cost savings. This instrument was designed, reviewed, and modified to fully answer the research questions as a recommendation by the research ethics reviewer. The GoogleDoc link of the questionnaire was distributed via email – internal staff email on Microsoft Outlook. Using the internal email addresses of the staff provided the ability to filter the search of the job titles according to the specified sample population, and the questionnaire was launched accordingly, following the ethical clearance process specified by the university. Concurrent quantitative data collection was conducted (Ntantsana, 2021).

The questionnaire (please Appendix A) was designed in the following sequence:

- Section A: Respondents' biographical information.
- Section B: Comprises the Likert scale, used to measure the perceptions of respondents as well as their attitudes towards the topic in the study.
- Section C: These are open-ended questions for qualitative purposes. The responses were open to the respondents' opinions and suggestions, and they could write or ask questions to express their views.

Data Collection

The researcher collected the data using the data collection tool mentioned in the data collection instrument section above that, a questionnaire. This method was used effectively, and the request to participate in the study was sent out to the participants. The respondents were individually communicated to via their work emails. This was done for quick response in terms of acquiring answers to the questionnaires as they daily view their emails at work for all internal and external communications. It was also done to ensure that the internal people responded to these research questions, for guaranteed accuracy of responses to offer trust and validation to the respondent and lastly, for reliability and accuracy of the data being collected.

The process of the research instrument approval that was followed:

- The questionnaire was sent to the ethics committee of the institution to review its eligibility to answer the research questions.
- It was approved, and an ethical clearance certificate was obtained to commence with the fieldwork.
- The signed ethical clearance documents from the institution and documents of authorization from the organization (Appendix C and D) where the study would be taking place were obtained. The documents were the Consent letter accompanied by an Ethics Informed Consent to participate in a research study form, a faculty ethical considerations questionnaire and a scientific review form.
- These documents, accompanied by the researcher's proposal and the research tool, were sent for review and approval.
- An ethical clearance certificate was issued by the ethical clearance committee approving the continuation of the research, and thus the research tool was launched to gather data.

3.1.14 Data analysis

According to Bhandari (2022), data analysis is a systematic procedure of obtaining observations or measurements. Data collecting allows one to get first-hand expertise and unique insights into the study's challenge, whether the research is for industry, government, or academia. Data analysis looks into variables, their effects, linkages, and patterns of interaction with the outside world.

How the data was analysed:

When responses were received from the respondents who participated in the research, the responses were automatically filtered into graphical representations such as pie charts and bar graphs. This made the results easily readable and allowed the researcher to analyse the results easily. This analysis was done on Google documents because the link for the questionnaire was generated on the same platform, responses were automatically recorded accurately by the system, and the researcher was able to monitor progress.

Ethical consideration

Many parts of the research process are influenced by ethical considerations, which aid researchers in determining if a topic of study is morally appropriate. The following ten criteria, according to Bryman and Bell (2007), constitute the most essential principles connected to ethical considerations in dissertations:

1. Research participants should not be subjected to any harm.
2. The dignity of study participants should be a top priority.
3. Prior to the study, the participants' complete agreement should be obtained.
4. It is necessary to ensure that the privacy of study participants is protected.
5. The confidentiality of the study data should be protected to an adequate level.
6. Individuals and organizations participating in the study must maintain their anonymity.
7. Any misrepresentation or exaggeration about the research's goals and objectives must be avoided.
8. Any and all affiliations, funding sources, and conflicts of interest must be disclosed.
9. Any research-related communication should be conducted with honesty and transparency.
10. Any false information, as well as a skewed depiction of main data findings, must be avoided.

Protecting human participants through applying suitable ethical norms is critical in all research studies. Because of the in-depth nature of the study process, ethical questions have a particular resonance in both the chosen research approaches, quantitative and qualitative research. Moreover, as aspiring executive project managers, it is vital to highly value ethics. In this research, below are in point form a list of how ethics will be observed:

- The quality of results was of high importance; therefore, the launching of the research tool was accompanied by a signed consent document for the candidate receiving the questionnaire to see that permission was granted by the company head to the researcher to carry out the study.
- All responses have been kept confidential, which was also assured to the respondents. In addition, the questionnaires did not include the candidate's identity. Therefore, the responses are kept anonymous.

- Before sending out any communication, permission was requested from the company's contact person, and consent was signed by the researcher to ensure that the information obtained about the company would not be used outside of this research for personal gain. A letter requesting to conduct research was sent to the company.

The precise ground of this research was to effectively communicate to the respondents via a research brief or scope. Therefore, the research brief or scope was prepared to accompany the questionnaire.

3.1.15 Assumptions made

- The respondents fully understood the subject being researched based on their experience level.
- Their responses were to the best of their understanding of the subject matter, and none were biased.
- The assumption made is that the respondents had a background presentation about the research topic. This was availed to them by the researcher before they could participate in the survey.
- The questions in the survey were all fair, and none violated the rights of the respondent.

Chapter Summary

This research process was a success and without any unmanageable challenges. The research has been conducted in the company where the researcher is employed. This has made the research process cost-effective as all the necessary information required was internally within reach or easily accessible. The accuracy of the data collected throughout the research process can be trusted, and the analysis provided in the paper is supported by the researcher's experience in the day-to-day business operations. It is often said that it is better to experience something than to be told; this is what the researcher provides as an advantage in this paper.

The population sampled for the study was also easy to communicate with, as they are all internal people in the company. The ethical research process to obtain approval to conduct this study was also easy to obtain from the company management. The research survey for data collection was estimated to be 51 respondents in total. The questionnaire was sent to 51 people internally in the company, and 31 respondents

completed the questionnaire accurately. This makes it a 61% rate of responses received, which is average and good enough to conclude for this particular paper. Chapter 4 presents the research findings in diagrammatic form and explains variable correlations.

CHAPTER 4

DATA ANALYSIS AND INTERPRETATION

Introduction

The data and information from the questionnaires was imported from the Google form that as used and into an Excel Google worksheets. The data was grouped, coded and ranked to allow for analysis. Descriptive data analysis was conducted within Excel. The reason that the graphical illustrations below were used was to aid data analysis by comparing responses provided by respondents and makes the data easily readable. In addition, the results are explained in chronological order, following each item in detail to better understand the questions' contents. The research objectives were as follows:

- To identify the schedule-driven project management techniques that can be used to improve productivity in a manufacturing set-up.
- To identify the relationship between scheduling and productivity in a manufacturing set-up.
- To provide recommendations on how productivity-related issues can be resolved by applying effective scheduling tools in project management.

FINDINGS

As indicated in Appendix A, the distributed questionnaire was divided into sections A, B and C. The findings are discussed briefly in the sections; however, the concluding better elaborative summary is provided in the closing chapter, which will discuss a greater detail and cover the conclusion and recommendations.

4.1.1 SECTION A: Biography

This section in the research questionnaire is vital as it gives the reader greater insight into the respondent. In addition, the biographical information assists with the relevance of the people being interviewed and their opinions while taking into account the groups to which they belong.

Biographical Information

Please select the relevant option by clicking on the circle and filling in the blank spaces where applicable.

4.1.2 QUESTION 1: Gender

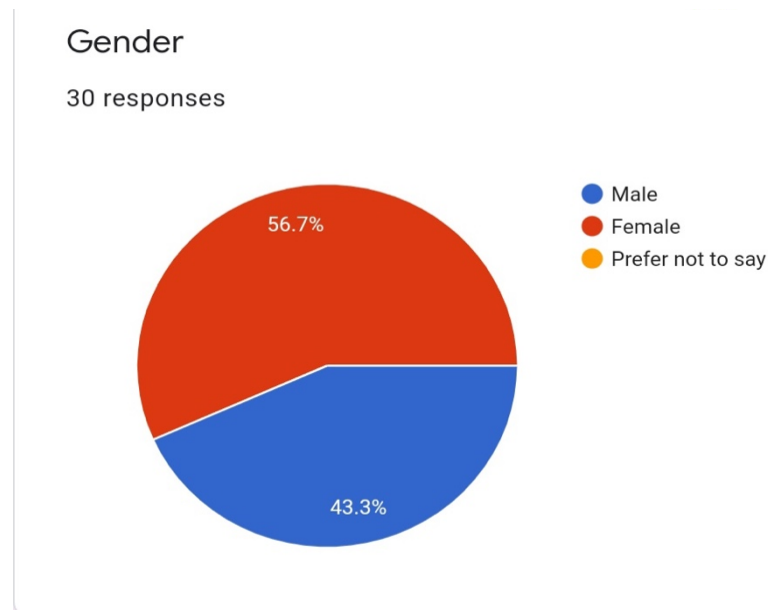


Figure 4-1: Gender

RESPONSE: In this question, the main interest was to know the judgments and opinions made by the respondents regarding their work environment while answering the questionnaire so that the reader has a clear indication of which group thinks a certain way and if there is any difference in the way certain people who belong to particular groups do think in terms of the questions asked further in the questionnaire.

There was no focus group of people regarding gender for this research. Instead, the respondents were given an opportunity to select how they classify themselves in terms of gender or if they prefer not to state their gender due to personal reasons.

Figure 4.1 shows that the respondents were 56,7% females and 43,3% males, which was not too far apart considering that 30 people had responded to this particular question in this questionnaire.

Implications on research objectives:

Both primary and secondary research objectives were not affected by this result as they are independent of a person's gender.

Identification of the relationship between scheduling and productivity in a manufacturing set-up is not limited to gender classification. However, this part of the research had to be fulfilled regardless of its significance to the research objectives.

Implications on research questions:

The positions in employment selected for the study fulfilment are not gender specific; therefore, the interest was not to discover the scale of balance between the respondents.

4.1.3 QUESTION 2: Age

Response: In this question, the main interest is to understand the level of experience in life, which will affect the judgment of how the respondent sees things in their work environment and opinions while answering the questionnaire.

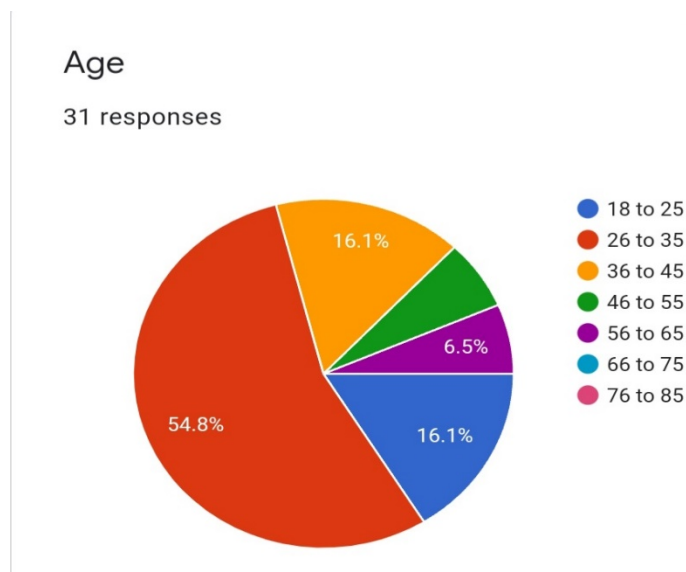


Figure 4-2: Age

Figure 4.2 above shows that 54.8% of the respondents were between the ages of 26 to 35. The age groups of 18 to 25 and 66 to 75 were tied at 16,1%, and the two age groups of 46 to 55 and 56 to 65 were tied at 6,5%. Thus, most of the respondents are in the company's entry-level to mid-level of their career.

Implications on research objectives:

The age factor does not carry much impact on answering the research objective. However, the respondents must be at the right age to work and make their own decisions. This allowed them to answer further questions in the questionnaire in which their judgment could be used to draw further recommendations in improving productivity in the manufacturing set-up.

Implications of research questions:

After compiling the results, it was evident that the company had more newly appointed candidates, which raised the researcher's expectations that there would be more insight, especially in answering the research questions and providing recommendations as desired.

4.1.4 QUESTION 3: Race

RESPONSE: The racial element in this study was not the primary concern but an

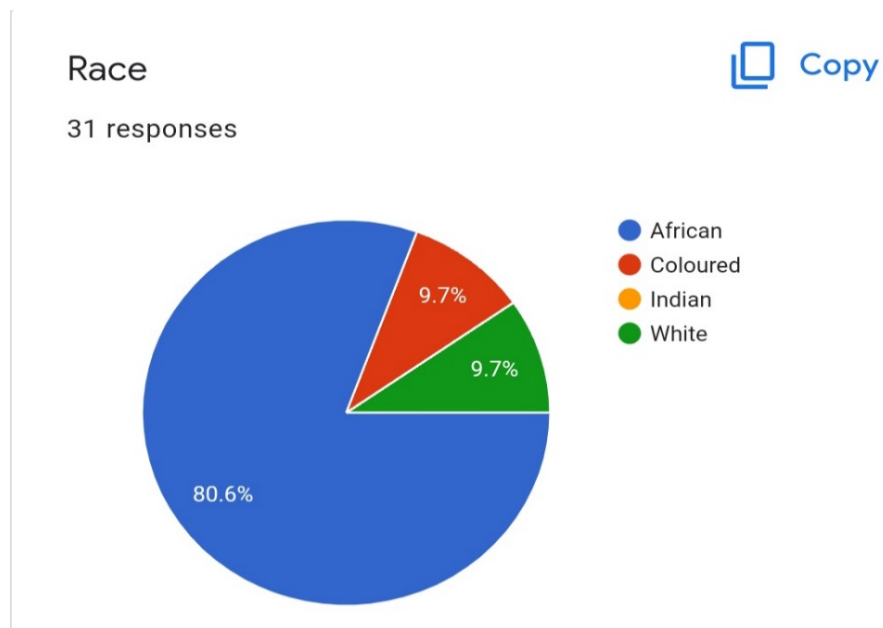


Figure 4-3: Race

Figure 4.3 shows that 80,6% of people who participated in this study were African only 9,7% were coloured, and another 9,7% were white. However, if things were to be switched around in terms of race, it would be interesting to see if that would have any change in the responses and opinions raised.

Implications on research objectives:

Based on the results obtained for this question, there needs to be a certain level of inclusion or increase of other races to create racial balance in the various departments of the organization.

4.1.5 QUESTION 4: Years of Service

The length of one's service in the field will aid in a clear interpretation of how one understands the business they are working in and, over the years, have acquired a deeper understanding of how things can be improved. Also, a person might have implemented strategies and participated in improvement projects, or anything related to trying to implement change which is to the more significant benefit of this research as it serves as an area of interest based on stated objectives.

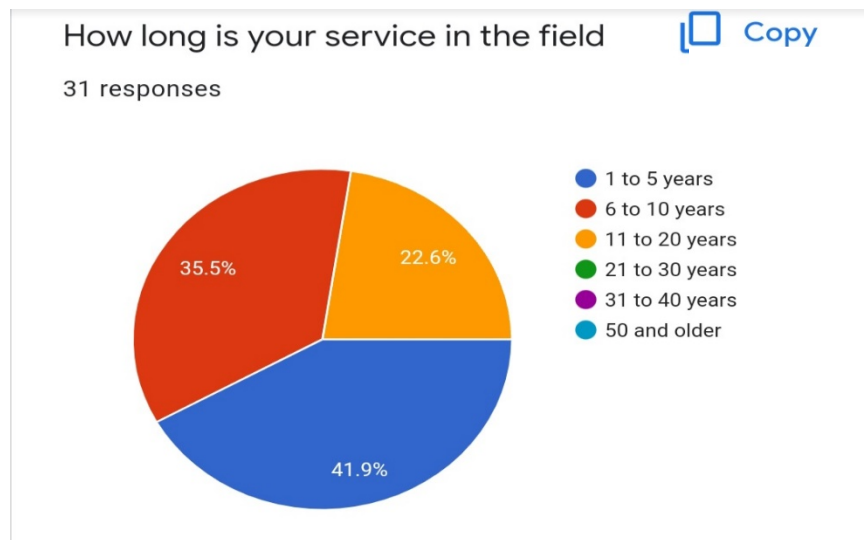


Figure 4-4: Length of service

RESPONSE: The number of years of experience is a critical factor because it shows how many years the respondents would have dealt with productivity-related problems in their departments and how they have resolved and formulated preventive methods or are even proposing ways to mitigate such occurrences. This is at the level of responding to the secondary research question asked by the researcher.

41.9% of the respondents as shown in Figure 4.4 are relatively new in the company. This means they still have a fresh set of eyes coming from different places. It is quite easy to see faults and what could work better when one has newly joined an organization as one is not yet consumed by the current system in operation in the company. These people have up to 5 years level of service only. The next set is 35,5%; they have a level of service between 6 to 10 years in the company, and the last group has up to from 11- 20 years of service in the company the percent result was 22,6%.

Implications on research objectives:

The expectation from the respondents is first to identify a productivity problem in their organization regarding executing projects on time. This will allow them to formulate ways that can be used in order to improve productivity in the manufacturing set-up, which will satisfy the researchers' primary objective for this research. Working in the organization for sufficient time, which may be at least one year, will fully qualify the respondents' response to this question.

Implications of research questions:

According to the strategic selection of the sample population employment position, working in the organization would have allowed them time to be exposed to different reports that speak to the manufacturing plant's productivity or efficiency reports. For example, one of the research questions seeks to establish the relationship between scheduling and productivity in manufacturing. The researcher believes that respondents with a certain level of experience in the organization may be able to give that insight which will answer the question.

The researcher believes that the 35,5% who have a level of service of up to 6 - 10 years in the company will be able to give more information in the longer questions about how productivity-related problems can be resolved in manufacturing through effective application of project management scheduling. Much experience gives a certain level of understanding and problem-solving that comes with the experience of working in the same environment to a level of mastery.

4.1.6 QUESTION 5: Role at the Organisation

This question guides the reader on the level of understanding of the subject matter; the position one holds in the business will help them answer directly what the research questions will be asking. In this part of the questions, the reader will also understand where the respondents' responses are drawn from and how much engagement the respondents have with the subject matter based on their role and problems they encounter daily and how they would address them. This is very important as it provides a clear indication of validity in the responses received.

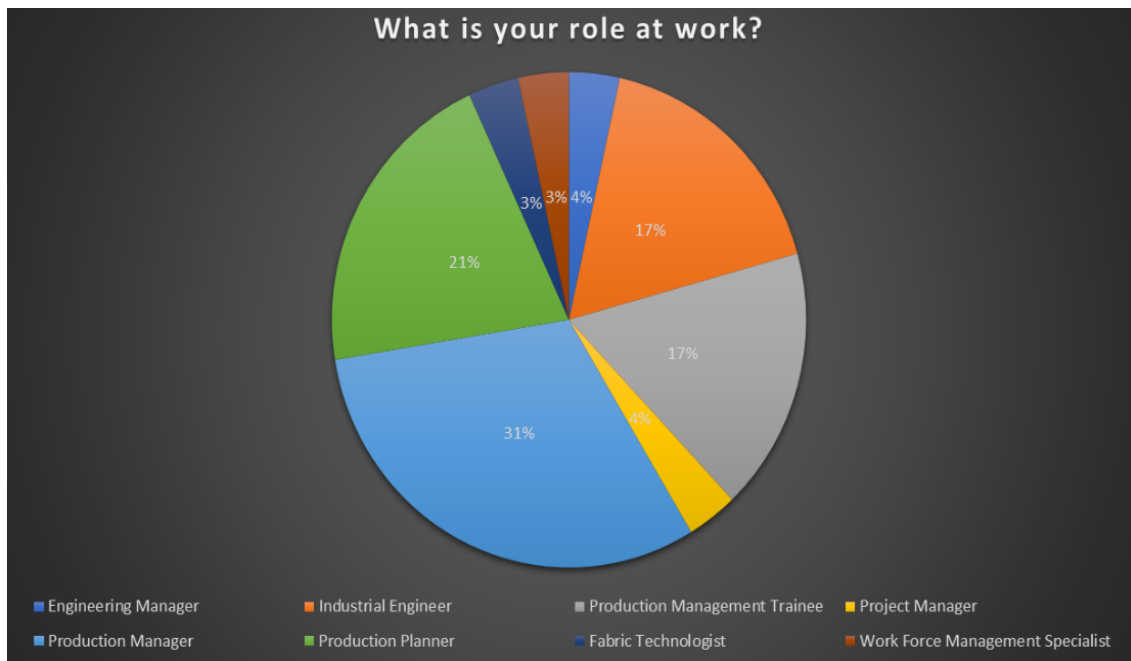


Figure 4-5: Position or role at work

Response: The majority of the respondents as depicted in Figure 4.5 are production managers and only a single respondent as a – WFM specialist: Work force management specialist. According to this research, these people are or should have been the project managers as they oversee the project and manage resources in the production space. In addition, 31% are the majority which are production managers. The second largest group is 21% of production planners, 17% of production management trainees and Industrial engineers, 4% engineering manager and project manager and lastly 3% fabric technologist and workforce management specialist who responded to the questionnaire. These groups controlled the conclusions drawn from the study as they were the key stakeholders from whom the research sought responses and views.

This question was intended to validate whether the respondents qualified to participate in the research, as this would establish the relevance of the participants and improve the reliability of the results. Production managers play a crucial role in facilitating the entire production process in the manufacturing organization. The results also indicate that most participants and respondents were production managers, which satisfies the research requirements as intended.

In answering the research questions, production managers will have greater insight into the various issues faced during production and how those issues can be eradicated or resolved.

4.1.7 Question 7: Highest educational qualification

By obtaining the respondents' qualification status, the reader can deduce that the respondent clearly understands the subject matter. This aids the study in qualifying all responses received in the study. All persons interviewed believe in various schools of thought, including you as a reader of this paper. This question allows the respondent to confidently defend and substantiate their response was necessary in order to grant validation to the researcher that the respondent understands the content which they are commenting towards and are giving valid recommendations which can be benchmarked against particular successes in the field.

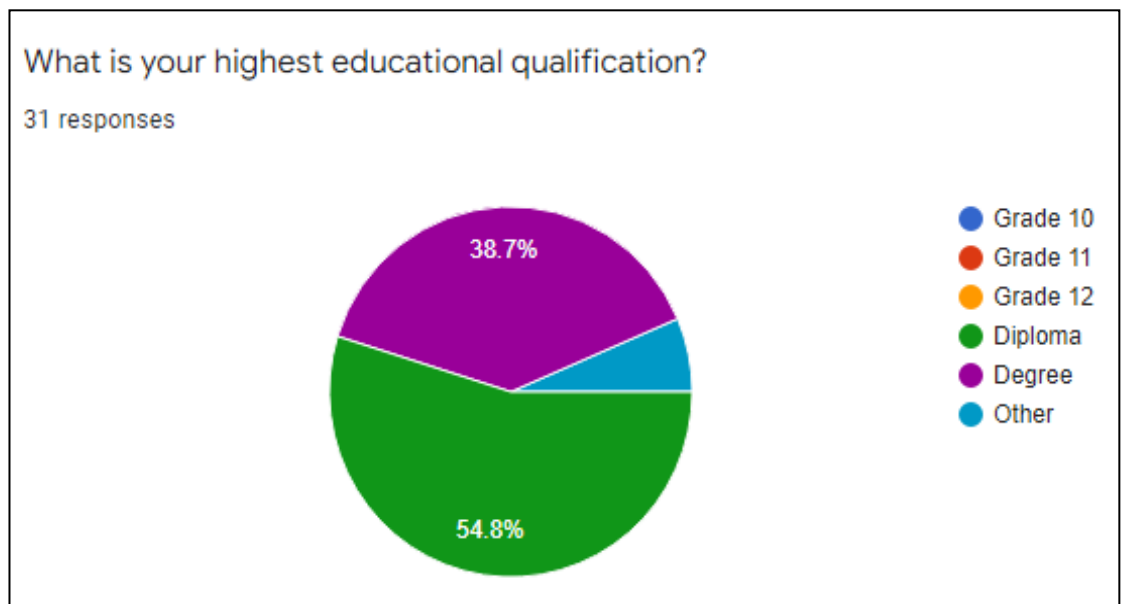


Figure 4-6: Qualifications

Response: Figure 4.6 shows that the highest qualification possessed by the respondents is a National Diploma at 54,8%. This is followed by a degree qualification at 38,7%.

The researcher wanted to understand the respondents' level of qualification by asking this question. This enables us to analyse better what could influence the expected responses and qualify each response for this study.

According to the various work positions selected to be studied in this research, one would have been required to participate in a particular university or college programme of study or a certain level of experience to qualify. This is important as the curriculum will cover areas of basic or in-depth project management principles and tools. Those with higher qualifications were expected to bring in-depth insight into answering the research questions and fulfilling the research objectives. This is because both these variables were formulated strictly on project management principles, and the respondent would be required to dig deep into their well of knowledge and align everything with what they experience around them in the workplace in order to form a qualified response vitally needed in this paper. The good part is that all respondents have undergone qualification training, and thus the responses meet the minimum threshold expected by the researcher.

SECTION B

This section comprises the Likert Scale, which assesses the respondents' sentiments and views of the employment scenario.

Because perceptions and opinions are difficult to assess, the scale was created with options of either strongly agree, agree, neutral, strongly disagree or disagree. The respondent had to select an option based on their perception and opinion or any other related school of thought, knowledge and experience. The following question is assumed to have been answered in accordance with the current situation where the respondent works.

4.1.8 Statement 1: Participation in multi-projects concurrently.

I am currently managing concurrently running projects in my company.

31 responses

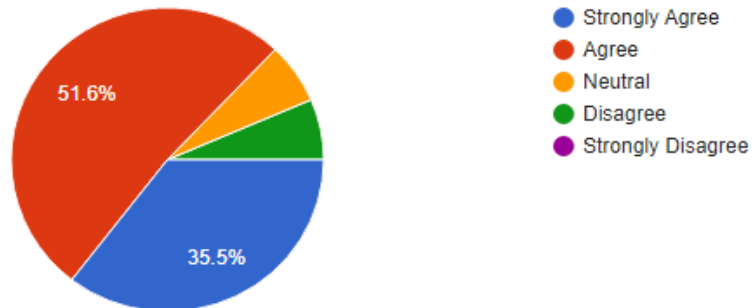


Figure 4-7: I am currently managing running projects concurrently in my company

This question was asked to draw a certain standard for answering the longer questions. The research tool aims to help the researcher answer the research questions and fulfil the research objectives.

Being a part of a project team in the manufacturing company or managing various concurrent projects means that one would be able to identify the schedule-driven project management techniques that can be used to improve the productivity of running projects down to the overall company performance financially. This would therefore qualify the respondents' responses as valid and satisfy the primary objective of the research.

Response: A big slice of the pie chart in figure 4.7 shows that 51,6% of the respondents' pool to have agreed to the statement that they are managing concurrent projects. This is followed by a strong agreement of respondents at 35,5%. These insights are profound and imply that employees are overstretched and one also has the question of the resources available to work on all the concurrent projects. The working on concurrent projects might have a direct impact on productivity and resource utilisation.

4.1.9 Statement 2: Use project management tools to improve productivity

I use project planning as a Project Management tool to improve productivity in the manufacturing plant where I work.

31 responses

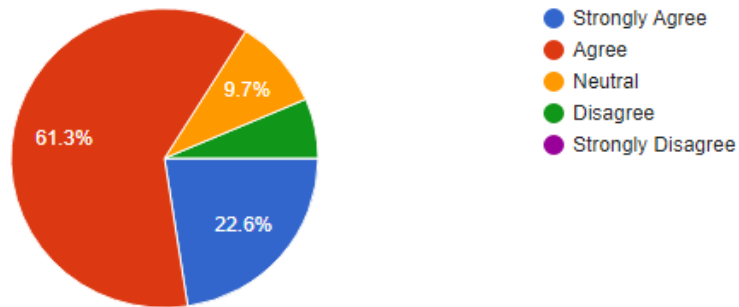


Figure 4-8: Project planning as a project management tool to improve productivity

Project management is a tactic used in businesses in the industrial and service sectors to oversee the successful execution of a project. Effective project management is crucial to the smooth operation of an organization, including organizational performance or productivity and the timely completion of goals. The practice of controlling, planning, and monitoring an organization's complete working process is known as schedule management. As a result, having an effective schedule management plan inside the business is important for good project management Suresh & Sivakumar (2019).

Both planning and execution must be done correctly if a project is to be successfully finished. Lack of proper project planning will prevent the attainment of the project's goals, which in the case of manufacturing are referred to as production targets Zwikael & Globerson (2020)

Response: The primary research objective and the primary research question have the same aim or goal: to identify which project management tool can be used to improve productivity in a manufacturing setting or environment. Based on the results depicted in figure 4.8; 61,3% of the respondents agree that they use project management planning tools, and 22,6% also strongly agree with the statement. This positively impacts the research questions and objectives as it indicates that the respondents strive to improve the company's productivity using some of the project management tools. This also points out the recognition of the importance of a project

manager's office and the project management tools among the population studied. However, there is 9.7% who are 'neutral' , this might mean that they are not knowledgeable about the tools or are not applying them at all. Continuous training and performance evaluation would be necessary to empower such workers.

4.1.10 Statement 3: Effective project execution scheduling impact on productivity

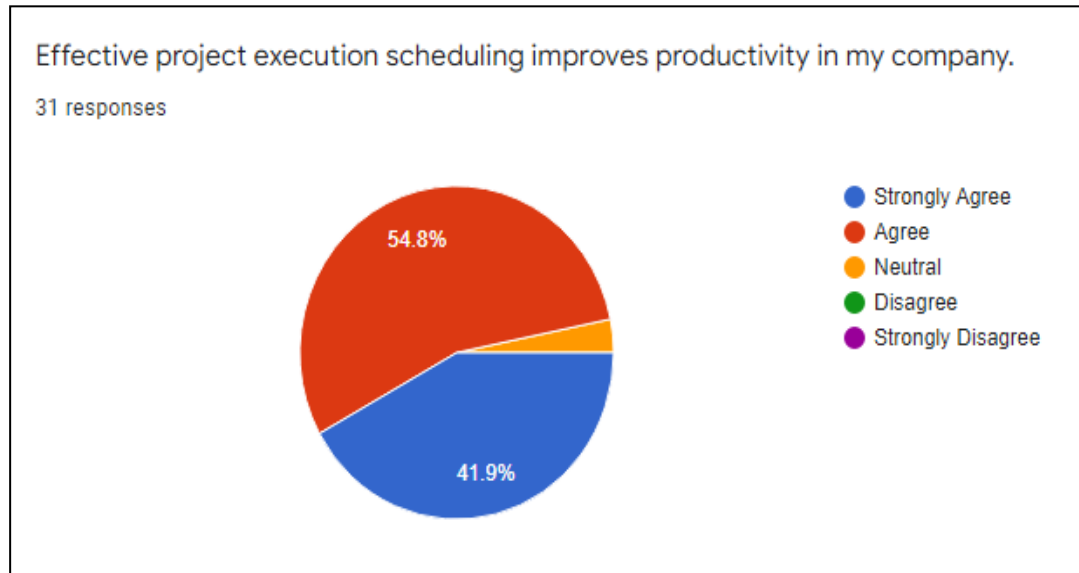


Figure 4-9: Effective project execution scheduling improves productivity.

Response: The respondents show to agreeing with statement 3 quoted above. Over 95% of the respondents are in agreement as shown in Figure 4.9. According to (Rose, 2015), the capacity to plan is a crucial skill for success on both a professional and personal level. Employees who can plan for their work week are better able to prioritize important on-the-job duties and thus perform more productively. This statement is being modelled or represented by the data of respondents for this statement.

From this response, it can be determined that the workers in the company value scheduling and planning as they agree with the importance of improving productivity. This is a good indication and also speaks to the research objective of identifying a tool in project management that can help improve productivity when applied effectively. It's noted that 2.3 % are neutral, implying that they may not be sure about the impact of project scheduling on productivity or are sceptical about the impact.

4.1.11 Statement 4: Systems implementation and Reaction time

Systems implementation in my company provide Production Managers and planners with an accurate view of the manufacturing plant to help them react more quickly to issues and changes.

31 responses

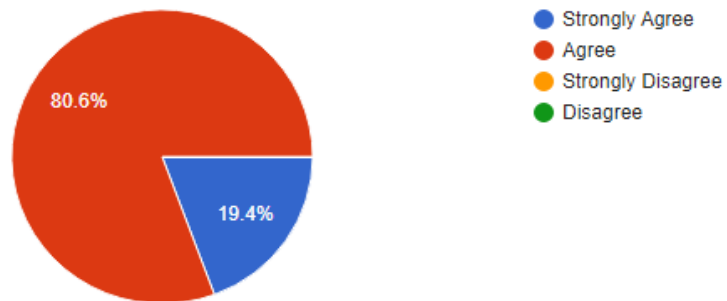


Figure 4-10: Systems implementation provides an accurate view of the manufacturing plant

Response: The days we live in are highly digital and technically advanced. There is a strong need for competence as competition is increasing globally. Managers are compelled to adjust employee schedules weekly with more traditional scheduling (sometimes, day-to-day). Many managers are tasked with completing this duty while juggling various other responsibilities. So, what is the outcome? When an individual (or management) multitasks, productivity reduces by 40% on average, according to one research Rose (2015).

The respondents show that they strongly agree with statement 4 above; this indication is proven by the data presented on the pie chart in Figure 4.10, whereby 80,6% of the respondents agree with the statement.

4.1.12 Statement 5: ERP system has improved productivity

Having a project scheduling ERP system has improved productivity in the manufacturing plant where I work. Production managers and planners can view project/product report activities at each stage of the project life cycle.

31 responses

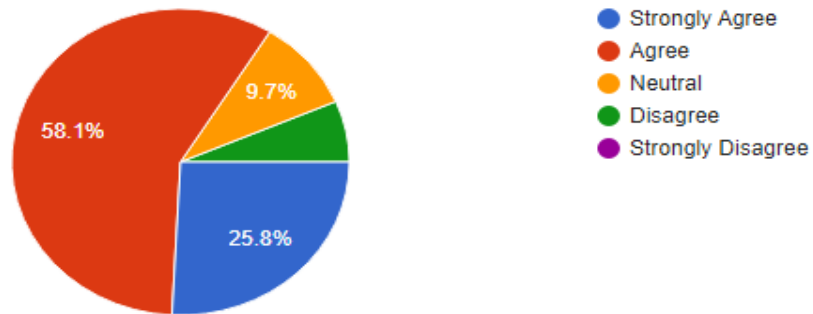


Figure 4-11: A product scheduling ERP improved productivity

Having a project scheduling ERP system has improved productivity in the manufacturing plant. Production managers and planners can view project/product report activities at each stage of the project life cycle.

Response: According to Rose (2015), a platform that allows for automatic scheduling, on the other hand, can significantly reduce a manager's workload, giving him or her more time to deal with important operational concerns. In consequence, the program enables the manager to work more efficiently. This way, productivity can be improved by investing more in systems and training employees on those systems to use them efficiently, and results are recorded before and after implementation. There is a positive implication drawn from these results towards the research objectives and questions.

Most of the respondents supported Statement 5 as illustrated in Figure 4.11, with 58,1% who agree and 25,8% of respondents strongly agreeing with the statement. However, 9.1% are neutral, implying they might not be aware of the ERP system impact on productivity, or they may not be aware of the existence of the system at all.

4.1.13

Statement 6: Project management at my company is driven by a schedule.

Project Management at my company is driven by schedule. (Schedule driven Project Management is managed under the overriding constraint of time. It is based on mainly delivery date).

31 responses

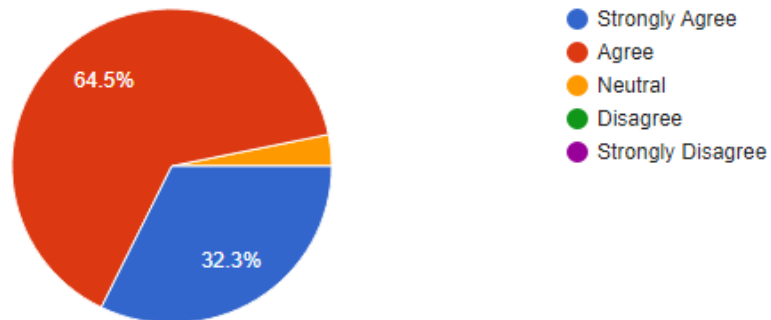


Figure 4-12: Project management at my company is driven by a schedule

Response:

Figure 4.12 shows that 96,8%, supported the above statement; 64,5% strongly agreed that project management is being driven by schedule in the company, while 32,3% strongly agreed with the statement. This is important for answering the research question as it indicates how project management is driven and impacts the company's productivity. Because a project becomes schedule-driven when either the sponsor (a person/organization investing funds in the project) or the customer (a person/organization supposed to use/consume the project's product) determines time as the core constraint of the implementation process. The team is allowed to use as many resources as possible to implement the project and create the product within the desired delivery date Task Management Guide (2021). The results suggest that the company in reference is a schedule-driven project management.

4.1.14 Statement 7: Fire-fighting and Productivity

Fire fighting is constantly a critical issue during a normal day of project execution.

31 responses

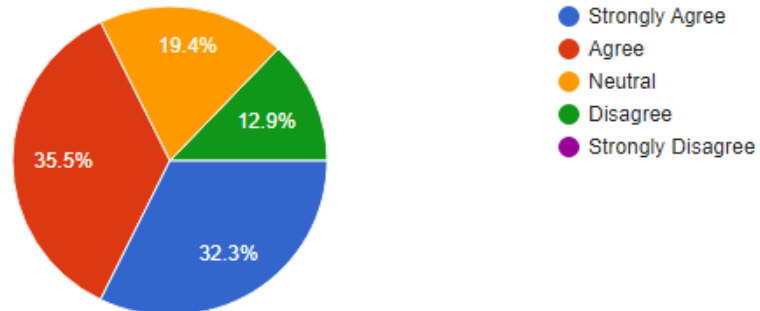


Figure 4-13: Firefighting is constantly a critical issue during a normal day of project execution

Response: Prior research has proven that firefighting becomes a daily event in places where planning and scheduling are not prioritized, as problem-solving is not what is valued, Bohn (2000). According to Melvin (2008), fire-fighting in project management is the unplanned allocation of resources to either fix problems or speed completion of a project. The total number of respondents who agree with the statement is 67,8%: 32,3% agree, and 35,5% strongly agree as illustrated in Figure 4.13. Previous research has suggested that the presence of a neutral response option or a nonresponse option increases the likelihood of participants selecting this option, Johns (2005). Most of the respondents suggest therefore that there is high level of concern in the planning and scheduling of their projects and that problem solving may not be as valued as it should – this is according to the results presented. 19.4% are neutral, and 12.9% totally disagree. The inference here might be that one employee’s understanding of “fire-fighting” is different from the other employee. To someone, it may probably be business as usual.

4.1.15 Statement 8: ERP System Impact on organisational performance

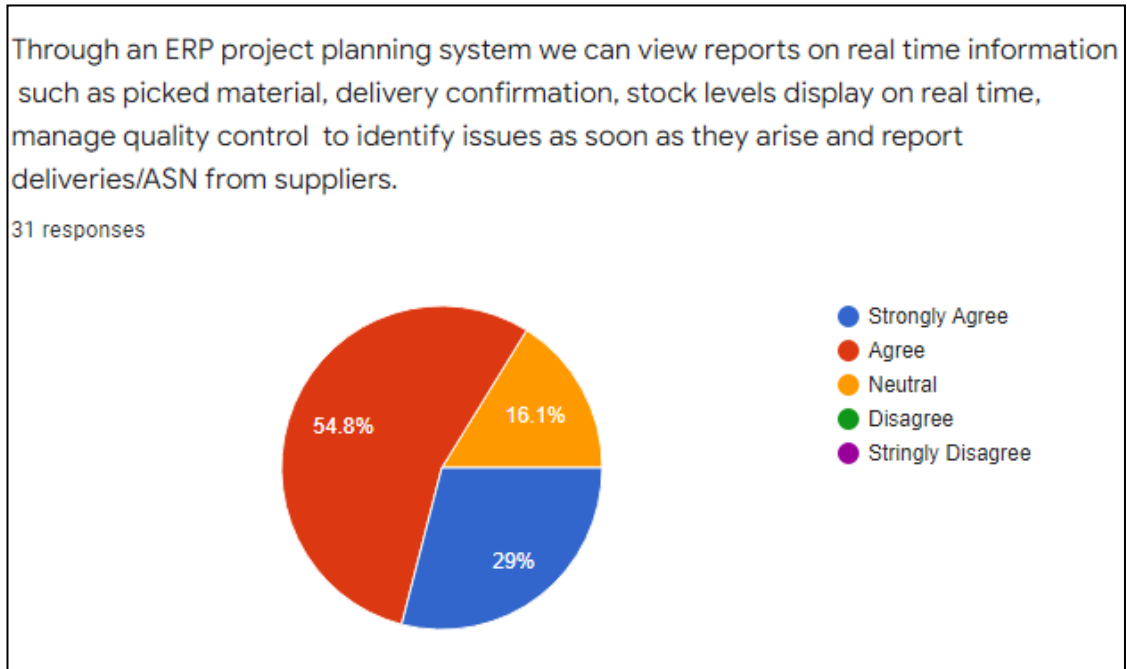


Figure 4-14: ERP Project planning system reporting

Response: The pie chart in Figure 4.14 shows that 54,8% of the respondents strongly agreed, and 29% agreed with the statement of what was happening in the company. This indicates that a project is planned and tracked at the conception phase. The gap which gives rise to the downfall of the project management in the manufacturing company is what we seek to discover while analysing these results.

The respondents value technology as an aid to increased productivity in project management in a manufacturing set-up. This suggests that manufacturing companies should invest in technical data analytics to improve the productivity of their businesses.

4.1.16 Statement 9: The productivity of project delivery

The productivity of projects delivery is significantly low in my company.

31 responses

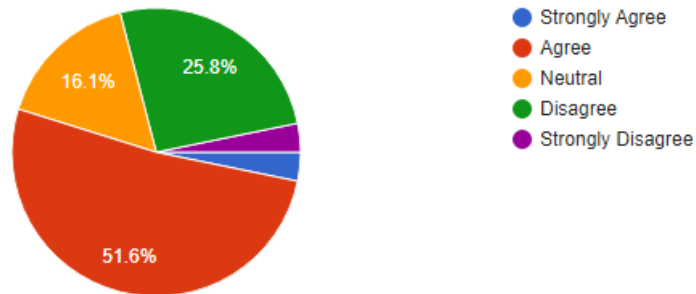


Figure 4-15: The productivity of project delivery is significantly low in my company

Response: As illustrated in Figure 4.15 above, almost half of the respondents agree that the productivity of project delivery is significantly low at the company. This is a concern because the business is measured by its productivity. Most, (51,6%) respondents agreed, and 25,8% disagreed with the statement; this is assumed at departmental performances as opposed to the overall company. However, the majority say there is a problem with productivity concerning project delivery.

If project delivery is low, this suggests a productivity-related issue. The satisfaction of clients depends on how effectively their expectations are met by the organization. When projects are delivered with quality services, on time, and within budget, it is considered a success. Effective resource scheduling allows you to maintain the quality of deliverables and increase the company's image, Saviom (2022). Part of the recommendation would involve a research study that will study delivery schedules and how they are managed and set up. The main aim would be to solve the problem using an effective project management tool. This cannot be achieved unless a clear plan is devised. If a plan is clear and visible when there is an issue, the plan gives a guide to examining the issue, and strategic actions are taken to correct the issue involved.

The starting point in trying to resolve this issue would be to look into the planning and scheduling departments of the business, thus following up with the rest. This also suggests low revenue due to these delays and possibly cancellations. This is because according to Saviom (2022) proactive resource planning allows managers to assess the capacity vs demand gap in advance and bridge it with appropriate resourcing measures.

In this case, the impact of schedule-driven project management could harm this business's success. When projects are driven by time, and there is a problem of delays in a business, it means a loss of customer base because no customers will be willing to accept excuses during product delivery. According to Master of Project Academy (2022), when a project delays, the company loses its reputation to their client as well as to other stakeholders. They will not trust the company again for future projects and it may be difficult for the company to win more projects.

It can be deduced that the effects of schedule-driven project management are detrimental to productivity when effective planning and scheduling are not applied.

4.1.17 Statement 10: Schedule chedule pressure during the project's life cycle.

We often encounter schedule pressure during the projects' life cycle.

31 responses

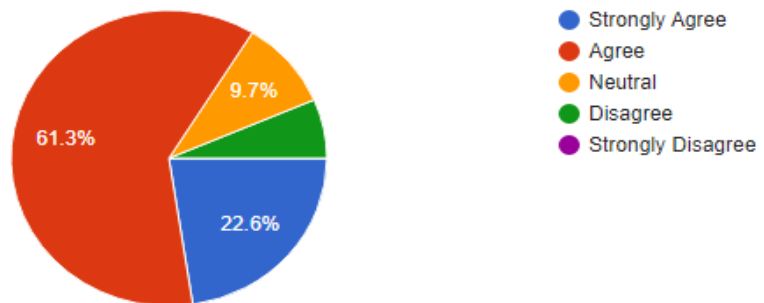


Figure 4-16: We often encounter schedule pressure during the project's life cycle

Response: Figure 4.16 shows that schedule pressure is encountered by 61,3% of the company employees. This is based on their response to the question which was asked. Schedule pressure is a result of a combination of many things during the project management process, and it can sometimes arise due to a non-effective way of planning for resources or delays in project resources or how a project schedule is not effectively managed and maintained. However, 22,6% of respondents strongly agree that they experience schedule pressure. Timetable pressure is the term used to describe how little time was actually allotted to a schedule to complete specific tasks. It describes a scenario where designated workers must complete the same amount of work in a shorter time due to time constraints Task management (2010).

This draws significance in identifying a problem or issue that may cause a bottleneck when projects have to be executed. The secondary research question seeks to uncover the relationship between scheduling and productivity. Schedule pressure could result in planning issues. Poor planning in project management is the number one mistake that leads to project failure. If something does not start right, it would be delusional to think it will end right Copper Team (2016).

4.1.18 Statement 11: Sharing of resources is common in the duration of the projects.

Sharing of resources is common in the duration of the projects.

31 responses

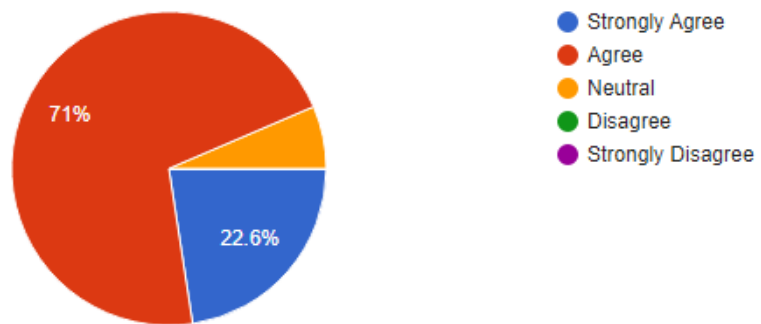


Figure 4-17: Sharing of resources is common in the duration of the projects

Response: The data presented in Figure 4.17 indicates that 71% of respondents agree that resources are shared during a project, with an additional 22.6% strongly agreeing. This highlights the importance of proper project planning and scheduling, as well as a qualified and experienced project manager in order to effectively manage and utilize shared resources. Resource sharing is a common practice in production environments and can have a positive impact on productivity if done correctly. However, it is unclear from the data how resource sharing is impacting the company's productivity, to what extent resources are being shared, and how they are being effectively managed. Despite these unknowns, the data suggests a positive direction as the research questions are fully supported and the research objectives are met. For effective resource sharing, it will be required to pair it up with a practical resource scheduling system to balance things for a better level of productivity; otherwise, complete chaos may be caused.

4.1.19 Statement 12: The customer determines the time for the project delivery.

The customer determines the time for project delivery. We must be careful to schedule our resources to meet the customer's delivery request.

31 responses

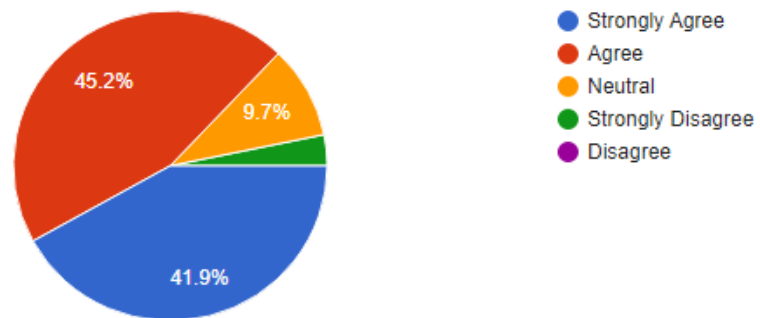


Figure 4-18: The customer determines the time for the project delivery

Response: Figure 4.18 denotes that 45,2% of respondents agree with the mentioned statement, and 41,9% strongly agree. This supports that projects are schedule driven in the company, and when the scheduled date is set, it is final.

Companies have a sole mandate of ensuring customer satisfaction at all given times. Customer satisfaction is part of what drives the business of many organizations. Fulfilling the objectives of this research would mean providing recommendations on how productivity can be improved in the organization while employing project management tools. In this case, the customer sets the rules validated by the above results. Part of the recommended point to accompany this result could be how the project teams could work on improving customer delivery times, possibly that could increase productivity as they would have to maximize the usage of their resources to get more in a short time or deliver more projects within the given period. This would require thorough research and data collection to study the performance and make recommendations before implementation.

4.1.20 Statement 13: Resource Supply Logistics and Productivity.

The late arrival of project resources badly affects the manufacturing plant's productivity.

31 responses

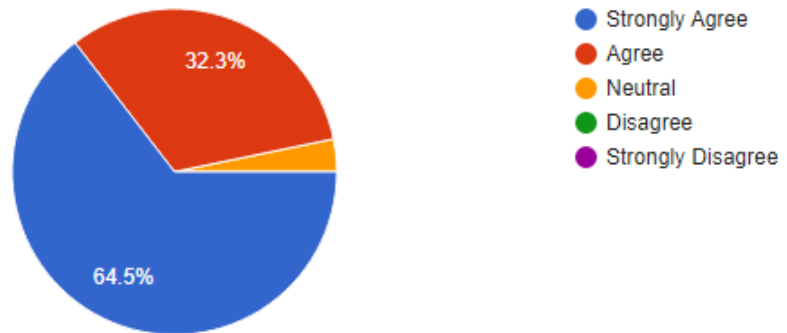


Figure 4-19: The late arrival of project resources badly affects the manufacturing plant's productivity

Response: In this question, the objective was to uncover any underlying issues which may be detrimental to project success and productivity or project management schedule. In this case, it is reflected by the results that there is an issue. If resources arrive late, that already is a late project start which will take extra work to deliver such a project on time; it is even a problem should there be any issue or delay during production. Close to the total number of the sample agrees that this is a problem in their company.

As shown in Figure 4.19, there are 64,5% of respondents who strongly agree that the late arrival of project resources harms the productivity of the plant, and 32,3% agree with the statement. This will require solid recommendations and is a perfect alignment with the research objectives as this is what this paper is trying to provide insight into within the manufacturing organization in Cape Town. Also, this draws a powerful insight into answering the research questions. Further elaboration on this will allow for the company's primary and secondary research questions to be fully answered and problem solved.

4.1.21 Statement 14: We currently do not have a Project Manager in my company.

We currently do not have a Project Manager in my company.

31 responses

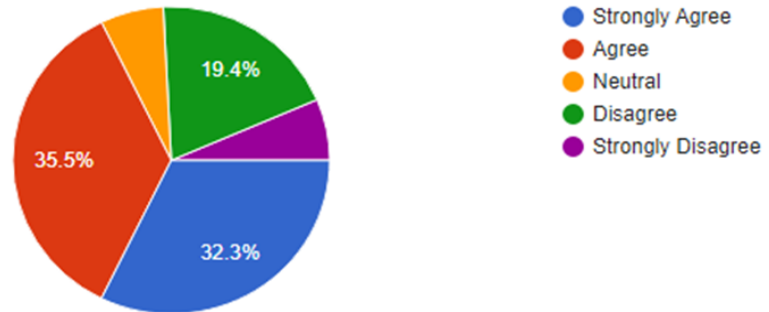


Figure 4-20: No Project Manager in the company

Response: The pie chart in Figure 4.20 shows how the responses were recorded regarding the question asked. The majority falls on 35,5%, whereby the respondents agree that where they work, there is no project manager and followed by a strongly agree response, with 32,3% responding that they strongly agree and are convinced that their company has not delegated a project manager to oversee their daily projects as a manufacturing company in Cape Town.

Many manufacturing companies fail to recognise the importance of a project manager in their facilities. A good project manager will communicate, be organised, delegate, be detailed and listen. These are part of the essential tools in project management which are often ignored in multi-project environments and, in turn, come to bite back when projects fail, Cote (2022).

Because manufacturing environments are fast-moving and highly pressurised, things such as communication are often overlooked. A project manager, therefore, comes in as a communication facilitator and helps to ensure everyone involved in the project stays on the same page and that there are few miscommunications, Rajkumar (2010). This is the benefit of having a project manager.

4.1.22 Statement 15: Customers and Project Delivery.

The customer determines determines the time for project delivery.

31 responses

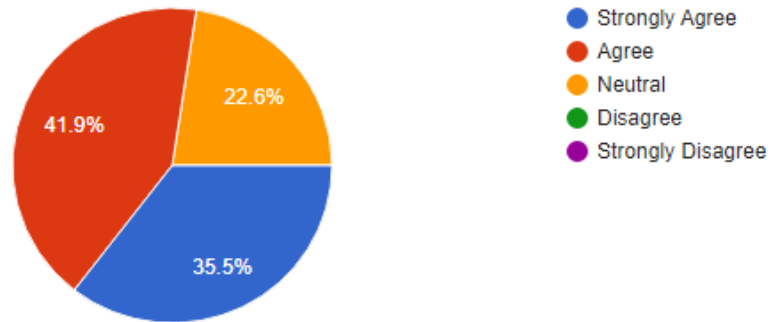


Figure 4-21: The customer determines the time for project delivery

Response: 41,9% of the respondents agree that the customer determines project delivery, 35,5% strongly agree, whereas 22,6% are neutral regarding their opinion as illustrated in Figure 4.1 above.

It was important to discover and verify that the chosen company drives schedule-driven projects by asking this question. Furthermore, having respondents answer this question would validate their responses, showing how much they understand about their projects. It was possible to anticipate that the respondents would be able to grant good recommendations in terms of techniques that could be used to improve customer satisfaction, which would positively impact the company's productivity.

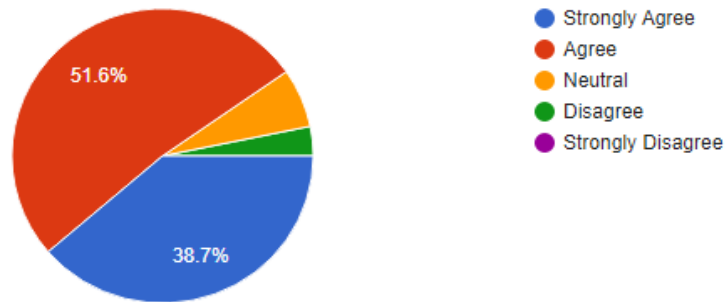
The neutral responses raise a concern as it appears that 22,6% of them do not have an understanding of how projects are on into their manufacturing plant. This could mean lack of involvement and can be detrimental to problem solving hen issues do arise, according to Anderson (2019), the solid foundation of any successful company is its people. Employees represent a source of knowledge and ideas, but oftentimes that resource remains untapped. Involving employees in the decision-making process not only empowers them to contribute to the success of an organization, but also saves the company time and money in increased productivity and reduced outsourcing.

4.1.23 Statement 16: Sharing of resources in multi-project environment

Figure 4-22: Sharing of resources is common in the duration of the projects.

Sharing of resources is common in the duration of the projects and thus it is of paramount importance to schedule effectively all our resources to avoid loss of production time.

31 responses



Response: This statement was supported with agreement by 51,6%, and 38,7% strongly agree with the statement as shown in Figure 4.22.

The more significant segment of the sample agrees with the statement. This shows that sharing resources not backed up by effective scheduling in a manufacturing plant can course major chaos to the entire production chain. This would mean delays during production. As schedule-driven project management emphasises that it deals with projects that are strictly driven by time, part of the things that cannot be afforded to be in jeopardy is the production time.

In this case, the sample can also reveal to the researcher a relationship between scheduling and productivity, which addresses the secondary research objective. The relationship identified in this response is that if resources are shared and effective scheduling is not applied, there will be a loss of time due to waiting should anything go wrong such as shortages or breakdowns. This means that failure to schedule resources for production brings a risk of sabotage to productivity.

SECTION C: OPEN-ENDED QUESTIONS

This section's key objective was to discuss openly with the survey participants or respondents. The respondents get to address their views and opinions to have a clear discussion about the topic and subject matter. There was no limitation in place regarding the expected responses, as any and every response is very important at this stage. The respondents were asked questions and expected to elaborate on their responses by giving an in-depth, fetched opinion. This allowed the writer to understand the response of the respondent. About 84% of respondents gave substantial support to their responses, and others, 16%, did not give answers or only had one-word responses rather than what was requested. For this section, the data was exported from the Google excel sheet to a Microsoft excel document. The data was formatted into a pivot table as indicated for better analysis as presented on the screen shots below.

What are the drivers of your manufacturing plant's productivity?			
Total responses to the question	Number of varying responses	Dominant/consistent responses	Number of dominant responses
27	12	On time delivery of products	15
		Quantities to be produced in the full quantity requested	
		The quality should be met at all times	

Figure 4-23: Drivers of the plant's productivity

4.1.24 Question 1: Drivers of Productivity

Responses: According to Figure 4.23 column 3, the respondents showed consistency in capturing the following points:

- On-time delivery of goods.
- Quantities that are in full as per the requested order.
- Good quality products.

The count and analysis of 15 out of 27 responses indicated the aforementioned productivity drivers. The process followed in order to code the responses was to export the response sheet from google forms and to an excel sheet.

The above responses indicate that customer satisfaction is highly prioritised. This positively impacts the research question that seeks to find out how productivity-related issues can be resolved in manufacturing through effective project management scheduling. For example, if delivery times are improved due to earlier finish dates of

production, requested quantities are produced as required, and with excellent quality, the customer satisfaction level may rise, increasing the overall company productivity. Figure 4.24 below, shows the summary of all the responses for question 1 and how they were coded according to similarity and meaning.

What are the drivers of your manufacturing plant's productivity?	Coding of similar responses
Quick problem solving skills, communication and planning	High productivity, quality, on time and in full
	On time delivery of products, in full quantities of order and good quality products.
Deadlines	Good quality, on time delivery and in full
Clearly defined KPI	Good quality, on time deliveries and in full quantities.
	On time delivery and in full, good quality.
Human capital development and investment in capital	Quality, on time delivery and in full production units. Supply as per requested order quantity.
Standard times, resources	Quality, in-full and on-time.
Measuring, planning, do, act and verify and do again	Efficiency, quality and on time delivery
	On time delivery, in full units' quantities to be delivered and of good quality units.
	On time delivery, in good quality and in full delivered quantities.
	On time, in full and in good quality.
	On time, in full and in good quality.
Average	On time, in full and of good quality
Market Demand	Service delivery
Customers' demands	Producing a good quality product exactly when it is needed and on time shipment of the product in the exact quantities requested.
Key driver at my company is the availability of all the required resources . The use of a good agile iterative approach among team members.	
Quick response to customer needs and wants.	
Production efficiency	
12	15

Figure 4-24: Results summary

4.1.25 Question 2: Impact of absenteeism on plant productivity.

How does absenteeism affect your manufacturing plant's productivity?	Negative effect	Varying
It affects the line efficiency and output; those require constant Re-balancing of the line.	1	
Absent machinist affects the efficiency of the production line, and also the quality if the machinist that is absent at that time is a multi skilled machine that can work with special machine, on the event when they are absent, the quality of the work is affected if that machinist is replaced with a less qualified machinist	1	
Negatively	1	
It is part of the plan and we reschedule operators to deferent functions, but where it is more then the planned, we end up requesting overtime and working weekends which increases labour cost	0	1
It affect it negatively.	1	
Impact target for the day and efficiency and productivity negatively.	1	
It creates unnecessary cost because you will be required to implement overtime to meet targets.	1	
Financially it affects the profits as we have to outsource labour to make sure our teams are all balanced for production delivery dates, if we do not do this, our efficiencies will fail and we will lose out on clients.	1	
Negatively. We often suffer imbalances in our production lines due to absenteeism. This causes lines underperformance in terms of efficiency.	1	
Negatively. Absenteeism is very expensive for the company especially if we have to meet targets daily. We currently do not get extra labour if our ream members are absent. We work with shortage of skills and are expected to still meet targets.	1	
Negatively especially financially.	1	
Low production which further pushes project delivery time	1	
Severely affects workflow and schedule	1	
it becomes slowly	1	
It slows productivity	1	
It has a negative effect on the agreed client delivery date timelines.	1	
It causes pressure to the schedule and delays especially if the absent party is a critical skilled person.	1	
It causes chaos in production and to the entire plan. Excessive absenteeism causes schedule pressure and major delays at times with regards to the project to be delivered. It frustrates the Plan.	1	
Negatively, more absent people the harder it gets to perform. We record a decline in productivity with increasing numbers of productivity.	1	
Negative, causes lost in Production time	1	
Efficiency is badly affected,	1	
Absenteeism affects productivity negatively as production lines are balanced to a certain number and this lowers the efficiency and productivity when there is absenteeism.	1	
It affects the productivity negatively as the production lines need to be rebalanced. Sometimes it creates a shortage of critical operation skill on the line.	1	
It affects productivity negatively.	1	

Absenteeism lowers the overall factory performance because the line has to be rebalanced due to people that are absent. Time is lost during this process. This causes a limitation in terms of output produced which then lowers productivity.		
It causes the productivity drop.	1	
It affects the productivity negatively.	1	
	25	1

Figure 4-25: How does absenteeism affect your manufacturing plant's productivity?

Responses: It has a negative effect on the line's efficiency and output, which require constant rebalancing.

In figure 4.25 it is presented that absent machinists affect the efficiency of the production line as when reading through the individual responses it is noticeable that there is a negative encounter for the company and the overall operational side of the business. Also, the skill level of the absent machinist is critical because it is a highly skilled machinist that is absent and being replaced by a lower-qualified person. Therefore, production will be challenged, including the quality of the product. Also in overall, figure 4.24 indicates that the total number of responses for this question were 26 and that there were 25 respondents who indicated that absenteeism has a negative impact to the company's productivity.

Furthermore, the responses revealed that absenteeism is part of the plan and, therefore, what needs to be done by planners is to reschedule and supervisors to rebalance their lines accordingly. In addition, operators are to be re-assigned to different functions where there is more work than planned. Finally, provision should be made for additional time, like overtime, in order to meet up with the work.

When production resources are in shortage, it is logical that production will not go smoothly unless something is done to ease the pressure on the current resources Buijs, Sievers and Tercero Espinoza (2012). One of the research questions seeks to find out what project management technique can be used to improve productivity in a manufacturing set-up, and based on the results above, and it is clear that scheduling and planning are part of the solution. A project manager can act as a coordinator that will coordinate resources, including scheduling and outsourcing of labour, when there is a shortage, Mochal (2002).

4.1.26 Question 3: Suggested Changes to Improve Productivity

If you were to change anything about your current system of running projects, what would it be?
Effective communication, due to lack of support from management.
I would change the project's immature execution, proper planning and communication to the relevant stakeholders is very vital in a project life, should that be done right on the first go, challenges are at a minimum .
Better execution of the production plan
Use RFID to get reliable data instead of data capture which is not really a real time system. People forget to update the system so you can't trust ERP data 100%
The use of Jira
Production processes
MRP and procurement process
People will have more responsibility and accountability
I would have a designated project manager on site who's main role is to handle all project related tasks.
The scheduling of our work into productions and how we plan for our resources.
The plan execution part of it. We need to schedule into resources that we do have.
How we allocate work or schedule work to the lines. It is not effective planning to allocate work without the necessary skill required to do the tasks required.
Employ more skilled personnel
Determining the success feasibility of project before starting.
Machines
Adjusting or relaxing too much red tape
Avoid the surfacing of new requirements coming from the client in the middle of a project.(start and stop).
I would put in place what I called the work schedule or project schedule after a plan is created because currently we know create a plan.
I would change our work scheduling system. We would optimize how we launch projects to our lines to ensure that skill is matched with the project to do as well as capacity or capability.
The scheduling of work sequence on the plan.
Give access to Microsoft Projects to every employee.
Planning of projects ,communication and stakeholder engagement
I would consider outsourcing labour to meet up with the rising levels of absenteeism and to help rebalanced lines with full numbered teams.
I would change how we plan the styles or schedule the styles to run. Also the sequence of work feeding from the cutting room which supplies production department.
Get management involved.
Improve communication. This will help the company build a culture of communication and will be able to standardize any changes made.
Plan projects effectively, communicate the scope and implement the changes made. Track the progress.

To optimally make use of the tools we have in place in order to improve our productivity, such as planning systems, MIS visual management planning and reporting tools we have.

Figure 4-26: If you were to change anything about your current system of running projects, what would it be?

The responses that are presented in figure 4.26 indicate that the respondents value support from management with project initiatives. Points of improvement such as communication to stakeholders during the management of projects appeared more than once among the list of suggestions, this shows how valuable communication is in project management. Therefore, an introduction of a new culture of effective communication stood out in the responses detailed in figure 4.26.

The secondary research objective perfectly aligns with this statement and is satisfied by the results. This objective is to provide recommendations on how productivity-related issues can be resolved by applying effective scheduling in project management. Communication is the most powerful tool that can drive the change in the culture sought after by the respondents in the results shown above. Where there is no communication, scheduling cannot thrive because the schedule is also based on what has been communicated.

4.1.27 Question 4: Effect projects driven by schedule on productivity.

Are your projects driven by schedule? How does this affect your productivity?	Yes	No
Yes our projects are driven by schedule, and those affect our productivity positively, because we are able to plan and forecast problems on time.	1	
Every time a line starts and ends a style is a project in my eyes. The duration of that "project" is driven by the number of units to be manufactured, the number of staff present to produce that quantity, the proper resources for producing that style up until the style is offline and at Dispatch	1	
Productivity is always priority	0	0
It's actually works for me, and I always try to be 3 days before customer dead line to be safe from uncertainty	0	0
the logical order in which the activities can be performed Is affected	0	0
No, negative	0	0
Yes, in-effective	1	
Not planning properly will create inconsistent in production	0	0
Yes. Sometimes negatively especially when we are experiencing resource constraints.	1	
Yes. Regardless of what delays or issues we are facing in production or late arrival of fabric, trims or other resources, the delivery dates aren't amended. This causes pressure on our resources and entire production schedule.	1	
Yes. We have fixed delivery dates which often times do limit us.	1	
Yes	1	
Delay of materials from suppliers slows down production frequency		0
Not always.	0	0
it affect us alot	0	0
Our projects are driven by needs and opportunities	0	0
My projects are driven by Sprints (usually 1-4 weeks per each sprint). The daily scrums held in our team,give us an opportunity to discuss if we are still in track with our set goals and targeted deadlines.	1	
Yes. We always compromise quality when we are running late, for the sake of numbers. This tempers with our integrity as a company.	1	
Yes they are. The lateness of your resources arrival is immaterial to the plan. The factory has to deliver as agreed. This often places so much pressure to the workforce. We end up fighting fire daily. This reduces productivity.	1	
Yes. The productivity often gets frustrated by the sequence of work that is scheduled.	1	
Yes, it helps us to be able to plan and execute our project plans.	1	
Most orders are never on time because bad of poor communication and line performance	0	0
Yes they are driven by schedule. It most of the time affects the quality of goods we produce more than it does with productivity because we would meet the order quantities however with quality that is not good.	1	
Yes they are driven by schedule. This becomes a problem because we end up compromising the quality of work whilst trying to push productivity.	1	
Yes they are. When we experience production delays we cannot amend the delivery dates and this creates pressure on our side.	1	
Yes. It negatively affects productivity.	1	
Yes. If we had to be using our tools effectively things would turn out better, however currently it is a chaos and affects our productivity negatively. We are constantly firefighting to resolve issues which can be easily resolved with better planning.	1	
	17	10

Figure 4-27: Are your projects driven by schedule? How does this affect your productivity?

According to figure 4.27, most respondents stated that a schedule drives their projects. Some have also claimed that they can forecast and plan for problems ahead of time, which positively impacts productivity. It is a number of 27 respondents who agree that their projects are driven by schedule out of 27 total respondents to the question.

Others opened up that each time a style is completed on a production line and another one begins, that is a project. The duration of that project is determined by the number

of units to be produced, the number of staff present to produce that quantity, and the proper resources for producing that style until the style is offline and at dispatch.

These responses suggest that planning as a project management tool should be prioritised because much planning is considered before production begins. However, these suggest that a project schedule depends on a prepared plan for production and thus suggests its importance.

4.1.28 Question 5: Effects of current method of project management has on productivity.

What effects have you observed that your current method of project management have on productivity?	Negative	Positive
Help me to plan and forecast production related issues and be able to be proactive and flexible in my approach.	0	1
Improper planning Lack of communication with the main stakeholders involved Poor resource allocation	1	0
Eat away productivity time	1	0
It's work	1	0
Time consuming	1	0
Timelines with due dates and pre-requisites in place	0	1
Planning, do, act and follow up and Plan again	0	1
We will compromise everything just to make sure we deliver on time, that is detrimental to building a productive firm.	1	0
The current method frustrates productivity.	1	0
It is very costly and does not help us bring much in to the business.	1	0
Our current method has a negative impact on productivity.	1	0
Inability to cordinate all the departments involved	1	0
Not much because of them mostly being research based	1	0
good effe	0	1
Slow service delivery	1	0
Transparency between client and customer is undoubtedly evident by the use of Agile Approach.		1
It negatively affects productivity.	1	0
This method can be non effective without all the necessary support it requires.	1	0
Negative.	1	0
We are less productive due to the lack of resources.	1	0
Setting standards and communicating those standards to relevant parties,engaging with them making them see the bigger picture,not just bulldozing everyone into doing whatever you need done without being transparent, inclusion drives and sustains a project	1	0
The current method of running projects does not really give room for optimization of productivity.	1	0
Data analysis is not effective although daily production data is being collected and therefore the problem solving becomes crippled and in turn this affects productivity as we cannot continuously improve our methods.	1	0
It is difficult to implement continuous improvement with the current way of doing things.	1	0
Management staff is not involved in projects driven in production.	1	0
Negative effects of schedule pressure, untimely arrival of production materials required for production, planning that is not properly executed causing chaos on production, supporting departments which cannot handle the capacity of production floors and demands thereof.	1	0
26	21	5

Figure 4-28:What effects have you observed that your current method of project management has on productivity?

The respondents have observed improper planning, lack of communication with the main stakeholders, and poor resource allocation. Others have observed that everything will be compromised, including quality, to ensure a delivery date is met. This can be detrimental to building a productive firm.

It was highly expected that the respondents would take advantage of this section by pouring out their responses in the form of a discussion; however, the information and engagement level were not much. However, that does not mean the data is insufficient to analyse and judge based on it, and more would have been better. It is indicated in Figure 4.28 that the number of respondents who are saying that the current project management method used in the company has a negative impact on productivity are 21 out of 26. This shows that the case study question of investigating the effect of schedule-driven project management on productivity in this manufacturing company in Cape Town is negative.

Chapter Summary

The finding deduced from this chapter is that the effects of schedule-driven project management in manufacturing can be excellent if proper systems are followed, and discipline from the relevant people is at work. However, it becomes a disaster when things start falling out of place and mostly when communication is not effectively managed. Therefore, the overall impression from this research is that it is essential to plan, schedule and track the plan's progress throughout all stages of production until the project handover, regardless of what happens. Also, absenteeism can be disastrous to productivity if it is unplanned or there is no plan to cover the absence, especially in a schedule-driven project management set-up.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

1.3 Introduction

Chapter four presented results which were obtained from carrying out the study and the analysis of results. This chapter consolidates the previous four chapters, the application of the research methodology, answering of research questions and objectives, limitations encountered as well as future research opportunities and recommendations.

5.4 Research background and problem

This research study sought to investigate the effects of schedule-driven project management on productivity in a manufacturing company in Cape Town. It is case study research as it was carried out at a single organization. The problem which triggered the study was thoroughly detailed in the first chapter that a manufacturing company in Cape Town was experiencing an issue of a declining productivity in projects delivery.

5.3 Research objectives

The primary objective of carrying out this study was to identify the schedule-driven project management techniques used to improve productivity in a manufacturing set-up. Based on the results discussed in chapter four, the open-ended questions revealed that resource allocation improvement is what the respondents wanted to have as an improvement in order to mitigate productivity issues in their manufacturing plant. This result was obtained by summarising the detailed responses in figure 4.28. It was also expressed that there were frequent experiences of improper planning and insufficient resources which frustrates production runs.

To identify the relationship between scheduling and productivity in a manufacturing set-up. The secondary objectives were answered as the results revealed that proper resources scheduling results in a productive project completion. Responses revealed that productivity was being compromised due to illogical flow of scheduled work, projects scheduled to start however no availability of resources (material delay), and compromised production quality due to chasing production hourly targets.

To provide recommendations on how productivity related issues can be resolved by application of effective scheduling tool in project management. The recommendations

which were obtained from the results reveal that changing the company's current material resource planning and procurement process in order to allow the planners to plan work into resources that are available to avoid any late starts which will lead to late finishes.

5.4 Research approach and methodology

The population studied was the production professions who were considered most familiar with the company's value chain process. This group was specifically those working for the company where the study was carried out. This study was approached as a case study as the research was carried out only on at a single company. The chosen sampling method was the purposive sampling following a quantitative research approach.

5.5 Research questions

The first research question was to find out which project management techniques can be used to improve productivity in a manufacturing set-up? The responses revealed that effective planning was required as a tool to be implemented.

What is the relationship between scheduling and productivity in a manufacturing set-up? Based on the results obtained, the relationship between scheduling and productivity is directly proportional, if the schedule is incorrect, productivity will decline.

How can productivity related issues be resolved through application of effective scheduling tool in project management? According to the results presented in the previous chapter, through an improvement of a material resource planning process.

5.7 Limitations and recommendations for future studies

The study was limited in terms of practical or simulated information which is enough to draw strong conclusions from without straggle. The open-ended responses were not as detailed as expected and the time to redo the study as preferred was a limitation as the course has phased out. Also, the limitation to this research study was the area restriction; restricted the study to only a single company in Cape Town of which there is still great opportunity to further in depth study the topic to a great scale of the industry. Future studies can look into expanding the topic to a national level and international. Studies to follow can also make comparisons with other different product type manufacturers as this study focused only on a garment manufacturer.

For future studies it would be vital to also have a practical research conducted physically with a proper project team whereby the state of productivity before implementation of recommendations are detailed and after collection of data, implementation can be made and track the changes. This will be done in order to solve the practical productivity problem that the company would be experiencing and not only end with surfacing the problem.

5.8 Summary of findings

For this research study, the quantitative and qualitative research approaches were used in a form of a questionnaire and the results are detailed in chapter four. The responses were received, analysed and discussed. The results showed that the company as indeed a schedule-driven project management company which deals with concurrently running projects daily and sharing of resources as indeed happening in the environment which proves some of the literature content cited in this research study. This was proven to be true by the answers to the questionnaire which the respondents had filled out.

Based on the results, the company strongly requires a designated project manager to aid the daily process as section C of the questionnaire showed responses from the respondents that they often face firefighting incidents hereby this is a results of poor resource management and allocation. In the company, there opportunity can be granted to a project manager to coordinate and structure projects with the functional managers as the project manager could bring in their skill in the process. This can have a positive impact on the overall company productivity as it can reduce the rate of project delay and failure.

Based on the findings, project management can be regarded as a valuable resource that manufacturers can invest in in their sites, just like having production managers, industrial engineers and more. This can save the company money by limiting the number of poor project planning and resource allocation which in turn have a negative impact on the company productivity.

5.8 Recommendations:

Research shows that a project manager is vital to oversee projects in a manufacturing plant, especially one that runs projects concurrently. It has been proven; even though not to a great extent statistically, however qualitatively as intended, the results do

support that the effects of schedule-driven project management in a manufacturing company in Cape Town are adverse towards productivity if all the conditions required to run these projects successfully are not met which are to name a few:

- Timeously delivery of materials and scheduling of resources.
- Having a project manager of the site overseeing the process.
- Effective scheduling of plans.
- Having project tracking tools.
- Not sharing resources or if sharing resources is unavoidable, a better recommendation of a resource scheduling system.
- Outsourcing of labour to rebalance where there is a need.
- The company's productivity will significantly deteriorate if most of these conditions are not met.

Chapter Summary

The finding deduced from this chapter is that the effects of schedule-driven project management in manufacturing can be excellent if proper systems are followed, and discipline from the relevant people is at work. However, it becomes a disaster when things start falling out of place and mostly when communication is not effectively managed. Therefore, the overall impression from this research is that it is crucial to plan, schedule and track the plan's progress throughout the stages of production until the project handover, regardless of what happens. Also, absenteeism can be disastrous to productivity if it is unplanned or there is no plan to cover the absence, especially in a schedule-driven project management set-up.

BIBLIOGRAPHY

- Ahmed, M., Baloch, A., & Ghani, H. (2015). The impact of organizational politics on the productivity of employees: an empirical investigation from Pakistan. *ResearchGate*, 25-30
- Ahmed, U., Alkadash, T. M., Shah, S. M., Alzgool, M., & Almaamari, Q. (2020). Uncertain Supply Chain Management Going green during COVID-19: Examining the links between green HRM, green supply chain and firm performance in food Industry of Bahrain: The moderating role of lockdown due to COVID-19. *Research Gate*, 18-29.
- Alchemer. (2021). Purposive sampling 101. www.alchemer.com/resources/blog/purposive-sampling-101.
- Almaamari, Q. A., & Alaswad, H. I. (2021). Factors influencing employees' - Productivity Literature review. *Turkish Online Journal of Qualitative Inquiry*.
- Anantatmula, V. S. (2010). Project Manager Leadership Role in Improving Project Performance. *Research Gate*, 13-22.
- Anderson C (2019). The Advantages of Employee Involvement in Decision Making. <<https://smallbusiness.chron.com/advantages-employee-involvement-decision-making-18264.html>> . [Accessed 11-12-2022].
- Arthur A. Thompson, J. (2012). Strategies for Staying Cost Competitive. *Harvard Business Review*.
- Beleiu, I., Crisan, E., & Nistor, R. (2015). Main Factors Influencing Project Success. *Econpapers*, 59-72.
- Berg, A. v. (2015). The Magic Triangle and Devil's Quadrangle – Understanding Project Management Models. In *Loox Blog*.
- Berssaneti, F. T., & Carvalho, M. M. (2014). Identification of variables that impact project success in Brazilian companies. *Research Gate*.
- Bhandari., P. (2022). Data Collection | Definition, Methods & Examples. *Scribd*.
- Bhat, S., Gijo, E., & Jnanesh, N. (2014). Application of Lean Six Sigma methodology in the registration process of a hospital. *International journal of productivity and performance management*, 613-643.
- Blanke, J., & Marcus, A. (2014). The Global Information Technology Report 2014, The rewards and risks of big data. *World Economic Forum*.
- Blismas, Nick and Sher, William and Thorpe, Antony and Baldwin, Andrew. (2004). Factors influencing project delivery within construction clients' multi-project environments. Vol 11. *engineering, Construction and Architectural Management*.113-125.
- Bo, A. J., Almaamari, B., & Al-Absy, M. (2020). The Impact of Leadership on Employees' Productivity. *ResearchGate*.
- Bohn, R. (2000). Stop Fighting Fires. *Harvard Business Review*. <<https://hbr.org/2000/07/stop-fighting-fires>>. [Accessed 11-12-2022].

- Brown, L. (2022). Top 5 Factors That Lead to Project Success. Inesis Global Learning Services.
- Bryman, & Bell. (2007). Business Research Methods. 2nd ed. New York: Oxford University Press.
- Buma, R. (2021). Manufacturing Resource Planning: A Quick guide to MRP II. <[https:// www .Projectmanager.com](https://www.Projectmanager.com).[Accessed 11-12-2022].
- Buijs B, Sievers H, Tercero Espinoza LA. (2012) Limits to the critical raw materials approach. Waste and resource management 165:7.
- Bureš, V., & Stropková, A. (2014). Labour Productivity and Possibilities of its Extension by Knowledge Management Aspects. ScienceDirect.
- Cartlidge, D. P. (2017). Construction Project Manager's Pocket Book. <[https://: www .Duncancartlidgeonline.com](https://www.Duncancartlidgeonline.com).>.[Accessed 11-12-2022].
- Chaitanya, N., Krishna, A. P., & Manjula, R. (2016). The Effects of Schedule-Driven Project Management. International Journal of Progressive Sciences and Technologies (IJPSAT), 54-67.
- Chen, T., Meiqing, F., Liu, R., Xuanhua, X., Zhou, S., Bingsheng, L., et al. (2019). How do project management competencies change within the project management career model in large Chinese construction companies? International journal of project management.
- Chetty, V. R., & Phung, S. P. (2018). Economics Behind Education: Elements of Development Outcomes Through Political Involvement. Eurasian Journal of Analytical Chemistry, 13(6), 146–157.
- Cleave, P. (2021). Advantages Of Questionnaires In Online Research. <<https://www.smartsurvey.co.uk/blog/advantages-of-questionnaires-in-online-research>>. [Accessed 11-12-2022].
- Coldwell, D. & Herbst, F. 2004. Business Research. Cape Town: Juta and Co. Ltd.
- Confonto, E., Salum, F., Amaral, D. C., Silva, S. L., & Almeida, L. F. (2014). Can agile project management be adopted by industries other than software development. Project Management Journal, 21-34.
- Copper Team. (2016). Why Poor Planning Can Lead To Project Failure. Copperproject.com.
- Cooper, R. G., Grey, C., Raymond, L., & Walker, P. (1997). Manufacturing strategy: text and cases. London: McGraw-Hill.
- Coursera (2022). Four Phases of the Project Life Cycle Explained. <https://www.coursera.org/articles/project-management-lifecycle> [Accessed 18-04-2022]
- Cote A, (2022). How to Become a Project Manager – A Reviewed and Optimized Guide for 2022. <<https://www.paymoapp.com/blog/the-complete-project-manager-guide/>>.[Accessed 11-12-2022].

- Decision Resources (2020). How ERP Makes Project Management Easier < <https://www.decision.com/how-erp-makes-project-management-easier/> > [Accessed 10-12-2022]
- Design Systems (2022) Manufacturing Project Management < <https://www.dsidsc.com/manufacturing-project-management/#:~:text=What%20is%20manufacturing%20project%20management,a%20set%20of%20established%20goals.>> [Accessed 12-08-2022].
- Dudovskiy, J. (2018). The ultimate guide to writing a dissertation in business studies: A step-by-step assistance (January 2018 ed.).. UK: Research-methodology.net.
- Duggan, T. (2018). What Is the Importance of Project Scheduling & Its Role in Business Projects? yourbusiness.azcentral.com/importance-project-scheduling-its-role-business-projects-9503.html.
- Dumas, E. (2020). Product Marketing Spotlight Series: Rodney Rasmussen. Crayon.
- D Dvir, T Raz, A J Shenhar. International journal of project management, 21: 89-95, 2003
- Gehring, A. (2022). Productivity vs Efficiency: Difference in Manufacturing. <<https://www.rhythmsystems.com> [Accessed 15-08-2022]
- Geraldi, J.G., 2008. The balance between order and chaos in multi-project firms:a conceptual model. International Journal of Project Management 26 (4), 348-356
- Gorman, L. (2014). Technology and Productivity Growth. the National Bureau of Economic.
- Gupta, S. (2022). Four Steps to Build an Effective Project Risk Management Process < <https://www.capterra.com/resources/risk-management-process/>> [01-12-2021]
- Javalgi, R. G., White, D. S., & Ali, A. (2018). Strategic marketing in the global telecommunications industry. Routledge
- J Grad Med Educ. 2015 Dec;7(4):669-70. doi: 10.4300/JGME-D-15-00414.1.
- Jardin J. (2021). Solving Quality Issues and Problems: Go Beyond Root Cause to 'Real' Cause. <https://www.mastercontrol.com/gxp-lifeline/quality-problems-beyond-root-causes-to-real-causes/> [Accessed 10-12-2022]
- Hamed, M., & Soliman, A. (2015). What Toyota Production System is Really About. Research Gate.
- Harris, F., McCaffer, R., & Edum-Fotwe, F. (2013). Modern Construction Management. <<https://www.perlego.com/book/1000042/modern-construction-management-pdf>>.[Accessed 10-12-2022].
- Hyväri, I. (2016). Project management effectiveness in project-oriented business organizations. International Journal of Project Management, 216-225.
- Javalgi, R. G., White, D. S., & Ali, A. (2018). Strategic marketing in the global telecommunications industry. Routledge.
- J, R., Bisharat, S. M., Bisharat, L., & Ghaleb Sweis. (2014). Factors Affecting Contractor Performance on Public Construction Projects. Life Science Journal. Vol.11, No. 4s, 28-29.

- Jonas, D., 2010. Empowering portfolio managers: how management involvement impacts project portfolio management performance. *International Journal of Project Management* 28, 818-831
- Jowah, L. (2012). The matrix structure: Does it create an authority gap for the project manager? *Journal of US-China Public Administration*, 9(10):1097-1106.
- Jowah, L. E. (2015). Both values and beliefs as a leadership style: the maturation of the studies in effective leadership. *Journal of contemporary management*, 77-103.
- Jun, Z., Liu, X., & Liu, X. (2013). The evolving pattern of the wage–labor productivity nexus in China: Evidence from manufacturing firm-level data. *Ideas.repec.com*.
- Karaca, Z., and Onargan, T. 2007. "The application of critical path method CPM in workflow schema of marble processing plants
- Kaulio, M.A., 2008. Project leadership in multi-project settings: findings from a critical incident study. *International Journal of Project Management* 26, 338–347
- Kulkarni, P. (2015). Why Are So Many Site & Sustaining Capital Projects Schedule-Driven? *Independent Project Analysis*.
- Künn-Nelen, A., Grip, A. d., & Fouarge, D. (2013). Is Part-Time Employment Beneficial for Firm Productivity? *Sage Journals*.
- Laslo, Z., & Goldberg, I. (2008). Resource allocation under uncertainty in a multi-project matrix environment: Is organizational conflict inevitable? *Semantic Scholar*.
- Manjula, R., Geetha, C., Nama, K., & Krishna, A. (2016). The Effects of Schedule-Driven Project Management in Multi-Project Environments. *Semantic Scholar*.
- Manufacturing Productivity Guide. (2022). Understanding Manufacturing Productivity. *Unleashedsoftware.com*.
- Markotic, K. (2021). Project Management in Manufacturing. *Machine Desk*.
- Ma K, Wang L, Chen Y. A Resource Sharing Mechanism for Sustainable Production in the Garment Industry. *Sustainability*. 2018; 10(1):52. <https://doi.org/10.3390/su10010052> [Accessed 11-12-2022].
- McCombes, S. (2021). What is a research design? Types, guides and examples. <https://www.Scribbr.com> [Accessed 12-06-2022].
- Tom Mochal, Is project management all administration? *TechRepublic.com*, posted 29 Nov. 2002. [Accessed 10-12-2022].
- Melvin H (2008). A system dynamics view of project management firefighting at a startup company. <http://oastats.mit.edu/handle/1721.1/44699>. [Accessed 11-12-2022].
- Moola, I. (2017). Factors affecting academic performance of learners in continuing education schools: a case of central, southern and western provinces of Zambia. *Master of Education Thesis*. arcjournals.org/pdfs/ijhsse/v4-i12/.
- Morris, P. W., Pinto, J. K., & Soderlund, J. (2011). *The Oxford Handbook of Project Management*. Oxford University Press.

- Mouri, H. R. (2011). An Evaluation of Project Management Processes in Public Sector Organizations Like Public Works (PWD). BRAC Institute of Governance and Development.
- Mouton, A. (2017). Motivations for contralateral prophylactic mastectomy as a function of socioeconomic status. *BMC Women's Health*.
- Muller, R., & Jugdev, K. (2012). Critical success factors in projects: Pinto, Slevin and Prescott—The elucidation of project success. *International Journal of Managing Projects in Business*, 757–775.
- Neufville, R. d., & Scholtes, S. (2011). Flexibility in Engineering Design. Research Gate.
- Nethathe, J.M.; Van Waveren, C.C. and Chan, K.-Y. Extended critical success factor model for management of multiple projects: An empirical view from Transnet in South Africa. *S. Afr. J. Ind. Eng.* [online]. 2011, vol.22, n.2, pp.189-203. ISSN 2224-7890.
- NetMBA. "PERT". <http://www.netmba.com/operations/project/pert>. Last update time unknown. [Accessed 10-12-2022].
- Paolo Canonico, J. S. (2010). Getting control of multi-project organizations: Combining contingent control mechanism. *International Journal of Project Management*, 796-806.
- Park, Konge, L., & Jr, A. R. (2020). The positivism paradigm of research. <http://www.pubmed.ncbi.nlm.nih.gov> > [Accessed 18-07-2022].
- Patanakul, P. (2010). Key drivers to the effectiveness in managing multiple projects: an empirical investigation in an IT organization of a large financial institution. Paper presented at PMI® Research Conference: Defining the Future of Project Management, Washington, DC. Newtown Square, PA: Project Management Institute, 5-10.
- Pranas Žukauskas, J. V. (2017). Structure of Research Design: Expert Evaluation. Intechopen.com/chapters/59034.
- Puplampu, B. (2013). Employee Motivation in Africa. In T.R. Lituchy, B.J. Punnett, & B.B. Puplampu. London: Routledge, 270-290.
- Rajkumar, S. (2010). Paper presented at PMI® Research Conference: Defining the Future of Project Management, Washington, DC. Project Management Institute.
- Rao, P. (2020). Material requirements planning (MRP): An overview. *Journal of Engineering and Technology Management*, 59, 100946.
- Rijke, J., Herk, S. v., Zevenbergen, C., Ashley, R., Hertogh, M., & Heuvelhof, E. T. (2014). Adaptive programme management through a balanced performance/strategy-oriented focus. Research gate.
- Rose, A. (2015). Critical Skills for Success in 2020 and Beyond. [Linkedin.com](https://www.linkedin.com/pulse/critical-skills-success-2020-beyond-rose-a/).
- Saeeda, R., Haseeb, U.R., Muhammad, Z., & Muhammad, A. (2018). Leadership styles, Organizational culture and employees' productivity: Fresh evidence from private banks of Khyber-Pakhtunkhwa, Pakistan. *Abasyn Journal of Social Sciences*, 1-15.

- Salehizadeh, A.M. and Mahmudi, J., 2020. A Systems Dynamics Model for Project Management systems of Project-Based Organization. *Journal of Industrial Strategic Management*, 4(2), pp.12-22.
- Crowe S, Cresswell K, Robertson A, Huby G, Avery A, Sheikh A. The case study approach. *BMC Med Res Methodol*. 2011 Jun 27;11:100. doi: 10.1186/1471-2288-11-100. PMID: 21707982; PMCID: PMC3141799.
- Sarveswaran, J., & Rajendran, D. (2020). A study on the implementation of MRP II in small and medium scale enterprises. *Journal of Applied Business Research*, 36(5), 1279-1289
- Sayed, Z. (2022). Absenteeism in the workplace: causes, impact on a business, and possible solutions. *HR Forecast* <https://hrforecast.com/absenteeism-in-the-workplace-causes-impact-on-a-business-and-possible-solutions/> [Accessed 10-12-2022]
- Snoo J, Zou, W., Kumaraswamy, M., Chung, J. and Wong, J. (2011), 'Identifying the critical success factors for relationship management in PPP projects', *International Journal of Project Management*, Vol. 32 No. 2, pp. 265-274.
- Schnetler, R., Steyn, H., & Staden, P. V. (2015). Characteristics of matrix structures, and their effects on project success. *Sabinet African Journals*.
- Scott, B. (2020). IMPORTANCE OF PROJECT SCHEDULE AND COST CONTROL IN PROJECT MANAGEMENT. *Globalknowledge.com*..
- Sileyew, K. J. (2019). Research Design and Methodology. In *Cyberspace*. IntechOpen. Available at:<https://doi.org/10.5772/intechopen.85731>
- Soederlund, J. (2010). Getting control of multi-project organizations: Combining contingent control mechanisms. *International Journal of Project Management*.
- Solutionformatics (2019). Factors that can affect Multi-project Management. <
<https://www.solusinformatics.com/factors-that-can-affect-multi-project-management/>>
 . [Accessed 12-12-2022].
- Steyn, H., Basson, G., Carruthers, M., du Plessis, Y., Kruger, D., Pienaar, J., ProzeskyKuschke, B., Van Eck, S. & Visser, K. 2007. *Project management: A multi-disciplinary approach*, 2nd ed. FPM Publishing, South Africa.
- Suresh, D., & Sivakumar, A. (2019). Impact of Schedule Management Plan on Project. *International Journal of Engineering and Advanced Technology (IJEAT)*.
- SweetProcess (2021). Operations Management:Maximizing Production Efficiency in any Organization <https://www.sweetprocess.com/operations-management/> [Accessed 15-07-2022].
- Task Management Guide (2021). WHAT IS SCHEDULE-DRIVEN PROJECT?
<http://www.taskmanagementguide.com/glossary/what-is-schedule-driven-project-.php>
 [Accessed 11-12-2022].
- Thorvaldsdóttir, H., Robinson, J. T., & Mesirov, J. P. (2013). Integrative Genomics Viewer (IGV): high-performance genomics data visualization and exploration. *Briefings in Bioinformatics*, 178-192.

- Tran, Q. X., Dang, M. V., & Tournois, N. (2020). The role of servicescape and social interaction toward customer service experience in coffee stores. The case of Vietnam. Emerald Insight.
- Ubani, E. (2012). Evaluating the effects of organizational structure on the effective delivery of civil engineering projects. *Interdisciplinary Journal of Contemporary Research Business* Vol 4 No6.
- Watt, A. (2012). *Project Management 2nd Edition*. BC campus Open Education.
- Wei, C.C. and Wang, M.J.J. (2004), "A comprehensive framework for selecting an ERP system", *International Journal of Project Management*, Vol. 22 No. 2, pp. 161-9.
- Westerveld, E. (2013). The Project Excellence Model: linking success. *International Journal of Project Management*, 21, 411–41.
- Wrona, V. (2016). PM Obstacles: Firefighting. *Project Management.Com*.
- Wysocki, R. K. (2011). Effective project management: traditional, agile, extreme. *Research gate*.
- Yaghootkar, K., & Gil, N. A. (2012). The effects of schedule - driven project management in multi-project - environment. *International Journal of Project Management*. Vol. 30 Issue 1, pp 127 – 140.
- Yang, & Ying. (2013). Technological factors affecting business all over the world. *European Journal of Scientific Studies* Vol.2 No.3, pp.21.
- Yang J, & Wei P (2010). Causes of Delay in the Planning and Design Phases for Construction Projects. *Journal of Architectural Engineering* 16(2)
DOI:10.1061/(ASCE)1076-0431(2010)16:2(80)
- Yi, Y., Zhang, Q., & Wang, D. (2018). Research on MRPII system based on cloud computing. In *2018 International Conference on Cloud Computing and Big Data Analysis (ICCCBDA 2018)* (pp. 235-240). Atlantis Press.
- Yin RK. *Case study research, design and method*. 4. London: Sage Publications Ltd.; 2009.
- Ziek, P., & Anderson, J. D. (2015). The Correlation between Emotional Intelligence and Project Management Success. *Scirp.org*.
- Zou, W., Kumaraswamy, M., Chung, J., & Wong, J. (2014). Identifying the critical success factors for relationship management in. s. *International Journal of Project Management*, 265-274.
- Zwikael, O., & Globerson, S. (2020). From Critical Success Factors to Critical Success Processes. *International Journal of Production Research*.

APPENDICES

Appendix A: Questionnaire

12/6/22, 11:28 AM

Cape Peninsula University of Technology

Cape Peninsula University of Technology

I am Siyamthanda Mlotha, currently registered at the Cape Peninsula University of Technology for an Masters in Project Management. I am researching about The effects of a schedule driven project management on productivity in a manufacturing company in Cape Town.

* Required

Biographic Information

Please select the relevant option by clicking on the circle and fill in the blank spaces where applicable.

1. Gender

Mark only one oval.

- Male
 Female
 Prefer not to say

2. Age

Mark only one oval.

- 18 to 25
 26 to 35
 36 to 45
 46 to 55
 56 to 65
 66 to 75
 76 to 85
 Other: _____

https://docs.google.com/forms/d/1U-j_I7uM7XuQm0_alwU9LrIsAmd8CDLuHDxCVsZbvxs/edit

1/10

3. Race

Mark only one oval.

- African
- Coloured
- Indian
- White

4. How long is your service in the field

Mark only one oval.

- 1 to 5 years
- 6 to 10 years
- 11 to 20 years
- 21 to 30 years
- 31 to 40 years
- 50 and older

5. What is your role at work?

6. Where is your company located (region) ?

7. What is your highest educational qualification?

Mark only one oval.

- Grade 10
- Grade 11
- Grade 12
- Diploma
- Degree
- Other

Quantitative Study

Closed ended questions.

8. I am currently managing concurrently running projects in my company.

Mark only one oval.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

9. I use project planning as a Project Management tool to improve productivity in the manufacturing plant where I work.

Mark only one oval.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

10. Effective project execution scheduling improves productivity in my company.

Mark only one oval.

- Strongly Agree
 Agree
 Neutral
 Disagree
 Strongly Disagree

11. Systems implementation in my company provide Production Managers and planners with an accurate view of the manufacturing plant to help them react more quickly to issues and changes.

Mark only one oval.

- Strongly Agree
 Agree
 Strongly Disagree
 Disagree

12. Having a project scheduling ERP system has improved productivity in the manufacturing plant where I work. Production managers and planners can view project/product report activities at each stage of the project life cycle.

Mark only one oval.

- Strongly Agree
 Agree
 Neutral
 Disagree
 Strongly Disagree

13. Project Management at my company is driven by schedule. (Schedule driven Project Management is managed under the overriding constraint of time. It is based on mainly delivery date).

Mark only one oval.

- Strongly Agree
 Agree
 Neutral
 Disagree
 Strongly Disagree

14. Fire fighting is constantly a critical issue during a normal day of project execution.

Mark only one oval.

- Strongly Agree
 Agree
 Neutral
 Disagree
 Strongly Disagree

15. Through an ERP project planning system we can view reports on real time information such as picked material, delivery confirmation, stock levels display on real time, manage quality control to identify issues as soon as they arise and report deliveries/ASN from suppliers.

Mark only one oval.

- Strongly Agree
 Agree
 Neutral
 Disagree
 Stringly Disagree

16. The productivity of projects delivery is significantly low in my company.

Mark only one oval.

- Strongly Agree
 Agree
 Neutral
 Disagree
 Strongly Disagree

17. We often encounter schedule pressure during the projects' life cycle. *

Mark only one oval.

- Strongly Agree
 Agree
 Neutral
 Disagree
 Strongly Disagree

18. Sharing of resources is common in the duration of the projects.

Mark only one oval.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

19. The customer determines determines the time for project delivery.

Mark only one oval.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

20. The late arrival of project resources badly affects the manufacturing plant's productivity.

Mark only one oval.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

21. We currently do not have a Project Manager in my company.

Mark only one oval.

- Strongly Agree
 Agree
 Neutral
 Disagree
 Strongly Disagree

22. The customer determines the time for project delivery. We must be careful to schedule our resources to meet the customer's delivery request.

Mark only one oval.

- Strongly Agree
 Agree
 Neutral
 Strongly Disagree
 Disagree

23. Sharing of resources is common in the duration of the projects and thus it is of paramount importance to schedule effectively all our resources to avoid loss of production time.

Mark only one oval.

- Strongly Agree
 Agree
 Neutral
 Disagree
 Strongly Disagree

Open ended questions

24. What are the drivers of your manufacturing plant's productivity?

25. How does absenteeism affect your manufacturing plant's productivity?

26. If you were to change anything about your current system of running projects, what would it be?

27. Are your projects driven by schedule? How does this affect your productivity?

28. What effects have you observed that your current method of project management have on productivity?

The
end.

Thank you for participating , please note that your responses are confidential and will not be shared with your company.

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Google Forms

Appendix B: Permission Letter

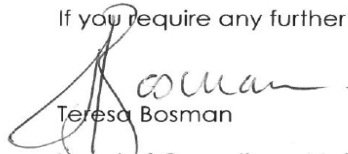
PRESTIGE CLOTHING

28 July 2021

RE: Siyamthanda Mlotha

This letter serves as confirmation that Siyamthanda Mlotha (ID 9405140308082) has been granted permission to carry out her research project out at TFG Prestige Clothing.

If you require any further information, please do not hesitate to contact me.



Teresa Bosman

Head of Operations: Maitland

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PO Box 6020
Parow East 7501 RSA

Tel: 021 937 4701

Prestige Clothing (Pty) Ltd. 2002/022233/07

DIRECTOR: A E Thunström, B Ntuli

www.tfg.co.za

Appendix C: Ethical Clearance Certificate



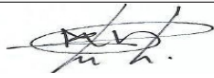
P.O. Box 1906 | Bellville 7535
Symphony Road Bellville 7535
South Africa
Tel: +27 21 4603291
Email: fbmsethics@cput.ac.za

Office of the Chairperson Research Ethics Committee	FACULTY: BUSINESS AND MANAGEMENT SCIENCES
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The Faculty's Research Ethics Committee (FREC) on **14 September 2021**, ethics **APPROVAL** was granted to **Siyamthanda Mlotha (213120445)** for a research activity for **MTech: Business Administration in Project Management** at the Cape Peninsula University of Technology.

Title of project:	The effects of a schedule driven project management on productivity in a manufacturing company in Cape Town Researcher (s): Mr S Fore
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Decision: APPROVED

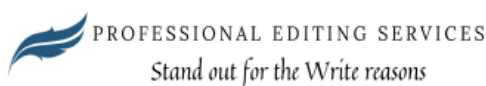
 Signed: Chairperson: Research Ethics Committee	29 November 2021 Date
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The proposed research may now commence with the provisions that:

1. The researcher(s) will ensure that the research project adheres to the values and principles expressed in the CPUT Policy on Research Ethics.
2. Any adverse circumstance arising in the undertaking of the research project that is relevant to the ethicality of the study requires that the researcher stops the study and immediately informs the chairperson of the relevant Faculty Ethics Committee.
3. The researcher(s) will conduct the study according to the methods and procedures set out in the approved application.
4. Any changes that can affect the study-related risks for the research participants, particularly in terms of assurances made with regards to the protection of participants' privacy and the confidentiality of the data, should be reported to the Committee in writing accompanied by a progress report.
5. The researcher will ensure that the research project adheres to any applicable national legislation, professional codes of conduct, institutional guidelines, and scientific standards relevant to the specific field of study. Adherence to the following South African legislation is important, notably compliance with the Bill of Rights as provided for in the Constitution of the Republic of South Africa, 1996 (the Constitution) and where applicable: Protection of Personal Information Act, no 4 of 2013; Children's act no 38 of 2005 and the National Health Act, no 61 of 2003 and/or other legislations that is relevant.
6. Only de-identified research data may be used for secondary research purposes in future on condition that the research objectives are similar to those of the original research. Secondary use of identifiable human research data requires additional ethics clearance.
7. No field work activities may continue after two (2) years for Masters and Doctorate research project from the date of issue of the Ethics Certificate. Submission of a completed research ethics progress report (REC 6) will constitute an application for renewal of Ethics Research Committee approval.

Clearance Certificate No | 2021 FBMSREC 101

Appendix D: Editor's Certificate



Gerald T du Preez
PhD

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gerald9@gmail.com

Certificate of Editing

This serves to confirm that copy-editing and proofreading services were rendered to
for a master's thesis entitled

**THE EFFECTS OF SCHEDULE-DRIVEN PROJECT MANAGEMENT ON PRODUCTIVITY IN A
MANUFACTURING COMPANY IN CAPE TOWN**

Siyamthanda Mlotha

with a final word count of 31 663 on 26 October 2022

I am a member of the Professional Editors' Guild (member number DUP015) and commit to the following codes of practice (among others):

- *I have completed the work independently and did not sub-contract it out*
- *I kept to the agreed deadlines and communicated changes within reasonable time frames*
- *I treated all work as confidential and maintained objectivity in editing*
- *I did not accept work that could be considered unlawful, dishonest or contrary to public interest*

I uphold the following editing standards:

- *proofreading for mechanical errors such as spelling, punctuation, grammar*
- *copy-editing that includes commenting on, but not correcting, structure, organisation and logical flow of content, formatting (headings, page numbers, table of contents, etc.), eliminating unnecessary repetition*
- *checking citation style is correct, punctuating as needed and flagging missing or incorrect references*
- *commenting on suspected plagiarism and missing sources*
- *returning the document with track changes for the author to accept*

I confirm I have met the above editing standards and professional, ethical practice. The content of the work edited remains that of
the student.

Gerald T du Preez, PhD

Membership: Southern African Freelancers' Association and Professional Editors' Guild (Membership #DUP015)