DIGITAL TECHNOLOGY APPLICATION IN PROJECT MANAGEMENT

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A project report submitted in partial fulfilment of the requirements for the award of Master Of Project Management

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DECLARATION

I hereby declare that this project report is based on my original work except for citations and quotations which have been duly acknowledged. I also declare that it has not been previously and concurrently submitted for any other degree or award at UTAR or other institutions.

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APPROVAL FOR SUBMISSION

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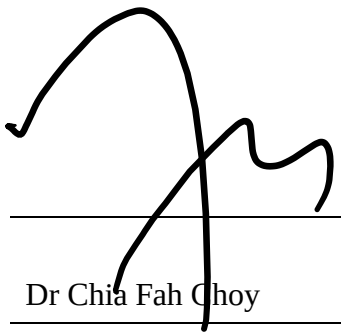
Signature : 

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APPLICATION OF DIGITAL TECHNOLOGY IN PROJECT MANAGEMENT

ABSTRACT

Digital technology has grown rapidly in today world and enhanced the quality of life, and digital technology has provided fast ways to communicate through instant messaging apps and social media platforms, technological. Due to growing challenges in today's technology-enabled work environment, where digital technology tools are frequently used for collaboration, communication, and implementation of project management methods, technology assumes prominence in the context of project management. Even co-located project teams are increasingly turning to the digital technology for these goals.

This study aims to explore further info and perception on application of digital technology in project management, and how digital technology can be incorporated effectively in project management. Specifically, it investigated on how digital technology able to assist project manager and facilitate project progress and efficiency. The published literature has indicated that by applying digital technology in project management has facilitate the process and improve the project efficiency.

To gather information, seven interview sessions were conducted. All seven respondents worked in different industries, inclusive of oil and gas, manufacturing, trading, and, of course, M&E. Meanwhile, every respondent had more than 5 years of project management experience, with the longest being 20 years. The results revealed that the majority of respondents used digital technology in project management because it was convenient, time saving, and reduced hassle, among other things. For example, information can be quickly disseminated among project team members, scheduling purposes, meeting scheduling, and so on. Data saturation was used to discover all major findings, as data saturation was achieved when there was no more information to be collected from the respondents. The results suggest that most organisations are adopting digital transformation as it improves communication, collaboration,

and content management not just within an organisation, but also in project management. Meanwhile, most projects could not be completed physically during the pandemic, thus digital technology was used to address to the situation.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

The introduction of this study is outlined in this chapter. The study background is introduced in Section 1.2, and the problem statement is elaborated in Section 1.3. The research goal, research objectives, research technique, as well as the scope and limitations of the study are all described in sections 1.3 to 1.8. Section 1.8 concludes the chapter with a summary of the research's chapters.

1.2 Research Background

The world has been rapidly changing as a result of the rise of digital technologies; digital technologies have shaped the world into a new dimension in which most of us depend heavily. For instance, Computers are now almost 33.5 million times more powerful than they were in 1965 (MPA, 2015), and many project managers keep their smartphones on them at all times during the day (MPA, 2015). With the ubiquitous and cost-effective availability of sophisticated computational equipment in project delivery, digital information becomes increasingly worldwide. In the meantime, many industries have adopted digital technologies in the workplace for improved communication and work efficiency. Applying digital technology in project

management has emerged rapidly nowadays as more businesses are becoming project oriented, and global projects spending many of billions each year (William, 2005). As a result, many businesses have already begun to use artificial intelligence (AI) in project management to automate daily operations that need human effort. The effect is useful for obtaining performance insights as well as automating simple operations. Besides that due to Coronavirus outbreak, in an effort to safeguard workers and limit the spread of the virus, companies and organizations have adopted new work-from-home policies that emphasize digital communication over face-to-face communication. For example: A meeting does not have to take place in the same physical location; instead, it can be held virtually with all project members (Anantatmula, 2008). Technology can assist project managers in successfully managing projects, but there are always hurdles, and the ones that are most prevalent today may not have been present a decade ago.

1.3 Problem statement

Many aspects of our daily lives have been transformed by digital technology advancements, including how we communicate and connect with one another (Menon, 2011). Same goes to project management, digital technology has integrated into all areas of project management, resulting in fundamental changes to project management. Past studies have shown that digital technology has transformed project management and provided numerous benefits. For example, transformation such as a meeting does not have to take place in the same physical location; instead, it can be held virtually with all project members (Anantatmula, 2008). Furthermore, employing digital technology for communication is frequently viewed as a management tool, with the project manager being held accountable for the project's digitalized communication process.(Wikforss and Löfgren, 2007). However, how essential is digital technology to project management, how can digital technology help project managers, and why should digital technology be incorporated into project management are all issues and gap remain unknown that need to be explored further. As a result, these are the motivations behind this study.

1.4 Research Aims

The aim of the research is to investigate what extent digital technology is incorporated in project management and the main challenges adopting digital technology in project management.

1.5 Research Objectives

There are three objectives in this research:

a) To identify the benefits of digital technologies in managing project

b) To uncover how digital technology can be used in project management in actual situation

c) To identify the issues of using digital technology in project management

1.6 Research Method

This study takes a qualitative approach, focusing on semi-structured interviews to elicit opinions from chosen interviewees on using digital technology in project management. Interviewees who meet the requirements will be invited to the interview session, which will contain pre-requisitions such as more than 5 years of project management experience, using digital technology in project management, among other things. Each interview session were carefully transcribed and examined in order to obtain the most relevant data. Compiling, disassembling, reassembling, interpreting, and concluding are the five phases of the qualitative analytical procedure used.

1.7 Scope and Limitation of the study

The scope of this study is to focus on how digital technology being applied in project management and how it improves project management in a better way. Because of the pandemic outbreak, virtual meetings were chosen as a substitute for physical meetings; nevertheless, engagement can be less dynamic, and internet connections can go down at any moment.

1.8 Structure of report

Introduction, literature Review, research methodology, results and finding, discussions, as well as conclusions and recommendations, are the six chapters of this study. The introduction to this study is covered in Chapter 1. The background of digital technology's application in project management, as well as the research problem statement, are presented. In addition, this chapter outlines the research's goals and objectives. In addition, the research method is briefly described. The limitations of this study are also noted. This chapter comes to a close with a chapter outline.

Chapter 2 focus literature review on digital technology, application of social media in project management, application of artificial intelligence in project management, advantages of digital technology, trends and emerging practices in project management, COVID-19 Pandemic, project management during COVID-19 pandemic, application of cloud computing in project management and last but not least application of block chain in project management. The findings from the previous studies will be summarised in this chapter.

Moving on to chapter 3 which is research methodology, chapter 3 indicate the research method and the best suitable research design. Qualitative approach is adopted and purposive sampling is used sampling where particular interviewees are focused on, and semi structure interview is conducted to obtain in depth information from the interviewees. To get fresh and new information, all interview sessions will be transcribed, coded, a theme will be generated, and the data will be analysed.

Chapter 4 presents the findings and results of the analysed data. There are 5 main themes and 19 sub themes, identified in the analysis process. The main 5 themes are application of digital technology in project management, influence using digital technology, project management during the pandemic (COVID-19), challenges using digital technology in project management and last but not least future of digital technology in project management.

Chapter 5 extend the elaboration from the research analysis on Chapter 4. The chapter extract concerns from the research findings in Chapter 4 and discuss with the literature reviewed.

Finally, the conclusion in Chapter 6 reviewed the research findings. The outcomes of the discussions were summarised in this chapter. It also considers the implications of the research findings on the use of digital technologies in project management. In addition, future study recommendations will be covered in this chapter.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter establishes the framework for this study, which is the primary focus of the research described in this research project. Definition of Digital technology, application of digital technology in project management, application of social media in project management, application of artificial intelligence in project management, application of Big Data in project management, advantages of digital technology in project management, COVID-19, emerging trends and practices in project management and more were included and being discussed in this chapter.

2.2 Digital Technology

Digital technologies have gained prominence and have progressed rapidly in recent years as it plays a crucial part of our life where we use it as a daily requirement and fundamentally altering the way we work and live. Furthermore, the emergence of game-changing digital technology has sparked a frenetic race for any organization to embrace digital transformation and develop the kind of inventive strategy that generates growth that is more than incremental. According to The C-Suite Outlook, approximately 80% of firms have witnessed a significant transition employing digital

technology in the last year. Meanwhile according to the Accenture report, Operate Like a Disruptor, digital technologies will continue to disrupt the way both companies and workers work at a rapid speed, to the point that 65 percent of children today will engage in future employment which do not currently exist. Also, when new technologies emerge, they bring with them a variety of socio-technical difficulties and challenges (J. Chen et al., 2019; Khan & Bokhari, 2018).

Fitzgerald et al. (2014) defined digital technology as "social media, mobile, analytics, or embedded technologies that enable us to acquire new information, share ideas, communicate with one another, and so on. Digital technologies, such as computer-aided design (CAD), email, building information modelling (BIM), and web-based project management (WBPM) software, have evolved rapidly worldwide, according to Froese (2010).

According to (Sebastian et al., 2017), using digital technologies allows products and services to be integrated across functional, organisational, and geographic boundaries. As a result, digital technologies have accelerated the speed of change and resulted in considerable transformation in industries where companies have begun to use digital technologies in the workplace to boost productivity and efficiency. (Bharadwaj et al., 2013; Ghezzi et al., 2015)

Whyte & Lobo (2010) identified that digital technologies have played an important role in helping in communication enhancement, knowledge sharing, and greater engagement with stakeholders. It is essentially crucial to adopt digital technologies as they facilitate communication and enables better communication with stakeholder where stakeholders play an important role in any organization or project as they can affect or get affected by any circumstances.

On the other hand, Ibrahim (2013) describes digital technologies as innovations that able to support the project, for instance, construction procurement, management, etc can be facilitated through using digital technologies. Consequently, digital technologies such as the internet, mobile phone, the Internet of Things, etc. could reduce hassle ahead and able to empower the project team to work more effectively and productively.

Digital technologies are enabling employees—including project managers and project teams, to work with higher efficiency and productivity compared to the past where digital technologies do not exist. In the future years, there will be a shift toward a hybrid human/machine workforce, with machines performing routine activities while humans focus on higher-end tasks that demand critical thinking and teamwork, as well as the ability to create effectively. Therefore, in the next few years, investment in talent and training will be essentially crucial where each organization has to prepare themselves and their workforces for the next iteration of the digital age.

Furthermore, digital technologies can be used for relieving stress and anxiety purposes. For example, music is considered as music technology and according to (Chanda & Levitin, 2013; Gillen, Biley, & Allen, 2008; Juslin & Västfjäll, 2008; Koelsch, 2015) effects of music are the calming and stress reducing effects, simultaneously music can also influence stress-related emotional states like subjective concern, anxiety, sleeplessness, or anxiousness (Akin & Iskender, 2011; Cohen et al., 1983; Pittman & Kridli, 2011; Pritchard, 2009).

Also, it is one of the purposes to remain competitive in the market, for instance, effective customer service is strongly required in today's world, responding to customers' needs more quickly and forging stronger ties with them. Face-to-face interaction cannot be relied nowadays on as every second count, and if we do not assist customers immediately, they might turn away their interest towards others. Also, digital technology enable organizations to analyse a large amounts of data for deep insights and patterns invisible to the human eye, while predictive analytics can help managers identify problems before they occur and take preventive action since project is a temporary endeavour that full of risk and uncertainty (PMI, 2009, 2013).

Rapid advances in digital technology are fundamentally redefining our world. (V. Arribas and J. A. Alfaro, 2018) have found that the adoption of digital technologies has changed a few key business elements, such as strategic plan, business model, business operations, and organization structure, as it provides new opportunities for an organisation to not only accelerate its growth but also remain competitive. As a result, these recent research have revealed that digital technology will be the backbone of future competitiveness, bringing benefits to humans not only in terms of communication efficacy but also in terms of long-term sustainability.

2.3 Definition of project management

Everywhere we look, projects are underway, whether it is a recruitment of staff or construction to build a high-rise building such as Jeddah tower, etc. Every project requires a project manager to ensure its success, managing every aspect at every stage from planning to completion. Besides, in today's fast-paced world, many companies have commenced exercising project management to stay competitive or have the upper hand in the market, in terms of becoming more time and cost-based. Therefore, better project management is more effective to work and survive in the current competitive business world. (Lewis, 2007).

Managing a project is never an effortless task as according to Bakens (2010) “Project management is not easy regarding the complexity, uncertainties and a large number of activities involved, even in a single project environment. “The discipline of planning and execution requires project management skills and the objective of project management seeks to achieve specified results by using the plan, budget, timeline, etc. planned before. Therefore, project management skill is one of the essential skills that strongly demanded by organizations around the world (Stellingwerf and Zandhuis, 2013). Also project management has grown to become one of the fastest moving professions in the world (Prabhakar, 2008; APM, 2012; PMI, 2015).

Project management is the practice of applying knowledge, skills, tools, and techniques to complete a project and achieve the desired deliverables according to specific requirements as stated in the project charter as a project charter is a formal, typically short document that describes a project in its entirety which inclusive of objectives, processes, and who the stakeholders are. Furthermore, Kerzner (2003) has defined project management as the planning, organizing, directing, and managing of company resources for a temporary endeavour that has been allocated to complete a particular objective. Also, project management is about getting things done by ensuring involved shares and understand those aims before the first steps are taken. Project management is also considered as a research field with potentials of bringing different disciplines to focus on projects (Soderlund, 2004).

Project management processes can categorized into 5 processes groups. These five process group are:

2.3.1 Starting

2.3.2 Planning

2.3.3 Executing

2.3.4 Monitoring and Controlling

2.3.5 Closing

Project management has been there for thousand-year and can be traced as far back as the building of one of the seven wonders, the Great Wall of China. The great wall of China is one of the largest construction building projects and one of the recognizable symbols of China and the objective and purpose of building the great war is for protection from the Mongolian and Manchurian tribes, therefore it can be concluded that every project has a clear and defined purpose and project management has been started during that period, also project in the past had a dedicated team where the great wall was built over a period 20 years. Without a dedicated team and defined goal, it will never achievable.

Project management can be classified into two types, traditional and agile project management. A traditional approach is a direct approach where processes occur in anticipated sequence as planned before whereas agile project management is an iterative approach, promoting velocity and adaptability that assist the project team to deal with something unique in a challenging period. (Highsmith, 2004). Therefore, it is essentially crucial to adapt the most proper project management approach to be implemented, as each project deliverable is different, etc and Effective project management has become crucial to the sustainability of organizations (Brahm and Tarziján, 2015).

2.4 Advantages of Digital Technology

The rapid developments of digital technology have been providing many benefits such as transferring information, communication effectiveness, and multi-tasking. Specifically, there are several advantages of digital technology, first of all in the working environment. For instance, Digital technology has expedited communications in such a way that individuals can communicate with each other even face to face by using computers or mobile devices. Without digital technology such as a computer or

mobile devices, a conversation will be unlikely and hassle, consequently it will cause issues that not able to solve at the time.

Digital technology has proved to be beneficial to many organizations nowadays and it is extremely helpful to the current pandemic situation to reduce manpower in the office, to reduce the risk of infection, where the work from home method has been implemented and people have started to work from home or telework. Telework is described as people are working from different locations (such as from their home, not office) that enable workers to access their labour activities by the usage of information and communication technologies (Perez et al., 2003).

Through digital technology, the usage of innovative and modern methods can be enhanced in the implementation of tasks and functions. It is essential to communicate the needed information to the employees so that everyone in the team receives adequate and similar information and no one is left behind. When employees possess the needed knowledge, they will be able to enhance their productivity and without wasting time, depending on the individual. (Green & Singleton, 2013).

Also, through the use of digital technology, individuals can become more independent and are less dependent upon their supervisors, managers, and other individuals. Through digital technology, individuals can acquire a better understanding of the organizations and the progression of their work by getting the needed info from any reliable sources by checking on their laptops or tablets. It has led to an increase in productivity and efficiency on a large scale. The individuals can accomplish their tasks in an appropriate manner and at a rapid pace without depending on anyone. Moreover, digital technology has made employees to be even more productive (Lee, 2001) as they able to apply digital technology to address any arising problems immediately due to most digital technology is user friendly. For instance, a video conference can be conducted immediately to have a quick meeting to address any sudden issue that occurs on-site.

2.5 Disadvantages using digital technology

Digital technologies have progressed faster than any other breakthrough in history, reaching nearly half of the world's population in just two decades and altering society. Technology can help to level the playing field through improving connection, financial inclusion, trade access, and access to public services. However, there are a few issues with digital technology that should not be overlooked. For example, cloud computing's rapid development has heightened various privacy concerns (Ruiter & Warnier 2011). Previously, while information could be accessed via the internet, user data and applications were still stored locally, denying programme suppliers access to data and usage statistics. Both data and programmes are online (in the cloud) in cloud computing, and it's not always clear how user-generated and system-generated data are used. Furthermore, because data is stored in different parts of the world, it is not always clear which laws apply and which agencies might seek access to the data. Meanwhile, Big data can be used to characterize users (Hildebrandt 2008), resulting in patterns of common combinations of user characteristics that can be used to anticipate interests and behaviour. As a result of these derivations, inequitable treatment or discrimination may occur. When a user may be assigned to a specific group, even if only probabilistically, this can have an impact on how others act (Taylor, Floridi, & Van der Sloot 2017). Profiling, for example, could result in the denial of insurance or a credit card, in which case profit is the primary motivation for discrimination.

Moreover, using digital technology may results in counterfeiting and poses a hazard to people' safety in the form of commodities that evade safety standards and laws, as well as providing propellant for criminal activity (Staake et al., 2009; Li and Yi, 2017; Bosworth, 2006; Peitz and Waelbroeck, 2006). Last but not least, while using social media improves job efficiency, it also lowers productivity, for example, reducing attention, leads to sleep deprivation, and etc. Employees’ significant use of social media has led in a rise in loss of personal information, defamation, and misinformation, as well as employee solicitation, according to the report.

2.6 Trends and Emerging practice in project Management

In recent years, project management has undergone a significant change and evolution. For instance, project management is no longer only to achieve project deliverables with fixed resources and timelines but also to keep updated with the latest trends, to stay competitive, and provide the best solutions for the clients. Trends and emerging practice such as application of digital technology has gradually transformed project management into another dimension as the demand of connected and digital organization operating in disrupted and rapidly changing landscapes, and also due to the outbreak of coronavirus outbreak, transition needed to be performed where project management leader need to adapt to it and respond to these challenges.

2.6.1 Greater Dependence on Digital and Remote Teams

Project management, like other professions, is no longer confined to the four walls of a traditional office. Digital and remote teams are more prevalent than it's ever been, thanks to a variety of causes such as increased connection, shifting corporate ideals, and the rise of the gig economy. The outbreak of Coronavirus (COVID-19) pandemic forced an unprecedented shift in the predominance of remote work, which was already on the rise. To safeguard workers and prevent the transmission of disease, organisations all over the world have developed new work-from-home rules that prioritise digital communication over face-to-face communication, and this trend is likely to continue for many years. Video conferencing platforms, for instance such as Google MeetTM and Microsoft Teams, have seen considerable daily gains in users (Peters, 2020; Thorp-Lancaster, 2020). Furthermore, videoconferencing is likely to continue even after the pandemic has passed, as Gartner expects that only 25% of corporate meetings will be held in person by 2024. (Standaert et al., 2021). Last but not least, because VoIP technologies allow for real-time interaction involving sound, video, and often written text, they differ significantly from asynchronous (i.e., communication that occurs at different times) online interviewing methods (e.g., e-mail, IM, OFGs) and synchronous Internet methods (e.g., chat rooms). As a result, such technologies mimic aspects of face-to-face interviews (e.g., the ability to

convey and respond to verbal and nonverbal cues) while also presenting distinct benefits, problems, and considerations (Lo Iacono et al., 2016).

2.6.2 A Closer Connection between Project and Strategy

Project management is typically an organization technique for working toward and achieving defined goals, such as the introduction of a single product or service or the pursuit of a specific outcome. In this view, a project is a temporary undertaking with a defined beginning and finish, and the project manager's job is to see this through completion. However, in recent years, project management has emerged to play a significant role in many organisations. The paradigm is increasingly being extended to broader strategy and objectives, making project management more than just a tool for achieving specific goals. Consequently, emphasis on programme and portfolio management as a tool for implementing and managing strategy in an organisation is one of the current trends in project management. Therefore, understanding the link between project, programme, and portfolio management is critical.

2.6.3 Project Management and Change Management

An organisation can go through dozens, if not hundreds, of organization change per year. Minor changes to internal processes to complete overhauls of a company's products, services, supply chain, strategy, or structure are all conceivable. While this has always been the case, the emergence of the novel coronavirus has compelled many businesses to accept significant reform initiatives while still finishing old projects. Project managers are increasingly being tasked with overseeing not only their individual projects, but also the organization's change initiatives. According to the International Project Management Association's (IPMA) most recent Project Management Survey, 63 percent of organisations perform projects that include at least some type of change management. Only 30% of these organisations believe their change management capabilities are "very" or "very" effective, according to the same research.

2.6.4 Artificial Intelligence (AI) and Automation

It is usual for project managers to be managing multiple teams and projects these days. As a result, it's critical to manage time and effort wisely in order to fulfil all tasks. It is critical to have technology that can assist in this task in order to keep a Project Manager from being overloaded. The emergence of artificial intelligence (AI), machine learning, and the explosion of data collecting and analysis that has defined much of the twenty-first century will have an impact on project management, as it has on virtually every other business. Project managers dedicate a significant portion of their time to administrative duties such as resource allocation, project balance, schedule and budget updates, and other time-consuming but frequently insignificant tasks. Any administrative operation that is consistently repetitive, however, can be automated.

Artificial intelligence is capable of handling such duties with ease and provides Project Managers with the numerous advantages, for instance:

- It allows Project Managers to devote more time to the project at hand, allowing them to focus on more complex and time-consuming challenges.
- It allows Project Managers to spend more time overseeing and communicating with their teams, resulting in more efficient work and problem-solving.
- It helps in focusing more on team members, providing them a sense of support and creating a more pleasant working environment. More Project Managers will emphasize the well-being of their team members in 2020.
- It frees up Project Managers' time and energy to focus on meaningful communication with stakeholders, relationship development, problem resolution, and promoting strategic values.
- It enables Project Managers to focus their efforts and energy on tasks that benefit their organisation the most, allowing them to make a stronger impact and raise the likelihood of accomplishing each project's strategic goals.
- It allows Project Managers to devote more time to tasks that require a personal touch.

Many projects experience delays, which cause issues for both the team and the client. According to PMI's Pulse of the Profession study, less than half of all projects are completed on schedule. Artificial Intelligence (AI) can assist in this endeavour in the following ways.

- It has the ability to undertake predictive analysis. In essence, AI can watch how the project is progressing and so create project forecasts. It aids in the detection of hazards, bottlenecks, and abnormalities.
- Artificial intelligence can take over duties that are easily automated, such as reporting and scheduling. Data-driven reporting and scheduling will provide for real-time, unbiased project status, which will aid in directing the project in the proper path.

  Artificial Intelligence, in short, automates repetitive tasks, enhances project analysis, and boosts project execution efficiency. Artificial intelligence is being gradually integrated into project management processes in order to bring more strategy and data collecting to these processes.

2.7 The Emergence of Hybrid Project Management Approaches

The ineffective application of project management methodology results in poor project performance (McHugh and Hogan, 2011). Therefore, multiple of approaches have been adopted in recent year and one of it is known as the hybrid project management. The hybrid project management approach is frequently considered for projects in order to increase stakeholder feedback while decreasing risk and uncertainty (Archer and Kaufman, 2013; Jaziri et al., 2018). The hybrid approach is widely known as it combines the structure of traditional approaches with the flexibility of agile approaches (Smith and Lewis, 2011). Many difficulties in projects can be remedied by combining traditional and agile techniques (Archer and Kaufman, 2013; Baird and Riggins, 2012; Fewell, 2017; Salah et al., 2017).

By use of hybrid methodology is classified by the characteristics of project and its requirements (Fewell, 2017; Salah et al., 2017). Adopting a hybrid approach empowers for the testing of techniques from both the traditional and agile models

in attempt to optimise working efficiency (Fewell, 2017). Whereas a hybrid project model is a solution for both traditional and agile challenges, it is referred to as a "water-scrumfall." This is how the hybrid model came to be, by combining both traditional and agile methodologies to provide a solution for project failures (Bohem and Turner, 2004; Fewell, 2017).

In recent years, project managers and the organisations for which they work have become more adaptable in their approaches. Some have even integrated different methodologies to create hybrid approaches tailored to the needs of their particular project or industry. The growing usage of alternative project management methodologies such as Kanban, Agile, and Scrum, as well as changing corporate values that allow for greater flexibility, have all contributed to this shift.

2.8 Application of social media in Project Management

Social media technology has arisen in recent years and has played a significant role in today's communication. For instance, the most up-to-date information from around the world can be obtained by simply clicking or scrolling on social media. As a result, social media has been widely considered as making people's lives easier, bringing them closer online while physically separating them, and has become an indispensable part of our existence.

The term ‘social media’ refers to the various internet-based networks that enable users to interact with others, verbally and visually (Carr & Hayes, 2015). Furthermore, social media has helped to create social network communities and inspired a new style of working, including project communication, and has progressively turned project management into a new dimension, among other things.

(Jackson, 2010) has stated that social media facilitates the creation of knowledge, the interaction between individuals, collaboration, networking, and sharing. Also, Kaplan and Haenlein (2010) classified social media as a group of internet-based applications that create and exchange messages, images, videos, etc with just a click (Kapoor et al., 2018).

Rosa et al. (2016) discovered that more than 50% of organizations adopt social media when conducting project management, and Mutua (2013) identified that the application of social media tools such as Facebook, Twitter, and LinkedIn improved project processes and helped to circumvent issues. Instead of informing each project team member one by one, the project manager can use social media to disseminate information to everyone in the team. Furthermore, any unexpected issue can be rectified quickly, avoiding any unavoidable problems.

Communication is a critical part of the project management process throughout the whole project cycle. For instance, engagement with project team members, communication with stakeholders, etc is an essential part of the project as they play the most influential role in the project progress. (Harrin, 2010). Therefore, Remidez and Jones (2012) highlighted that social media can play a significant role in project communications. For instance, social media plays a crucial role in connecting and developing relationships among the project teams, sharing of info, keeping track of the project progress, and etc.

Also, Whited (2016) identified that social media has undeniably influenced and enhanced project team communication as the application of social media in project management is simplistic, quick, modern, and organized. Consequently, effective communication creates working atmosphere and feeling of responsibility (Ahimbisibwe, A. and S. Nangoli, 2012) and has a positive impact on work attitude, and leads to a better performance, and benefits the organizations. (Abugre, J.B, 2013).

Dolan (2013) highlighted by adopting social media in project, able to achieve its full potential in stakeholder engagement as one of the key benefits of using social media tools and proposed the necessity to develop appropriate policies to oversee the effective use of social media tools in projects. Social media is an effective way for organizations to reach stakeholder groups (Waters et al., 2009; Pelet, Ettis, and Cowart, 2017).

Also, social media can enhance communication effectiveness, promote good relationships, and build trust in the project team. (Remidez, H. and N.B. Jones, 2012). For instance, by using social media, the daily conversation can be done without seeing each other. Also, project team members' relationships can be improved by having a private group on social media, where they can share anything related or personal to

know each other better. Also, information will be disseminated to all project team members, ensuring everyone receives the same information without leaving anyone behind.

Social media could prevent any miscommunication, for instance, social media can keep history in a way verbal cannot, and also it allows every issue can be resolved through social media while dealing with project team members (Harrin, 2010). Miscommunication in any project may result in project failure, for instance lacking information will cause miscommunication among the project team, eventually will lead to negativity, and also distrust and low morale will result.

The ease and speed of information access, linked with richer experience for users, are some of the key benefits of using social media. (Jackson, 2010). For instance, all information can be shared, access, and being discussed in haste throughout the project life cycle, and there is no discrepancy among the project team.

The above research concluded that the application of social media has contributed to enhanced customer experience, as many scholars identified that communicating via social media tools can benefit customer relationships (Harrin,2010) and it eventually resulting in improved brand awareness, increased capability for information access and sharing (Kapoor et al., 2018).

2.9 Application of Artificial Intelligence in Project Management

In the twenty-first century, we live in the world where global transformations are continuously transforming our world at a quick speed. For example, artificial intelligence (AI) has drastically improved the efficiencies of our working area and has been capable of enhancing the amount of work that humans can complete. Also, Artificial Intelligence will have a significant impact on the future workforce, especially project management, due to AI's potential to perform functions formerly performed by humans. (Seedahmed, 2019). AI now has a firm footing in organizations' strategic decision-making processes. Five years ago, less than 10% of large companies had adopted machine learning or other forms of AI, but today 80% of them make use of the AI technology. Based on PWC survey, 85% of CEOs agree that Artificial

Intelligence will dramatically change their business over the next five years. Nearly two-thirds see AI as something that will have a larger impact than the internet.
Artificial intelligence (AI) has displayed an essential area of research in practically all disciplines, for instance, engineering, science, education, medicine, business, etc. (Halal (2003), Masnikosa (1998), Metaxiotis et al. (2003), Raynor (2000), Stefanuk and Zhozhikashvili (2002), and Wongpinunwatana et al. Furthermore, Artificial Intelligence has advanced tremendously in recent years, with AI capable of doing specialized tasks such as driving or parking a car, scheduling a meeting with a single click, combating misinformation, recognizing fake news, and so on. As a result, artificial intelligence has been hailed as the technology of the future, with the ability to have a significant impact on sustainability, climate change, and environmental challenges, as well as project management.

Artificial intelligence will soon be a part of future project management practice and will affect project management in a variety of ways. For example, AI will alter project management and the project manager's function in the future, among other things. By prediction by 2030, most than 50% of the work of today's project management discipline will be eliminated as AI will be succeeding traditional project management functions such as data collection, tracking, and reporting (Gartner, 2018). AI can be used in project management to analyses diverse types of data including 'big data with increased speed and dexterity in order to obtain actionable, concrete insights. As a result, project managers will have access to more and better quality data and insights, allowing them to increase decision-making speed, quality, and accuracy throughout the project lifecycle.

If Artificial Intelligence is used effectively, it may significantly decrease errors and boost employees' productivity. This is especially important in software projects, where problems can be spotted at any stage.

Artificial Intelligence has numerous tools which including Chatbots, Stratejos, ZiveBox, Rescoper, ClickUp, Clarizen, and PolyOne which support project managers in handling the different projects as each project varies. (Lahmann, Keiser, et al., 2018). For instance, AI assists the manager in developing the project team as well as in assigning tasks and duties to individual project team members (Butt, 2018). It is

essentially crucial to delegate a task to the qualified and right candidate to prevent any unwanted jeopardy and failure.

Additionally, AI tools assist project managers in effectively managing and complying with project deliverables and timelines in place to evade any project failures. For examples, by analysing huge amount of saved data, AI could assist estimate the amount of errors or overall quality in project management all through the project cycle. As a result, AI that can assist project managers can anticipate potential risks and delays, and, more crucially, AI could propose alternatives to have the project on schedule if it has fallen behind schedule.

Besides, there are various advantages that project managers can obtain from the application of artificial intelligence. First, AI provides support to project managers. For instance, AI can effectively manage scheduling, reminders, and follow-ups to eliminate any human input which is a time-consuming and repetitive process as AI is capable of saving humans time on their efforts by helping to ensure that nothing is overlooked. AI is also effective in providing project managers with an efficiency of results since the tasks performed using AI do not have mistaken and errors (McCarthy, 2007).

The use of AI in project management assist project managers in gaining insight and strategizing. For example, an AI tool can provide alternative or additional steps to project managers who are managing extremely tough projects, as project managers may become perplexed when managing a project because project deliverables may fluctuate from time to time. As a result of AI's support in project management, the project manager now has more options to choose from, allowing him to justify which solution is best for the project at hand.

Artificial Intelligence improves project quality and efficiency, therefore it has gradually increased project manager productivity by expanding their inventiveness while also increasing their emotional intelligence. (Abduh & Soemardi, 2002). AI's ability to analyse data, discern complicated patterns, and even provide strategic recommendations. This predictive technology can assist leaders in dealing with the rising complexity of strategic decisions by providing new views and insights to

consider, allowing firms to achieve a competitive advantage. (B. Libert, M. Beck, and M. Boncheck, 2017)

2.10 Application of Big Data in Project Management

Big data has risen in popularity in recent years, and it will have a significant impact on the workforce in the near, enabling a large volume of unstructured data to be managed without difficulties. Big data can be defined as massive volumes of data generated at a quick speed, recorded, and processed at a rapid rate. (Laney, 2001). As such, these data are difficult to process using existing technologies (Constantiou and Kallinikos, 2015). By adopting big data technologies, many individuals or organizations expect to obtain interests across many fields, such as e-commerce, e-government, science, health, and security (Chen et al., 2012). Consequently, data generated and stored in almost every industry and business area increase significantly in recent years (Jin, Wah, Cheng, & Wang, 2015)

Also, Big data is regarded as being a sequence of a process by which companies seek competitive advantage staying competitive, and seeking more business opportunities (Davenport et al.,2012; Davenport and Kudyba, 2016; McAfee and Brynjolfsson, 2012). Furthermore, big data is thought to improve an organization's or operation's effectiveness, such as maximising supply chain flows, determining the most advantageous and competitive pricing for both products and services, choosing the best and talented employees for specific jobs and tasks to minimize risk, reducing errors and quality dilemmas, and so on. (Chen et al., 2012; Davenport, 2006; McAfee and Brynjolfsson, 2012).

Furthermore, the use of big data technology has brought numerous insights and benefits in project management. Big data technologies, for example, enable project managers to identify chances for making better decisions that result in successful projects. The organization can make better-informed decisions by evaluating the narrower scope and enormous unstructured data, which will eventually lead to more successful initiatives and interests. Additionally, the project team's spirit can be enhanced, and the project will not encounter any unexpected setbacks. Big data has a

significant impact on project and resource management, ranging from lowering project costs and increasing project efficiency to optimising resource allocation.

Also, applying big data such as data analysis leads to overcoming project complexity. For instance, having inadequate knowledge of information to make decisions is harmful to any business and eventually will cause huge impacts such as loss of profits, failure, and customer dissatisfaction. Therefore, it must be handled well as nowadays many managers must deal with uncertainty and complicated problems, however, if they can uncover digital material using the right tools to perceive the project's problems, then they can decrease the complexity of the project (McAllister, 2018).

Big data is perceived as a new tool mitigating project complexity. (Ginevri, W. & Guerini, M, 2013). The Project Management Institution (PMI) – PMBOK Guide defines projects as "A temporary endeavour undertaken to create a unique product, service, or result" (PMI, 2012, p.3), therefore every project is varied in terms of scope, schedule, budget, handling, etc. Also, the complexity of a project has created poor performance, cost, and schedule delays (Kennedy et al. 2011, and big data technologies are the prospect in shaping a project into a better method.

The use of Big Data can shape the future of project management performance in various ways.

2.10.1 Planning and delivery

Planning and delivery activities are typically carefully recorded, allowing for the collection and analysis of data. As projects get more technologically advanced, collecting and analysing Big Data related to planning and delivery becomes easier. The volume of information available to a large or projectized business could assist in conducting analysis and developing insights on how to redefine internal planning processes and parameters to do things in innovative and exciting ways. Consolidating planning and delivery-related Big Data across industries, economic sectors, and geographies could help to accelerate the creation of new planning and delivery frameworks and techniques. To summarise, Big Data may have a substantial impact on future project and delivery efforts.

2.10.2 Project Team Environment

A considerable amount of data about the project team members is created on a regular basis. This includes project management experience in current and prior organisations, as well as project team members' abilities, education, and training courses, performance evaluation, and the size and composition of teams with which they have worked. In addition, additional data on the team working environment is documented, such as conflicts, their solution, team member turnover, leadership, and team performance. These pieces of information, when reorganised and analysed using Big Data, might provide information and insight on how to structure teams more efficiently, how to develop optimal level team size and arrangement, the skills required by teams for handling future projects, the development of scalable leadership, and capability building within the organisation for the management of future complicated projects. That means that all risk incidents must be recorded. Similarly, as risks occur and become Concerns, the firefighting and troubleshooting operations required to address the new problems are meticulously documented. As a result of this method, a great amount of data is generated that can be examined to improve risk and issue management.

2.10.3 Knowledge management

A substantial amount of information is collected as part of knowledge management activities, both in project and corporate organization, in this era of pervasive usage of internet and related technologies. On a regular basis, such information is processed and transformed into knowledge. This information could come in the form of records, lessons learned, practice guidelines, troubleshooting, and real-time firefighting information. However, it is typically the case that this knowledge is not exploited to its full potential, and instead ends up in archives. People look for new projects due to the rapidly changing of project management, while archive information remains buried in information sources. Big Data can analyse this crucial data to forecast future advances and growth in the field. We could discover new ways to deal with problems and obstacles, develop best practices, and develop new technologies to work more efficiently by using Big Data technology.

2.10.4 Risk and Issue management

Project management is a highly dynamic processing paradigm influenced by a wide range of circumstances. Risks must be resolved when they become concerns in order

to reduce their negative influence on project delivery. Project teams must continuously analyse and prioritise risks as a matter of prudence. There is a definite need to develop new methods, procedures, and techniques that will gain higher acceptance among project team members, allowing the newly developed procedures to be used more effectively to address risks and obstacles. These objectives can be achieved with the use of big data as big data helps to identify and forecast risk and can be used in project management to spot suspicious activities in real time and prevent future losses.

2.11 Application of Cloud Computing In Project Management

The Cloud Computing paradigm is fast growing rapidly, and it shares technologies with Grid Computing, utility computing, and distributed computing. By connecting the cloud application to the network, cloud computing allows users to store and access cloud data from anywhere. (L.M.Vaquero, L.Rodero-Merino, J.Caceres, and M.Lindne, 2008).

The advantage of using cloud computing is that it allows team members to communicate more easily and allows the client to participate in project management. Rather than the implementation of new IT solutions, such an understanding of project implementation is a new style of teamwork. National Institute of Standards and Technology (NIST) has defined cloud computing as a prototype for enabling convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction," (Brown, 2011).

The following are some of the advantages of cloud computing for project management (Asava & Mzee, 2010):

a) Sustain large complex projects that were previously difficult to manage due to a lack of collaboration, development, or network capacities within an organisation.

b) Facilitate the parsing of multiple transactions in a highly distributed environment made up of multiple providers to be available in real-time and aggregated in an appropriate manner.

c) Allows real-time collaboration between globally dispersed team members, customers, and vendors.

d) Enables faster staging, set-up, and take-down of a variety of development environments as needed to test/validate an application.

e) Allows real-time project management software to be used with a wide range of web-based tools.

These are advantages that are special to project management. There are also some more general advantages to cloud computing.

a) It will result in increased resource sharing, economies of scale, architectural uniformity, and process optimization (Gartner, 2008).

b) Realize project cost savings by implementing projects with agility and speed. It helps projects to save capital expenditures while increasing operational efficiency (Gartner, 2009).

c) Allow users of IT-related services to concentrate on the benefits of the services rather than how they are created or hosted (Gartner 2008b). Utilize cloud computing's near-instant agility, flexibility, and reach to dynamically access anything or anybody, as well as the near-infinite diversity of potential capabilities originating from composite applications and components (Gartner, 2010).

2.12 Application of Block chain in project management

In recent year, block chain technology has the potential to become a game- changing technology in the management and commercial worlds. It is critical for businesses to understand the impact and risks of block chain technology adaptations and implementations in order to gain and maintain economic advantages. Without a doubt, such new technology will have a direct impact on the traditional project management process. Block chain technology has the potential to increase project life cycle efficiency. The core qualities of block chain, such as auditability and transparency,

create a trusting environment between project teams, senior management, and shareholders, allowing individuals and organisations to act quickly and confidently. Through systematising reconciliation, record keeping, and fundamental management tasks, block chain technology can assist project management offices and their shareholders, freeing executives from extra challenging and value-added operations (Julia Kokina, 2017). Digital record storage, digital asset exchange, acceptable conduct assurance, reputation development, and intelligent contract execution are five areas where block chain technology helps with project management. Project managers using block chain technology will be able to use automation to expedite their transition from passive operators controlling scope, expenses, and agendas to active, adaptive partners leading and implementing big projects. Meanwhile, block chain technology has the potential to enable a new generation of distributed platform technologies, which could assist enhance project productivity in the future (Alain Yee Loong Chong, 2019)

Benefits of block chain in project management

2.12.1 Lowers Risks: Because the project manager is participating directly, it helps to lower risk, correct errors, and keep projects on track.

2.12.2 Efficiency: Because all parties engaged must communicate through the block chain system, the dialogue is limited to only topics related to the project.

2.12.3 Project Manager: The project manager will maintain things under control by utilising block chain technology. They will have access to all information and will be able to react as circumstances change. To make transactions more efficient, the block chain can manage them all.

2.13 Project management during the COVID-19 pandemic

The recent COVID-19 outbreak is an international health epidemic that has leaders all around the globe concerned about the well-being and livelihoods of their citizens. The pandemic's economic difficulties are only getting worse, causing a lot of concern about the future. Meanwhile, due to pandemic, many countries have imposed stay at home policies and face-to-face interactions have been limited as many organisations implement full-time work from home policies or teleworking to contain virus transmission (Chong, Huang, and Chang, 2020). Almost every employee who is affected by changes in the workplace is stressed (Sutherland and Cooper, 2006). Apart

from that, projects have been delayed by worker absenteeism, supply-chain disruptions, and decreasing investor confidence, which have all had an impact on capital projects. Consequently, this shift in work has had a significant impact on project management. Several initiatives have continued to operate in the present pandemic scenario while adhering to confinement and physical distance restrictions. Others had to slow down or perhaps cease some of their operations momentarily. A delay or halt in project execution, on the other hand, can have a huge economic impact on businesses and governments. Agile project management is a key management strategy that tries to help organisations react to change (Bergmann and Karwowski, 2019). Another important takeaway from the pandemic is the need to improve ability to deal with uncertainty and unpredictability, as well as to become more adaptable and flexible, and to enable rapid innovation.

Furthermore, project manager must develop a plan that stratifies risks, defines action triggers, and provides guidance on what to do in the face of changing policies. They can more quickly identify threat levels and advise their personnel now that they have this system in place. Flexibility is a project manager competency, according to Turner (2004): 'The project manager should be given the flexibility to deal with unforeseen circumstances as they arise, with the owner offering guidance on how the project should be performed in the best possible way.' Flexibility can be defined as the ability to make irreversible decisions more reversible or to postpone irreversible decisions until new information is available (Olsson 2006). In addition, the project manager should think about how to emerge from the catastrophe stronger and more resilient. Larger expenditures in modern digital technologies may be able to assist. Smart technologies, Internet of Things-connected assets and worker monitoring, augmented reality, and labour and process automation are just a few of the emerging technologies in the business, and project management as well. At this pandemic period, project managers must be adaptable and flexible as project managers are leaders, and it is critical to be conscious of the team's mental health as a project leader. The risks and implications of COVID-19 on the project should be discussed openly and honestly with project team members, stakeholders, and clients at this time. Maintaining open channels of communication with employees and stakeholders is crucial. A risk management plan is needed to identify and mitigate existing and future risks as a project is a short-term undertaking to create a one-of-a-kind product or service (Project

Management Institute, 2004). Risk management includes processes for identifying and mitigating project risk, as well as risk management planning, monitoring, and control (PMI, 2004). Risk monitoring is required throughout the project execution phase to maintain track of identified risks, monitor residual risks, discover new risks, and verify risk strategies are followed (PMI Standards Committee, 2004).

2.13.1 COVID-19 (Coronavirus)

The unprecedented 2019 Coronavirus outbreak has affected the world's financial and social health. For instance, people around the globe have been suffered losses of jobs, life, etc. Therefore the World Health Organization (WHO) has declared the Covid 19 as a pandemic and it is one of the deadliest pandemics in history. The first case was identified in Wuhan City in the central province of China in early December 2019. To date, the deadly disease has spread all over the world infecting millions of people and causing hundreds of thousands of deaths [case fatality rate (CFR): 6.25%, John Hopkins Coronavirus Resource Centre, accessed 7 May 2020]. As of 25 May 2021, more than 168 million cases confirmed worldwide.

The Symptoms of COVID-19 are unpredictable, varying from mild symptoms to severe illness. Everyone might experience differently but there are few types of general symptoms which inclusive of include headache, (Islam Ma, 2020) loss of smell (Saniasiaya J, Islam MA, 2020) and taste, (Saniasiaya J, Islam MA, 2020) nasal congestion and runny nose, cough, fatigue, fever, breathing difficulties, etc. Besides, there are positive cases without symptoms, and it called it as asymptomatic symptoms.

The virus is transmitted mainly via the respiratory way, for instance when an infected person breathes, talk, cough, sneeze or sing. Small particles will be released from their nose or mouth, therefore the victim nearby will inhale droplets and particles that infected people release from the mouth or nose in a small particle while they breathe, talk, cough, sneeze or sing. Also, the closer people interact, and the longer they interact, the more likely they are to transmit COVID-19, but infection can occur over longer distances, particularly indoors. Therefore, social distancing is being practiced such as to keep 1m away apart from each other and to put on face mask has become a necessity that covering both nose and mouth

all the time and prohibited to remove it while in the public area. (Feng, S. et al, Lancet Respir, 2020)

COVID-19 is not solely a global pandemic and public health crisis, but also it has critically affected the global economy and financial markets. For instance, many individuals have been facing pay cuts and retrenchment of jobs, disruptions in the transportation, service, and manufacturing industries are among the consequences of the disease mitigation measures that have been implemented in many countries. The most impacted industries such as the tourism industries have been hit massively due to the closure of international borders and concerns of infections, people are just too afraid to travel at this period. Tourism has been a crucial sector of the international economy and has contributed approximately 29 percent of the world's services exports and provide up to 300 million jobs globally in 2019. Therefore, it is an essential source of income and employment for all countries as most countries are depending heavily on tourism as tourism contributes a part of the national GDP. However, due to the virus, tourism has been in a deteriorating situation since the beginning of the pandemic and the retrenchment of employees is still increasing daily. (UNWTO, 2020).

In order to mitigate the burden of infection and to reduce the surging of cases, numerous mitigation measures have been implemented to combat the devastating coronavirus disease 2019 (COVID-19) pandemic, including widely adopted social distancing, lockdown, and practicing wearing a facemask. (Sintema, 2020) has identified that the locking down of country and staying home strategies are the required action to flatten the curve and control the transmission of the deadly disease which seems uncontrollable for the time being. Also, international and domestic travel have been restricted, closed schools and nonessential businesses, and strictly limited public gatherings. (Anderson, R. M., Heesterbeek, H., Klinkenberg, D. & Hollingsworth, T. D, 2020).

CHAPTER 3

RESEARCH METHODOLOGY

3.1 Introduction

This chapter will explain the methodology used in this research. This chapter will go into every aspect of the research, including the research design, research instrument, and sample procedure. Finally, this chapter goes through the chosen mode of analysis as well as the data gathering method in detail. In Vivo codes then analyze the interview transcripts. The quotes are then re-examined and re-assembled in accordance with the themes. The use of a tabular arrangement, as shown in Appendix B, facilitates data recombination. As qualitative approach was adopted in this research project and the aim was to explore new ideas in depth and gain fresh knowledge therefore interview session was conducted to collect data where data was expressed in words and through interpretations. Interview was used to explore the views, experiences, beliefs, and motivations of individual participants. Semi-structured interviews were conducted where semi-structured interviews inclusive of a lot of specific questions that help to define the areas to be explored while also permitting the interviewer or interviewee to deviate to pursue an idea or response in greater depth. The interview was conducted via zoom meeting due to current pandemic situation where physical meeting was discouraged to reduce the spread of the virus. Personal interviews have the advantage of involving personal and direct contact between interviewers and interviewees, as

well as eliminating non-response rates; however, interviewers must have developed the necessary skills to successfully conduct an interview (Fisher, 2005, Wilson, 2003).

3.2 Research Design

Anthropological and sociological adjustments can be traced back to the beginnings of qualitative research design. Cultural investigations, constructivism, natural inquiry, phenomenological inquiry, postmodernism, post positivism attitude, and post-structuralism are some of the terms used to describe the qualitative line of inquiry. (Schwandt, 2001) Qualitative research, as per Shank (2002), is "a kind of systematic empirical enquiry into meaning" (p. 5). Also, Qualitative research, according to Denzin and Lincoln (2000), uses an interpretive and naturalistic approach: “Qualitative researchers investigate objects in their natural environments, aiming to make sense of, or interpret, phenomena in terms of the meanings people assign to them” (p. 3). Similar to quantitative research, qualitative research is demanding, disciplined, systematic, and it often delivers a practical alternative approach to quantitative research techniques (Randy & McKenzie, 2011).

This research used interview technique to collect data, and semi structured questions will be asked as Semi-structured interviews include a series of important questions that help outline the areas to be investigated, but also allow the interviewer or interviewee to deviate in order to dig deeper into an idea or response. Open ended questions were asked during the interview session to gain additional information or knowledge that were never been discovered before. Also, the respondents were allowed to express their views and perception freely on the application of digital technology in project management as there was no restrictions. Therefore, it has provided a better understanding and something unique which was unlikely to be achieved by numbered data obtained through statically methods in quantitative research.

3.3 Research Instrument

To elicit responses from the interviewees, an interview was chosen as a study instrument. The semi-structured interview was guided by a list of interview questions as shown below.

Sequence of Interview	Main Interview Questions and Probing Questions
1. Greeting	Commence the interview session with a polite greeting
2. Background Introduction	Next, begin the 1st question by asking about the interviewee's background, experience in project management
1. Do you use digital technology in your work (Managing a project)?	-If answer is Yes, request respondent to share more: For instance: Where do you use at? What kind of digital technology being applied (EG: social media, Artificial Intelligent etc.) -If answer is No, request reason.
2. How does digital technology influence you?	Experience (Giving a real-life experience, example, how, why being influenced
3. How the work was carried out during the pandemic? Could you	a) What has changed differently compared before the pandemic.

share some of your experience during the hard time?	b) Work from home method being implemented, how does work from home looks like, any differences? c) Project facing issue, as everyone is forced to stay at home during the lockdown, what issue? How did you resolve the issue by using digital technology? (Share)
4. What are the challenges applying digital technologies while managing a project?	Example a) Network issue (Describe precisely, line coverage is poor, expensive, etc.) b) Privacy c) Productivity
5. Any suggestions for digital technology application in Project management in the future /any comments (advice)	Example: How to use digital technology effectively in project management?

The questions were identified from the reviewed literature, and five main questions were prepared for the interviewee to answer. It was a semi structured question where interviewees were asked a series of predetermined but open-ended questions to explore their thought, therefore their views were expressed freely in their own term without concerning on it. Follow up questions had been asked to collect fresh and new knowledge to explore the research question and objective. Data was collected through note taking and zoom meeting due to current pandemic situation, face to face interview was discouraged, therefore new platform, for instance zoom session was adopted as a substitution to face to face meeting.

3.4 Research Sampling

3.4.1 Sampling Technique

The sampling technique practiced in this research project was purposive sampling where particular interviewees were focused on. Purposeful sampling is a qualitative research technique for identifying and selecting information-rich situations to make the most efficient use of limited resources (Patton, 2002). Considering the nature of the research design and objectives and goals, the purposive sampling approach may prove to be beneficial when just a small number of persons can serve as primary sources of data. Only participants with experiences on project management and applying digital technologies were interviewed to provide in depth and detailed information on the above research question. As a result, before being invited to the interview session, these two criteria must be fulfilled.

3.4.2 Saturation

Saturation was defined as the moment at which no new clinical experience touchpoints, codes, categories, or themes were identified. (Fusch and Ness, 2015, Walker, 2012) When there is enough information to replicate the study (O'Reilly & Parker, 2012; Walker, 2012), when the ability to gather more fresh information has been gained (Guest et al., 2006), and when further coding is no longer viable (Guest et al., 2006), data saturation has been reached (Guest et al., 2006). Based on table 4.2 and 4.3 below, data saturation has been experienced after 7th interview conducted as there were not fresh data identified after the 7th interview.

3.5 Data Collection procedures

To begin, selected interviewers were contacted via email and invited to participate in an interview session. All were scheduled for a Zoom meeting based on their preferred time and date. Because face-to-face interviews were not possible due to the ongoing pandemic, a virtual meeting was chosen for safety purposes and time saving

reason. All interview session was recorded, and all interview sessions were transcribed precisely into word. Verbatim transcription was used as every single word, including pauses, emotional expressions like laughter, stuttering, and hesitations like "oh" were written down. Changes were done if the audio quality is poor or if the conversation needs to be clarified.

Following that, all qualitative data or information was coded to identify different themes and their linkages. In Section 3.6, we'll go through how data is analyzed in more depth.

3.6 Data Analysis Method

Thematic analysis was used to analyses the collected data once all the transcripts were completed. Thematic analysis was used as it is suitable for finding out about people's experiences, views, and opinions and simultaneously able to identify the themes that crop up repeatedly within the data. There were five steps in analyzing the data.

3.6.1 Familiarization

The first step is to get a thorough overview of all the data collected before start analyzing individual items. Recorded audio and notes go through several times read to get familiar with it.

3.6.2 Coding

The second step is to go through the transcript of every interview and highlight everything that jumps out as relevant or potentially interesting, and after that all data are collated together all into groups identified by code. In qualitative research, coding is "how you define what the data you are analysing are about" (Gibbs, 2007). Each transcript is read several times in order to determine the line-by-line code. Inductive coding, also known as open coding, was used to generate codes from scratch based on the qualitative data. Following that, the created code is categorised, with more than 10 themes and over 100 codes first identified before being reduced to the final 5 themes and 19 subthemes.

Table 3.1: List of themes and subthemes

Theme	Subtheme
Application of Digital technology in project management	Conduct meeting
	Info sharing
	Scheduling work
	Decision making
Influence using digital technology	User friendly
	Convenience
	Acquire new skills
	Better communication
Project Management during the pandemic	Lesson learnt
	Contingency plan
	Flexibility
	Risk Management Plan
Challenges using digital technology in project management	Network issue
	Productivity
	Privacy and security
	Digital counterfeit
Future of digital technology in project management	Embrace
	Training
	Adoption

3.6.3 Generating theme

This phase entails examining the codes and collected data to identify significant broader patterns of meaning (potential themes). It then entails compiling data relevant to each candidate theme. In each session, more than 100 codes were highlighted, and each code was made, and patterns among them were found, and themes began to emerge.

At this stage, some of the codes were too imprecise or irrelevant (for example, because they don't show frequently in the data), and that they should be eliminated because they were unrelated to the research aims and did not

contain the data that needed to be assessed. Other codes may develop into their own themes.

3.6.4 Reviewing theme

This phase involves comparing the candidate themes towards the dataset to ensure that they tell a convincing story about the data and address the research questions. Themes are typically refined during this phase, which may include splitting, combining, or discarding them. As a result, there were five main themes identified, each of which had a subtheme, for a total of 19 subthemes.

3.6.5 Defining and naming themes

This phase entails conducting a thorough analysis of each theme, determining the specific focus of each theme, and defining the ‘story' of each. It also entails selecting an informative name for each theme.

3.6.6 Writing up

This final phase entails weaving the analytic narrative and data extracts together, as well as contextualizing the analysis in accordance with specific literature. The result and finding will be presented and any odd or unexpected patterns or trends that arose because of the analysis will be discussed in respect to the research problem. After then, the findings will be compared to those of other studies, or the studies will be used to back up a claim to be presented in Chapter 4.

CHAPTER 4

RESULTS AND FINDINGS

4.1 Introduction

This chapter discusses the findings from the semi structure interview data. Seven qualified interviewees were selected and undergone the interview session.

4.2 Finding of interview

Seven interview sessions were carried out, with all of them being primarily experienced in the project management field and well knowledgeable in project management skills. Saturation has been achieved as there were no more additional information discovered. Below Table 4.1 shown the position, years of project management experience, and position.

Table 4:1:Interviewee profile

Interviewee	Sector	Position	Project management experience
A	Oil & Gas	Superintendent	20 years
B	M&E	Project service Engineer	8 years

C	Manufacturing	Project Manager	10 years
D	Oil & Gas	Assistant Regional Manager	7 years
E	Trading	Project Manager	10 years
F	Manufacturing	Project Manager	10 years
G	Oil & Gas	Assistant project manager	5 years

During the compiling phase, transcriptions of the interview contents were prepared and attached. All the seven interview transcripts are available in Appendix A.

4.2.1 Application of Digital Technology in project management

Table 4.2: Application of digital technology in project management

Interviewee	**A**	**B**	**C**	**D**	**E**	**F**	**G**
Conduct meeting		✓	✓		✓	✓	
Info sharing	✓	✓	✓		✓	✓	✓
Scheduling work			✓			✓	✓
Decision making	✓			✓			

Based on the table 4.2, there were four application of digital technology being applied in project management and each data was interpreted respectively.

Digital technology was applied in project management to conduct a meeting. Four of out of seven interviewee which were interviewee B, C, E & F applied digital technology to conduct meeting in project management.

Firstly, interviewee B shared that he used digital technology to conduct meeting and shared that he had been using zoom meeting since last year and have found it to be very useful, convenient and shared his thought below:

"I've been using Zoom meetings since last year and have found them to be very useful and convenient. I believe that everyone is now using Zoom, which has recently become popular for meetings and discussions. Zoom meeting was extremely convenient

because I could easily have a discussion with my colleague by sharing my screen and presenting the project progress that we encountered throughout the day."

In the meantime, both interviewee C and F shared the same idea about using digital technology to conduct virtual meetings since one of the benefits is that they don't have to travel far to hold a meeting, and virtual meetings have made meetings easier. Both interviewee C and F has shared their thought below:

"I used Zoom to have meetings with clients from other countries to discuss on certain project progress. It is much more convenient and reduce hassle."

Interviewee F added:
"It is used for meetings. Even before the pandemic, I used Skype for Business to host a meeting with clients from other countries, as it would be absurd to travel from Malaysia to the United States for a brief appointment."

Meanwhile, based on the table the second application of digital technology in project management was sharing info. In project management, 6 out of 7 interviewees used digital technologies to share information. All six interviewees indicated that information may be easily disseminated within the project group. Additionally, one of the advantages was the time savings, and it was possible to avoid disseminating incorrect information.

Besides, digital technology was applied in project management to schedule work. Based on the above table 4.2, interviewee C, F& G had been using digital technology in scheduling works.

Interviewee C& G mentioned that they used digital technology to schedule work, tracking purposes and AI was used in project for scheduling work, as well as other activities, and that no human participation was required. Below is what interviewee C has to say:

"AI system is used to handle scheduling, reminders, and follow-ups effectively, expelling the need for human intervention."
Interviewee C statement was supported by Interviewee F and he added that:

"Digital technology is used in a variety of methods, including scheduling work, keeping track of requests and vacation time, analysing labour needs, and reducing needless admin."

Last but not least, digital technology was used in project management for decision making purpose. Based on the table, interviewee A and D used digital technology for decision making purposes.

Interviewee A shared that by using digital technology could provide better decision making as:

"AI enables project management to provide more insights into possible outcomes, and subsequently decision making be much easier."

Also, the above view was supported by interviewee D by added that:

"Using AI technology to revolutionise project management, organisations may reinvent the role of PMPs. They will be in charge of more than just tracking project progress and deliverables. Rather, project managers of the future will be involved in strategic decision-making with assistance of AI technology."

4.2.2 Influence using digital technology

Table 2.3: Influence using digital technology

Interviewee	A	B	C	D	E	F	G
User friendly		✓			✓	✓	✓
Convenience	✓	✓	✓	✓	✓	✓	✓
Acquire new skills			✓				✓
Better communication	✓	✓		✓	✓	✓	✓

According to the table 4.3, there were four influences using digital technology. Each data was interpreted respectively.

First of all, interviewee B, E, F, and G were influenced by digital technology, with user friendliness being one of the factors. Each interviewee B, E, F& G has shared their view about it.

Interviewee B has shared that using digital technology is user friendly and information can be gained in a quick way. He stated:

"Any information is obtained quickly by accessing the Web, clicking on the things you want to understand exactly or tasks can be addressed immediately without hassle and user friendly."

The following three interviewers E, F, and G supported Interviewee B's standpoint, and each of them had shared their own view.
First of all, Interviewee E supported and shared that digital technology is user friendly, and shared his thought below:
"In many ways, for example, digital technology has become deeply ingrained in our lifestyle, and we use it on a daily basis as it is user friendly and convenient. It has become a necessity for us in recent decades."

Meanwhile, interviewee F shared that:
"Digital technology's main qualities and benefits are its user-friendliness and convenience. As you can see, there are no age constraints nowadays; even my parents, who are in their seventies, are proficient at using a mobile phone and have a social media account."

Lastly, interviewee G has shared that:
"I would say it is user friendly, convenient, and most importantly time saving. Info dissemination is much easier, faster and efficient."

Also the most noticeable was according to the table, all interviewees A,B,C,D E, F, and G stated that they were influenced by digital technology, with convenient being one of the factors. Info acquiring, communication was much easier using digital technology.

Furthermore, based on the table 4.3, two interviewees C and G were influenced by digital technology as they were able to learn new abilities through it. Both interviewees C and G developed a unique skill set as a result of their exposure to digital technologies.

Interviewee C has shared that he learnt to bake during the lockdown by watching YouTube video, he stated:

"I've recently picked up baking as a new skill. I decided to learn to bake during the lockdown because it was so boring at the time. So I spent hours learning how to bake on YouTube, and it was an unforgettable experience. It had been a lot of fun and a lot of excitement." Also, I managed to earn some money selling cakes during the pandemic.

Lastly, interviewee G has shared his view below:

"During the lockdown, I was so bored at home, and that time I learned how to make video content. It was tough, challenging as I was a newbie and did not have any experience on that. I took this opportunity to learn to shoot, edit and make video content."

Last but not least, the second most noticeable factor. According to the table, all interviewees A, B, D E, F, and G except C stated that they were influenced by digital technology, with better communication being one of the factors.

4.2.3 Project Management during the pandemic (COVID-19)

Table 4.4: Project management during the pandemic (COVID-19)

Interviewee	**A**	**B**	**C**	**D**	**E**	**F**	**G**
Lesson learnt	✓			✓		✓	
Contingency plan		✓		✓	✓		
Flexibility	✓	✓	✓	✓	✓	✓	✓
Risk management plan			✓		✓		✓

According to the table 4.4, there were four ideas or awareness were shared on how project management should be conducted during the pandemic.

Based on the table, interviewees A, D, and F have shared what they have learned to manage a project during the pandemic. Each interviewee has expressed their own point of view.

Firstly, interviewee A has shared that the pandemic has disrupted most of the way of living, working and project management as well. He stated that work from home should be continue and digital technologies should be adopted frequently:

"Also, another point that I would like to share is this pandemic has totally changed the way of living and working, same goes to project management. Therefore, I would like to advise that work or project should be conducted frequently using virtually and try to reduce human interaction. This is the lesson learnt we should bear in mind."

Interviewee D added by stated being resilience, flexible and endurance were the lesson learned gained to manage project during the pandemic:

"For me, what the pandemic has taught me was, to deal with continuous adversity, we need resilience, flexibility and endurance in managing a project during the pandemic, and adopting digital technology is the solution."

Lastly, interviewee F added being adaptable and flexible to surrounding were the lesson learned gained to manage project during the pandemic:

"This pandemic has taught me to be more adaptable and flexible of my surroundings at all times."

Meanwhile, each interviewee B, D, and F have a shared contingency plan that is needed as a backup or guide plan to keep the project from failing, as shown in the table. Their point of view were shared below.

According to interviewee B, the project was able to be carried out by using zoom meetings as a substitute for physical meetings, which were not permitted during the pandemic. His statement was shared below:

"Fortunately, contingency plan, plan B such as Zoom Meeting, which is widely trendy, was adopted to connect all project team members together and provide an update on the project's progress. "

Meanwhile, interviewee D has supported by stated:

"Development of a contingency plan, for example, how work will be carried out during a lockdown, so virtual meetings will replace present physical meetings, and email and WhatsApp will be the communication channels."

Lastly, interviewee F added that a contingency plan should be developed to address the priorities:
"A flexible contingency plan should be established to handle the priority, as managing projects in difficult times is difficult. In this pandemic moment, acting swiftly is critical to keeping the project on track and identifying any hazards."

Based on the table 4.4, all interviewees agreed that flexibility was critical in managing projects during the pandemic because the pandemic had created so much disruption. As a project manager or project individual, he should be flexible in handling projects during this difficult period and he can't be too rigid or inflexible.

Last but not least, based on the table 4.4 , interviewee C, D and G has shared that risk management plan should be developed to identify future risk in project management and how to address it in a proper manner.

Firstly, interviewee C has shared that:
A risk management plan should be created to identify and mitigate existing or future risks in order to be a successful project manager. A risk plan should be developed, with the risk plan emphasising specific risks associated with integration, interactions among project team members, and assumptions about serving clients.

Also, interviewee D has shared that:

"Risk management plan should be developed to identify new risk, For example, if coronavirus is a newly identified risk in the project, what will be the risk management technique and how will it be addressed? For example, wearing a facemask is required at all times, temperature scanning is required at all times, and what will happen if one person becomes infected? As a result, it must be explained clearly and precisely."

Last but not least, interviewee G has shared that:
"Risk management plan was developed, for example, if the project could not be completed on time. So, what is going to be the solution? So, prior to the lockdown, I held a meeting with the clients to reaffirm some agreements regarding jobs that cannot

be completed after the pandemic. Before the shutdown, for example, the client requested that the project be completed in the 16th month. However, due to unforeseen circumstances, the project will take longer to complete, possibly after the lockdown is released."

4.2.4 Challenges using Digital Technology in project management

Table 4.5 : Challenges using digital technology in project management

Interviewee	A	B	C	D	E	F	G
Network issue	✓	✓	✓	✓	✓		
Productivity		✓	✓	✓	✓		✓
Privacy and security	✓					✓	✓
Digital counterfeit						✓	✓

Based on the table 4.5, there were four challenges encountered using digital technology in project management. Each data was interpreted respectively.

The first challenge encountered was a network problem, and according to the table, five interviewees had encountered the similar problem while using digital technology to manage a project. When there is no connectivity, nothing can be done because digital technology need a network connection to function.

The second challenge encountered was a decrease in productivity, which five interviewees had experienced, according to the table 4.5. One of the key reasons was the implementation of the work-from-home approach, which required many job operations to be conducted digitally. As a result, adopting digital technology in project management has resulted in low participation and distraction.

Interviewee B has shared that there was a low in engagement using digital technology:

"For example when having a discussion with a team member, I couldn't feel their engagement throughout the discussion and productivity has been declined slightly, and it can be difficult not to say something face to face at times."

Meanwhile, interviewee C also added that engagement was low with the project team:

"I do not always feel engaged with the team. Sometimes I'm not sure if they're listening or not, if they're paying full attention or not, and this varies greatly when compared to a physical meeting."

Interviewee D stated that:

"But to speak the truth, there was a decrease in productivity when digital technology is used in project management work from home method was introduced."

Last but not least, interviewee E added that:

"Furthermore, I believe there will be a decrease in production. Because most of us are working from home during the lockdown, I've noticed that some of the team members aren't performing their best work and aren't responding to group messages. This can get a little annoying at times."

The third challenge that came up was privacy and security, which interviewees A, F, and G expressed concern about it. Interviewee A stated that while using digital technology in project management, personal accounts such as yahoo and Hotmail can be hacked, and project data can be hijacked, resulting in a significant loss for the company. Furthermore, interviewee F stated that there are a lot of fraudsters these days, and that clicking on an unusual file could result in data loss, including project data. Lastly, interviewee G has shared another view that hacker might seek for ransom after stealing important data for example project data, etc.

Interviewee G has shared his concern on privacy and security using digital technology in project management:

"On privacy and security, as there are a number of scammer issues that we must be aware of today. After stealing project data, it can be a big issue, and hacker might seek for ransom or some other benefits."

The last challenge using digital technologies in project management could lead to digital counterfeiting issues. Interviewees G and F expressed their opinions on the concern, with interviewee G suggesting that someone might clone someone's signature in order to obtain confidential information. Below is what interviewee F had to say:

"Digital counterfeiting is a major challenge; for example, some hackers may copy someone's signature and seek confidential material. The hackers may clone the

signature of your company's director and request information, and the person who provides the information will immediately share it because the director requested it but didn't even realise it was the hacker. This act may cause the company to lose a significant amount of project data and result in further failures."

Lastly, interviewee G has shared his personal opinion and below is what interviewee G had to say:

"There have been multiple cases of digital counterfeiting, in which someone impersonates another's signature in order to obtain something. Meanwhile, falsified documentation will place the project's future in jeopardy."

4.2.5 Future of digital technology in project management

Table 4.6: Future of digital technology in project management

Interviewee	A	B	C	D	E	F	G
Embrace	✓	✓	✓		✓	✓	✓
Training				✓	✓		✓
Adoption			✓	✓		✓	✓

Based on the table 4.6, each interviewee has shared their thoughts, view on the future of digital technology in project management.

Six out of seven interviewee except interviewee D has suggested that digital technology should be embraced in project management. Interviewee A, E, F and G has shared that digital technology should be embraced as digital technology is a tool that able to facilitate job progress and reduce hassle, improve project success rate, etc. Besides that, interviewee B shared that by embracing digital technology in project management, more and more tasks will be executed using digital technology and repetitive tasks will be performed using digital technology as well. Below is what interviewee B had to say:

"We must embrace that digital technology is the future of project management; as more and more tasks will be executed using digital technology and repetitive tasks will be performed using digital technology as well."

The second suggestion given was training should be provided so that more personnel is well equipped with digital technology, and project can be managed easily.

Interviewee D, E and G has shared their opinion respectively and interviewee D shared that training on digital technologies should be provided to the employees frequently and each employees will be developed to higher stage. Meanwhile, interviewee E shared that each project varies, and when training is provided frequently, project team able to keep them up. Below is what interviewee E had to say:

"Another suggestion is that project team members receive training on a regular basis to keep them up to date on current trends. Because each project is different and distinct, it is critical to give the team with the most up-to-date digital technology training."

Last but not least, the last suggestion given was digital technology should be adopted in project management. 4 out of 7 interviewees had suggested that digital technology should be adopted in the future of project management as each interviewee has shared it views on it. Interviewee C shared that by adopting digital technology in project management, it reduces hassle and project can be managed easily. Meanwhile, interviewee D shared that by adopting digital technology in project management, it allow the company to stay competitive, improve and stay one step ahead.

Last but not least, both interviewee F and G shared that by adopting digital technology in project management, it improves efficiency, increases transparency, provides better customer experience, employee engagement, and culture, saves time and costs, increase transparency among the project team and facilitate project progress. Below are what interviewee F and G had to say:

Interviewee F shared that by adopting digital technology in project management, it allows:

"Digital technology should be adopted as it improves efficiency, increases transparency, provides better customer experience, employee engagement, and culture, and saves time and costs."

Meanwhile, Interviewee G supported interviewee F by quoted that:

"I would suggest digital technology should be adopted as it improves project efficiency, increases transparency among the project team, facilitate project progress, etc."

There were five identified themes and 19 sub themes analyzed in total, and as a result there were findings discovered in each interview session to be discussed further in the

next chapter. The findings were compared with the previous study to provide a fresh and more in-depth findings.

Table 4.7 displays the five identified themes and 19 sub-themes.

Table 4.1: Themes and sub-themes of interview transcripts analysed

Theme	Subtheme
Application of Digital technology in project management	Conduct meeting
	Info sharing
	Scheduling work
	Decision making
Influence using digital technology	User friendly
	Convenience
	Acquire new skills
	Better communication
Project Management during the pandemic	Lesson learnt
	Contingency plan
	Flexibility
	Risk Management Plan
Challenges using digital technology in project management	Network issue
	Productivity
	Privacy and security
	Digital counterfeit
Future of digital technology in project management	Embrace
	Training
	Adoption

CHAPTER 5

DISCUSSION

5.1 Introduction

The purpose of this chapter is to interpret and describe the significance of discovered findings in relation to what was already known about the research problem being investigated.

5.2 Discussion for each themes

5.2.1 Application of digital technology in project management

The results reported in the previous Chapter 4 indicated that first of all digital technology was applied by all interviewees in project management and digital technology was not something strange to the interviewees. For instance, digital technology was used in project management to conduct meeting, info sharing purpose, and scheduling work and last but not least for decision making purpose. This has shown that digital technology has play an important role in project management and emerged rapidly.

Based on the table 4.2 on chapter 4, more than 50% interviewees had used digital technology to conduct meeting. The main reason was using digital

technology to conduct meeting is way more convenient, free of charge, time saving and they do not have to travel just to have a meeting.

Meanwhile, 6 out of 7 interviewees revealed that they had used digital technology in project management, as it is very convenient and allow them to share info easily into the project team. The data contributed a clearer understanding that in accordance with the reviewed literature where (Jackson, 2010) quoted that the ease and speed of information access, linked with richer experience for users, are some of the key benefits of using social media.

Besides that, interviewee C, F and G used digital technology in project management for scheduling work. Scheduling work was much way easier using digital technology such as artificial intelligence as AI can examine the historical data it has gathered since the commencement of the project. The system then leverages this information to generate insights and efficiencies in the scheduling process. The finding indicated that there was a correlation between the literature review and the following:

a) AI can effectively manage scheduling, reminders, and follow-ups to eliminate any human input.

b) Artificial intelligence can take over duties that are easily automated, such as reporting and scheduling. Data-driven reporting and scheduling will provide for real-time, unbiased project status, which will aid in directing the project in the proper path.

Finally, it was revealed that interviewees A and D had used digital technology in project management to make decisions. Artificial intelligence (AI) has given project managers access to more information and insight, allowing them to make better decisions. As mentioned in the literature, AI can be used in project management to analyses diverse types of data including ‘big data with increased speed and dexterity in order to obtain actionable, concrete insights. As a result, project managers will have access to more and better quality data and insights, allowing them to increase decision-making speed, quality, and accuracy throughout the project lifecycle. The finding was consistent with the stated literature as AI is increasingly being used to augment decision-making processes at all levels, including top management (S. Raisch, S. Krakowski,

2021), also to support further, AI technology able to assist leaders in dealing with the rising complexity of strategic decisions by providing new views and insights to consider, allowing firms to achieve a competitive advantage. (B. Libert, M. Beck, and M. Boncheck, 2017).

5.2.2 Influence using digital technology

Based on the table 4.3 on chapter 4, it indicated that all interviewees were influenced using digital technology.

First of all, interviewee B, E, F and G had shared they were influenced using digital technology due to one of the factor was user friendliness. This finding was correlation with the literature review stated that digital technology has made employees to be even more productive (Lee, 2001) as they able to apply digital technology to address any arising problems immediately due to most digital technology is user friendly.

Secondly, all interviewees had shared they were influenced using digital technology due to convenience. The result shown that digital technologies had provided convenience in many aspects, for example: gaining info, ease of communication were two major conveniences. Meanwhile, as found in the previous studies: Fitzgerald et al. (2014) defined digital technology as "social media, mobile, analytics, or embedded technologies that enable us to acquire new information, share ideas, communicate with one another, and so on.

Based on the table 4.3 on chapter 4, it indicated that interviewee C and G were able to acquire new skill from the influence using digital technology. It shown that both interviewee C and G were able to acquire new skill from using digital technology for instance: cooking, editing video, and etc.

Last but not least, based on the table 4.3 on chapter 4, all interviewees except C were influenced using digital technology due to that communication was much way enhanced, convenient by using digital technology. This finding is in accordance with the reviewed literature review which Kaplan and Haenlein (2010) classified social media as a group of internet-based

applications that create and exchange messages, images, videos, etc. with just a click (Kapoor et al., 2018).

5.2.3 Project management during the pandemic (COVID-19)

Project management during the pandemic was difficult, according to the in-depth interview. Due to the pandemic, most interviewees were forced to work from home and compelled to use digital technologies to continue the project. Based on the table 4.4 above, interviewee A, D and F had revealed they had gained lesson learnt during the pandemic on how to manage project. Being resilient, adaptable to situation, and flexible were the lesson learnt gained. This finding was correlated with reviewed literature where project managers must be adaptable and flexible as project managers are leaders, and it is critical to be conscious of the team's mental health as a project leader.

Meanwhile, interviewee B, D and E revealed that contingency plan should be created in project management during the pandemic as the contingency plan can be used as a guidelines to manage the priorities or swift to another plan to keep the project on track. The finding was correlated with the reviewed literature where project manager must develop a plan that stratifies risks, defines action triggers, and provides guidance on what to do in the face of changing policies.

Besides that, all interviewees had strongly indicated that being flexible is extremely essential while managing project during the pandemic. Due to pandemic, there were many disruption such as working from home, supply chain disruption, movement restrictions, therefore it is important to be flexible. The finding was correlated with the reviewed literature where flexibility is a project manager competency, according to Turner (2004): 'The project manager should be given the flexibility to deal with unforeseen circumstances as they arise, with the owner offering guidance on how the project should be performed in the best possible way.

Last but not least, interviewee C, E and G revealed that risk management plan should be created in project management during the pandemic as it identify and mitigate existing or future risks. The finding was in accordance with the reviewed literature where risk management includes processes for identifying and mitigating project risk, as well as risk management planning, monitoring, and control (PMI, 2004) and due to project is a temporary endeavour (PMI, 2004), Risk monitoring is required throughout the project execution phase to maintain track of identified risks, monitor residual risks, discover new risks, and verify risk strategies are followed (PMI Standards Committee, 2004).

5.2.4 Challenges using digital technology in project management

The above table 4.5 shown that there were few challenges using digital technologies in project management. The first challenge was network issue and network issues were unavoidable, according to interviewees A, B, C, D, and E, who had experienced multiple disruptions while using digital technology in project management. When there is a network disruption, the majority of them are unable to continue working and are forced to wait until the network is restored. Therefore, future research is recommended to further investigate this issue.

Meanwhile, interviewee B, C, D, E and G revealed that using digital technology in project management has caused low productivity. The finding shown that when work from home policy was implemented, and employees were working from home. They were distracted using digital technology as they spend much of their time on the mobile phone, etc. From the past studies shown using digital technology such as social media might reduce attention, leads to sleep deprivation while working.

Besides, another challenge encountered was privacy and security. Interviewee A, F and G has revealed that using digital technology in project management might lead to several issues on privacy. For instance: personal account can be hacked and scammer might hack and steal important info from

the personal computer. Also, by opening an unknown file might lead to losses of confidential info to unknown parties. This finding was consistent with the reviewed literature where stated cloud computing's rapid development has heightened various privacy concerns (Ruiter & Warnier 2011). Furthermore, past studies shown that employees' significant use of social media has led in a rise in loss of personal information, defamation, and misinformation, as well as employee solicitation, according to the report.

Last but not least, there was another challenge, digital counterfeiting to contend with. Hackers may replicate someone's signature in order to gain access to specific secret data, according to interviewees F and G. In addition, a hacker may generate a forged paper in order to gain approval, putting the project in peril. As mentioned in the literature, when new technologies emerge, they bring with them a variety of socio-technical difficulties and challenges (J. Chen et al., 2019; Khan & Bokhari, 2018).

5.2.5 Future of digital technology in project management

Based on the table 4.6 above, all interviewees except interview D revealed that In the future, project management should embrace digital technology as more tasks will be performed using digital technologies, it increase productivity and reduce hassle. This finding was in accordance with the reviewed literature where by prediction in 2030, most than 50% of the work of today’s project management discipline will be eliminated as AI will be succeeding traditional project management functions such as data collection, tracking, and reporting (Gartner, 2018).

Meanwhile, interviewee D, E and G shared that training on digital technology should be provided as to keep them updated and stay competitive, as more and more company has made transition to digital age and more projects are handled using digital technology. This finding was correlated with the reviewed literature that artificial intelligence will soon be a part of future project management practice and will affect project management in a variety of ways. For example, AI will alter project management and the project manager's

function in the future, among other things. Also, in the future years, there will be a shift toward a hybrid human/machine workforce, with machines performing routine activities while humans focus on higher-end tasks that demand critical thinking and teamwork, as well as the ability to create effectively. Therefore, in the next few years, investment in talent and training will be essentially crucial where each organization has to prepare themselves and their workforces for the next iteration of the digital age.

Last but not least, interviewee C, D, F and G had revealed that digital technologies should be adopted in project management as it increase transparency among the project team, increase communication, reduce hassle and etc. As mentioned in the literature, (V. Arribas and J. A. Alfaro, 2018) have found that the adoption of digital technologies has changed a few key business elements, such as strategic plan, business model, business operations, and organization structure, as it provides new opportunities for an organisation to not only accelerate its growth but also remain competitive. Also, Dolan (2013) highlighted by adopting social media in project, able to achieve its full potential in stakeholder engagement as one of the key benefits of using social media tools and proposed the necessity to develop appropriate policies to oversee the effective use of social media tools in projects.

5.3 Summary of findings

5.3.1 Application of digital technology in project management

Based on the finding, there were similar findings with the previous studies, for example, digital technology is used in project management for scheduling purpose, conduct meeting, provide better insights for decision making and last but not least, information sharing to the project team. Therefore, it shown that digital technology is a growing trend in project management, and most project tasks are done digitally.

5.3.2 Influence using digital technology

Based on the finding, there were similar findings that can related to the previous studies, for example there were few factors using digital technology such as better communication, convenience, and user friendly. A new fact discovered was using digital technology able to acquire new skills. Interviewee C mentioned that he learned to bake by watching YouTube videos, which allowed him make some extra money during difficult times. As a result, this new data indicates that digital technology has had a significant impact, has evolved over time, and has improved people's lives.

5.3.3 Project management during the pandemic (COVID-19)

Based on the finding, there were findings that similar to the previous studies. For example, being agile, flexible is a must while managing a project during the pandemic. Also, as per found, contingency plan and risk management plan should be created to address potential and existing risk. Aside from that, a new fact has been discovered: digital technology is the platform or tool that will allow the project to proceed during the pandemic. For example, during the pandemic, the majority of employees worked from home to curb the spread of the virus, and the project had to be completed in some way. Consider the possibility that without digital technology, the project would be jeopardised, resulting in greater retrenchment. Therefore it shown that we should counted on digital technology more than ever, as digital technology solutions can help not only project, but also businesses stay open while reducing the transmission of the coronavirus.

5.3.4 Challenges using digital technology in project management

There were findings that similar to the previous studies, as digital technology has posed many challenges in project management. When there is a network problem, for example, an employee is unable to perform his job as normal, causing a difficulty in project management. Apart from that, the use of digital technology in project management has raised concerns about digital counterfeiting and privacy security. Therefore, a new fact discovered was we can’t completely relying

solely on digital technology in project management even though digital technology facilitated project progress.

5.3.5 Future of digital technology in project management

There were findings that similar to the previous studies, where more and more organizations adopted digital technology in project management. Also, from the previous studies shown that by prediction in 2030, most than 50% of the work of today's project management discipline will be eliminated as AI will be succeeding traditional project management functions such as data collection, tracking, and reporting.

CHAPTER 6

CONCLUSION & RECOMMENDATIONS

6.1 Introduction

This chapter will be presenting on conclusion and recommendations being found on the previous chapter.

6.2 Research findings

The application of digital technology in project management has been identified as a growing trend in this study. The majority of interviewees said that using digital technology in project management reduced their workload, made task progress easier, and so on. They shared that most tasks can be completed quickly, such as using digital technology to disseminate information to the project team with a single click, and making decisions is much easier, as when digital technology such as AI is used in project management for decision making, AI can provide more consistent decisions by leveraging datasets. As a result, it is clear that digital technology plays a vital role in today's project management, with more project employees and organisations relying on it.

Meanwhile, the interviewees perceived that digital technology is a must-have in project management since it is user-friendly, convenient, and serves as a tool

for better communication. They also stated that, in the future, digital transformation in project management is a must to remain competitive, make project tasks easier, and provide organisational benefits. Also, it was found that most of them were acquainted with digital technology, and most of them believed that it enhanced project progress and elevated project management to a new level.

Aside from that, most of the interviewees stated that they were forced to stay at home during the COVID-19 outbreak and had to switch to a different approach to keep their project continuing, which was using digital technology. To address any concerns that arose, a face-to-face meeting was substituted by a virtual meeting such as zoom meeting or skype. Furthermore, throughout the pandemic, the work-from-home system was adopted, and the majority of project duties were completed utilising digital technology, such as WhatsApp and email, which were used for communication, job monitoring, and other purposes. Therefore, they realised that digital technology was a powerful tool that taken a quantum leap in project management, as there was quick shift and likely to stay in the long term.

Last but not least, despite the fact that digital technology has played a major role in project management, there had been certain challenges with using it. The majority of interviewers concluded that the most important issue was a network problem, which is inevitable. Furthermore, they had an issue with low productivity because most employees were easily distracted by their phones, causing them to produce low-quality work and finally, the most serious issues using digital technology in project management were digital counterfeiting and privacy, both of which might lead to a disastrous project. In conclusion, the research aim and objectives listed in the introduction chapter are fulfilled.

6.3 Research Contribution to the field

There are a few takeaways from this study that can be used to support people's beliefs about using digital technology in project management. To begin with, incorporating digital technology into project management has been a developing trend, and digital technology has offered numerous benefits to project

management, as well as easing many of the challenges. Many businesses have begun to use and embrace digital technology, and more will experience digital transformation in the coming years, indicating that digital technology is the future of project management and should not be underestimated.

Second, the study revealed that digital technology has been integrated into project management as well as our daily life. During the pandemic, all of the interviewees stayed home, and the pandemic changed the world. The majority of them acknowledged that digital technology was the key to keeping everything operating. Physical meetings, for example, were forced to become virtual meetings, and working from home became the norm. They realised how strong digital technology can be as a response to the pandemic, as digital technology provided benefits in terms of organising, executing, and delivering project deliverables during the pandemic. Meanwhile, such as the fact that most businesses should acknowledge the value of digital technology and devote more resources or priority to it. Many of these changes are likely to continue even after the pandemic, as the pandemic aided in the acceleration of the digital transformation and created a competitive environment that will continue to stimulate innovation and technological adoption in the future.

6.4 Research Limitations

Some aspects of the literature review have been missed. For example, in addition to how digital technology might benefit project management, the downsides of employing digital technology should be investigated further, and the interviewee's perspectives should be sought in deciding whether or not digital technology should be used in project management. These will provide a better insights for further studies.

6.5 Recommendations for further studies

This study shows that digital technology plays an important role not just in our daily lives, but also in project management. Applying digital technology in project management has been found to be far more effective, save time, and aid project progress. However, there are still concerns about difficulties involving digital technology in project management, as discussed in Chapter 4, therefore challenges involving digital technology in project management can be researched further in future studies to get new information.

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APPENDICES

Interview guide

Sequence of Interview	Main Interview Questions and Probing Questions
1. Greeting	Commence the interview session with a polite greeting
2. Background Introduction	Next, begin the 1st question by asking about the interviewee's background, experience in project management
1. Do you use digital technology in your work (Managing a project)?	-If answer is Yes, request respondent to share more: For instance: Where do you use at? What kind of digital technology being applied (EG: social media, Artificial Intelligent etc.) -If answer is No, request reason.
2. How does digital technology influence you?	Experience (Giving a real-life experience, example, how, why being influenced

3. How the work was carried out during the pandemic? Could you share some of your experience during the hard time?	a) What has changed differently compared before the pandemic. b) Work from home method being implemented, how does work from home looks like, any differences? c) Project facing issue, as everyone is forced to stay at home during the lockdown, what issue? How did you resolve the issue by using digital technology? (Share)
4. What are the challenges applying digital technologies while managing a project?	Example a) Network issue (Describe precisely, line coverage is poor, expensive, etc.) b) Privacy c) Productivity
5.Any suggestions for digital technology application in Project management in the future /any comments (advice)	Example: How to use digital technology effectively in project management?

Interview Transcript Sample

APPENDICES

APPENDIX A: Interview Transcript Samples

Interview: A

Transcribed: 14 July 2021

Me: Good evening Mr. A, thank you for accepting the interview session.

Mr. A: Hi Nigel, no problem.

Me: It is tough to conduct a physical meeting nowadays due to concern on the pandemic. We are just too afraid to get infected.

Mr. A: Yes, certainly. COVID-19 is getting severe now.

Me: Yes, without further ado, can I start the interview session?

Mr. A: Sure, I am ready for the interview.

Me: Ok, my first question will be, can you share me some of your background and experience in project management?

Mr. A: I graduated with a degree in Mechanical Engineering in 1984, and I have joined oil and gas sector at the age of 26, and presently I have been with the company more than 30 years, and I have more than 20 years' experience in project management.

Me: Could you share with me more on your working experience.

Mr. A: Currently, I am assigned as superintendent at O&G Sdn Bhd, and I am responsible for leading pre-mobilization discussions with contractor to ensure work is planned efficiently and executed in accordance with company safe work performance expectations, work management practices, project requirements and specifications. At the same time, I have to ensure that the approval fabrication work plan, technical procedures, specifications and codes are properly implemented. Also, I am involved in reviewing work, procedures including checklists as required for the work in accordance to project management systems and ensure material movement as per MMF (material transfer form), MR

(material request) and inventory (MMIL – master material inventory log) are in place and up to date.

Me: Besides that?

Mr. A: At the same time, I have to implement and lead material inventory audit. Also, I am accountable for interface with project engineers/contractor on any changes to project specifications and requirements utilizing the EMEPMI Quality Manual Procedures (Site technical query, NCR). Monitor and manage work scope variations due to design changes or additions to work scope after appropriate approval with contractor.

Me: You must be extremely busy then.

Mr. A: Yes, so I have to manage my time well.

Me: How do you manage your time and how to stay effective throughout the day?

Mr. A: Every day I will set goals and objectives to be achieved. For example, I will prepare a task list to be completed daily, also I will set the priorities, what are the things that require me to address on first, and what can be done later. Besides, being organize is one of the key to stay productive also. I will write down the deadlines for projects, or for tasks that are part of completing the overall project. So, basically this is how I stay effective throughout the day.

Me: That's great. My next question will be do you use digital technology in project management.

Mr. A: Yes.

Me: Could you share a few example?

Mr. A: Email is used all the time while working as Email is the formal communication at O&G Sdn Bhd. Every morning, I will check my email to check out if there's any missed out email from offshore, as over there, on the offshore platform, we work 24/7 and fast communication is needed all the time to prevent any bad happens.

Besides, I have few WhatsApp's group team, for example I have project group A and group B. So, it allows me to communicate with them separately, without mixing them together and disseminate the important information to the right group.

Me: Any more information to be added?

Mr. A: Also, info sharing can be done, I can send any pictures, videos, or any recorded audio to the project group. Any latest information on the project status can be gained immediately on WhatsApp.

Me: Are you familiar with Artificial Intelligence, and Big Data?

Mr. A: Based on my working experience, Artificial Intelligence helps a lot in project management. For example, using AI tools able to automate most unnecessary task, for example, when there is repetitive jobs, using AI based tool will perform the jobs for planning to data collection, and therefore we don't need so many manpower of doing it. At the same time, AI enables project management to provide more insights into possible outcomes, and subsequently decision making be much easier. Also, AI is also effective in providing project management with relevant results and decision making because tasks performed by AI are far superior to those performed by humans.

Me: I see, that's great. How AI impact on project management?

Mr. A: I would say AI is the future of project management. First of all, AI works by mixing large amounts of data with fast, iterative processing and intelligent algorithms, also it makes real-time analytics possible and more efficient. Also, it provides real data on risk scoring, forecasting, status updating, issue, and change management. AI can also include real-time data, for example, it can be used in reviewing prospective contracts to predict potential unseen risks based on previous project performance.

Me: Do you think AI will replace the role of project manager?

Mr. A: Absolutely nope, AI is a tool to help the project manager to facilitate his jobs, and to make his job easier. AI can perform very specific tasks

well, but even then, they occasionally need to be managed by a human. We still need human being to run and get the job done.

Me: Can you share some examples why AI cannot replace the role of project manager?

Mr. A: First of all, AI cannot communicate like human beings. Managing a project requires a high level of communication skills and AI cannot perform the task as project manager does. For example, a project manager knows every single individual of his project team member well, therefore it will be much easier for him to communicate, and to get along with them. Also, machine does not have a feeling or emotion, so they will not get intimidated or annoyed, so it will be bad sometimes when there is no input to grow.

Me: Ok, I agree with you. I will move on to the next question. How does digital technology influence you?

Mr. A: In many ways, for example communication is much way easier nowadays compared to the old days. Over the years, communication has changed dramatically, as we went from having no technology and having to send letters to someone, to having everything at the touch of our hands. Communication has changed so much over the years. There are now telephones, social media, computers, and email; which makes communication easier. Life has been made pretty much easy because of these inventions. Making a phone call or sending a text around the world or even across the state is as simple as eating. Besides, information can be acquired easily nowadays compared to the old days.

Me: Could you give me some experience that how digital technology has influenced you?

Mr. A: The development of digital technology has grown rapidly and digital technology has become part of my life and I have used it daily for communication, entertainment, working etc. For example, I used it to communicate with my project team member to discuss on work purposes, to update the bosses what are the progress daily. It is very

convenient, that's the main point. At the same time, I used it to listen to songs and watch some videos that is relaxing during my off day, so I would say it has become a necessities to me, and I believe most of us rely heavily on digital technology nowadays. But somehow, using digital technology such as social networks also have a negative impact, one of the adverse effects is growing laziness of a person to meet people directly when interacting because too comfortable using social networking. It makes people more anti-social, and too relying on social media. Therefore, in long term will be detrimental to the society and public health. I would like to give you some example: In Japan, half a million people live as modern-day hermits. They are known as hikikomori, recluses who withdraw from all social contact and often don't leave their houses for years at a time. They will be staying at the room playing video game, and reading comics. I would say this is a disease needed to be mitigated as young people tends to get influenced easily by social media, and they spend most of their time surfing on the internet and believed the sources from website easily without analysing it. Therefore, it is important to have a balance at doing anything, before we put ourselves in difficult situation.

Me: Yes, I have read some of the news in Japan also. How scary it was. Mr. A, can you share your thoughts on how digital technology grow laziness of a person?

Mr. A: You see, digital technology has led to laziness and grow unproductive due to its added conveniences, keeping us from unlocking our full potential. For example, with digital technology, it makes our life easier. We can just buy anything from online website, we can do anything, reading e-news and get any information from website. As you can see, people nowadays prefers the easy way, so if they encounter something difficult, they might choose to evade or avoid it. Another example will be grab food and food panda is getting popular in Malaysia, every day we can see there are so many of riders on the road, sending food. So, from there, people is lazy to cook nowadays and relying heavily on

digital technology as they can get their meal done by just ordering through the respective apps.

Me: Yes, agreed with your statement.

Mr. A: So, I would like to say, it is important to be balance, doing anything we must be balance, must not overdoing it.

Me: Yes, certainly. My next question will be how project was carried out during the pandemic? What are the changes compared to before the pandemic happens. Could you share some of your experience during the hard time?

Mr. A: Just for your information, Oil and gas sector was allowed to operate during the lockdown (MCO 1.0), and offshore site still operate as usual, project was still ongoing at that time. During the pandemic, we have reduced manpower to 60% instead of full force complying with the SOP enforced by the National Security Council.

Me: What are the changes being implemented during the pandemic?

Mr. A: I was working from home during the lockdown, and we have implemented using zoom meeting as a substitution to physical meeting to oversee the daily operation. I would say it was tough at that time as I was not allowed to go the offshore at that time, and luckily there was few of my team members were there to monitor on the progress, so there was no much of issues at that time. Digital technology has really help a lot during the pandemic.

Me: Could you share more on how digital technology helps to manage during the pandemic.

Mr. A: Try to imagine that if there is no digital technology, there will be no such thing as work from home, and I believe that retrenchment will be way more severe not only in Malaysia, whole world will be suffering from the pandemic. With digital technology, it provides flexibility and I am still able to work from home and monitor ongoing project remotely. Besides, if there is any uprising issue in the project, I am still able to hold a meeting virtually to address the issue, keeping the project

ongoing. Luckily, I am still able to work during the pandemic, and it keeps me occupied. I will go crazy staying at home doing nothing. Also, another point that I would like to share is this pandemic has totally changed the way of living and working, same goes to project management. Therefore, I would like to advise that work or project should be conducted frequently using virtually and try to reduce human interaction. This is the lesson learnt we should bear in mind. For example, physical meetings are being replaced by virtual meetings, reporting is no longer done face to face, and everything can be done via email, and so on. As we cannot rely on physical meetings, being adaptable and adapting to new situations is required. As a result, I must be flexible and seek out a new option, which is a virtual meeting to keep the project moving.

Me: Yes, agreed with that.

Mr. A: Certainly.

Me: How did you interact with clients during the pandemic?

Mr. A: Mostly done using zoom meeting.

Me: My next question will be what the challenges are applying digital technologies while managing a project.

Mr. A: There are number of challenges, when network disrupted, all work tend to stop as we are too dependent on digital technology. For example when network is bad, we will lose of focus and concentration and subsequently we will stop working. The second challenge will be O&G Sdn Bhd is one of the world's largest publicly traded international oil and gas companies and there are some rules that we have to comply with. For example, we have to use company laptops and our ID needs to be with company ID address account. Every single employees are disallowed to use company laptop for personal business. Furthermore, there is a concern where personal account such as yahoo, Hotmail also can be hacked. All files in your computer will be gone. Even worse if there is any important project data or video, company may suffer a huge

loss. There was one time our company lost millions because been attacked by hacker's cyber-attacks, ransom ware etc. They have impersonated someone and accessed to company system and seek money if want the system to be back in normal for the company to operate. It was one of toughest period at that time. Another challenge will be it is tough to oversee a project during a pandemic, as I mentioned earlier, oil and gas sector was allowed to operate during the lockdown, and offshore still operate as usual, project was still ongoing.

Me: Could you share some of the experience regarding on the cyber-attack? Don't worry, I will keep it confidential and it is for my research purposes.

Mr. A: Ok, I remembered that time, our company network was hacked and thousands of data were lost. Then, the hacker requested for some money and after that I was unsure how's the problem was solved, as the upper management did not share much. It was so serious at that time, and O&G Sdn Bhd has been very strict on email. Implementation such as we cannot use company email for personal usage, also if we receive email from yahoo.com or gmail.com, we must not open it and must delete it immediately. Furthermore, email filtering was used also to scan for potential threats. As sometimes, we might get email from anonymous, and we might accidentally open it and got ourselves in trouble. Besides, in O&G Sdn Bhd, only certain level of individual able to access to certain folders, and not all the employees have the privilege to access, and in case they found guilty, they will be terminated straightaway, in 24 hours.

Me: I see, that was tough, I believed.

Mr. A: Yes, every data is important to the company, and when there is leakage of information and confidential information is revealed to the public, will be bad to the company. Reputation will be harmed at the same time. It can be risky to use digital technology in project management since we may not notice we are clicking on specific links or providing

information on a website. I believe that a significant amount of confidential information or project data has been stolen without the individual's consent. Confidential information will be publicly disclosed, or it may be used to benefit someone. As a result, I strongly advise be diligent always.

Me: Yes, I agree with you.

Mr. A: Yes, this is how a large organization runs, to stay competitive in the market.

Me: I see, that’s great. We have come to the last part of the question, my last question will be any suggestions for further digital technology application in PM/ and any comments (advice) on digital applications in Project management?

Mr. A: Ermm, in my point of view, I think digital technology has grown rapidly. Therefore, as a suggestion we should embrace the application of digital technology in project management. I believe accepting something new and unusual is tough sometimes, but digital technology is a tool that able to facilitate job progress and reduce hassle. So that we can save time on the certain areas and procced to another stage. Besides, it must be a balance and not too over relying on digital technology, as people might misuse it. For example, digital technology is a tool for us to speed things up, to make our job easier, but it is not a standalone. It still must be operated by human beings to get the job done. For fabrication jobs, I still require manpower such as fitter, welder to execute the job, and digital technology could not perform it. Lastly, I would say change can be happen quicker than many of use expect it to happen, for the last 10 years digital technology may not be the major focus, but that does not mean that could not change now.

Me: Yes, I agree with it. Thank you very much Mr. A for your time and sharing. Appreciate it.

Mr. A: You are welcome.

APPENDICES

APPENDIX A: Interview Transcript Samples

Interview: B

Transcribed: 25 July 2021

Me: Hi Mr. B, first of all, I would like to express my gratitude and thanks for accepting the interview session. It has been a difficult period this year and we have to conduct the interview session by zoom meeting and I hope you are totally fine with it.

Mr. B: Hi Nigel, sure no problem. I am totally fine with it as I am quite familiar with Zoom meeting.

Me: I see, great to hear that. Without further ado, can I start the interview session?

Mr. B: Sure, I am ready for the interview.

Me: Ok, my first question will be, can you share with me some of your background?

Mr. B: Background such as?

Me: Ermm, for instance, your professional experience, your alma mater, etc.

Mr. B: I see, ok, alright I have graduated with a bachelor in Mechanical Engineering from UTM in 2009, and I have joined Belt Sdn Bhd from 2010 till now as a Project service engineer in M&E sector. I have been in the project management line for approximate 8 years and there are several of projects I have been participated and I am accountable of, for example, I am accountable for all services, ensuring that objectives are met in a profitable way, that all machineries are functioning efficiently

and without breakdown, that frequent inspections are performed prior to the deliverable dateline, and one of the most unforgettable experiences was having to travel overseas for training and work purposes for a few months. That was one of the most amazing experiences I've ever had.

Me: Sounds amazing, Could you share more on your experience in overseas, specifically on the training and what's the training about.

Mr. B: Alright, Beckum, Germany, was the location of the training. If I'm not mistaken, it was in 2015. Yes, it was 2015, I believe. I recall being assigned to a six-month training programme in Germany with a colleague. We were delighted at the time because it was an once-in-a-lifetime opportunity for us to discover ourselves and gain something valuable. At the time, we received training in Germany in the form of seminars and outdoor activities. We have a four-hour class in the morning and a two-to-three-hour jobsite training in the afternoon to become acquainted with the machine. It was tiring because we were training for much of the day, but it was a pleasant experience.

Me: Great, thank you for the sharing. My next question will be, do you use digital technology in project management?

Mr. B: Of course, at all times. Nowadays, I believe it is used by everyone.

Me: I see, where do you use it the most in project management?

Mr. B: Project management has never been an easy task. To communicate with my colleague or my superior about job-related matters, I use digital technology such as email and WhatsApp. While managing a project, I frequently use WhatsApp to communicate since I find it more efficient than email because people don't read email much anymore. Communication plays a crucial role in project nowadays because it increases productivity and efficiency. For example, info sharing is much easier and more convenient nowadays, and information can be sent with a tap or click, and everyone in the project team can obtain the same information, as opposed to the previous time when you had to

pass the information by gathering everyone together, which was time consuming. Furthermore, any unanticipated issue in project can be addressed quickly, avoiding any unavoidable problems by using digital technology. Furthermore, I've been using Zoom meetings since last year and have found them to be very useful and convenient. I believe that everyone is now using Zoom, which has recently become popular for meetings and discussions. Zoom meeting was extremely convenient because I could easily have a discussion with my colleague by sharing my screen to discuss on the project progress that we encountered throughout the day.

Me: I see that you are well-equipped with digital technology, aside from the specific digital technology you use in project management. Do you apply Artificial Intelligence and Big Data while managing a project? Do you hear a lot about?

Mr. B: As you are probably aware, artificial intelligence is one of the most recent emerging trends. AI-powered tools that can assist project managers with a variety of tasks throughout the project planning process.

Me: How do artificial intelligence tools help project managers?

Mr. B: For example, artificial intelligence (AI) can assist the project manager in forming the project team and assigning responsibilities and duties to individuals and teams. AI tools can also help project managers manage and adhere to deadlines more effectively. Furthermore, the application of artificial intelligence offers significant advantages to project managers and AI assist project manager in many ways, for example: Through the use of machines, it lessens the burden and pressure of project management.

Me: Are there any more to be added? What do you think? Is AI the future and will it eventually replace the role of project manager?

Mr. B: I don’t think so.

Me: What’s the reason? Could you share?

Mr. B: Ermm, a project manager is still needed to oversee progress, ensure that everything runs smoothly, and that teamwork is maintained, and AI cannot perform such tasks. Furthermore, AI cannot guarantee complete success. Using AI to manage a project entirely is not a wise choice because AI is operated by humans, and artificial intelligence is not entirely human. AI is a tool that can help project managers with not only routine but also advanced tasks. However, it is impossible to replace. If the world is run by machines and AI, there will be a slew of social issues, job losses, increased leakage of personal information, and so on.

Me: That's great. Ok, my next question will be how does digital technology influence you?

Mr. B: I believe we are now surrounded by digital technology in many ways. Habits and ways of life are evolving. For example, the first thing I do every morning is check my cell phone to stay up to date on global news; access to information has never been a problem and extremely convenient for us in this day and age. In addition, I'll check my email to see if there are any emails that I missed yesterday. If I have time, I will occasionally use YouTube apps to catch up on a football game that I have missed. I enjoy football games, but they often start late at night, so I can watch them over and over again by going to YouTube. So, in my opinion, digital technology has played an important role in our daily lives, not just in the workplace.

Me: I see, Could you share more?

Mr. B: As you can see, Nigel. Using digital technology has made our lives more convenient and comfortable. I'd like to give you an example. The first is that digital technology has greatly improved communication in many ways; instant messaging and sharing of photos and videos were never so easy before, and I remember back in 2007-2008 during my university years, sending a picture via phone could cost up to RM0.50, and video calls back then were not as good as they are now, with better audio and image quality. Communication is far more convenient; for

example, I frequently communicate with my colleague via social media platforms such as WhatsApp, which greatly improves our relationship and fosters trust in the team or among us. As a result, I believe that I have gained a lot of benefits from the use of digital technology; any information is obtained quickly by accessing the Web, clicking on the things you want to understand exactly or tasks can be addressed immediately without hassle and user friendly, and relationships can be enhanced concurrently.

Me: Okay, good Mr. B. My next question is we are having bad time now and how project was carried out during the pandemic? What has changed differently? Could you share some of your experience managing project during the hard time?

Mr. B: When the government announced the first lockdown on 17 March 2020, we were literally worried and uncertain how to continue working, as we were not allowed to go to the office and were forced to stay at home to prevent the spread of virus. My boss was extremely stressed and anxious at the time, and we were as well. Every day, he'll text us and ask, "What's your plan for updating our client, what's your contingency plan, what's your plan to get things in order?" It was a very stressful time for me. We were forced to explore new ideas and how to coordinate things at the time. Fortunately, contingency plan, plan B such as Zoom Meeting, which is widely trendy, was adopted to connect all project team members together and provide an update on the project's progress. It was difficult at first because we were used to physical meetings and virtual meetings were alien to us. But we made it through and eventually became acquainted with it. I would say being flexible is needed in project management during critical period. I'm still working from home right now, and I'll go back to the office once in a while if there's something crucial that needs to be addressed. The majority of meetings are continued to hold virtually in order to reduce physical contact.

Me: So, Mr. B, you've been working from home since the pandemic, but could you share more details about how the project is being carried out and any issues that have arisen?

Mr. B: Okay, every morning at 9 a.m., I'll have a virtual meeting with my boss and the team to discuss and update on project progress. For me, it is critical to indicate the priorities for the day and week, so that I can focus on the tasks that are truly important rather than focusing on every aspect of the project during this pandemic period. That was one time when we were having difficulty completing the project within the deadline because we were not allowed to travel interstate, which caused us problems. Fortunately, we are able to communicate with our clients on a daily basis via Zoom meetings, assuring them that the project would be completed within budget but not on a specific timeline.

Me: How did you interact with your clients during the pandemic? Could you tell me about your experience?

Mr. B: As you can see, Nigel. Even before the pandemic, interacting with clients has never been easy. During the pandemic, we were forced to find new ways of communicating with our client, and zoom meetings were used frequently. The webcam was on at all times during in the meeting to demonstrate our presence and our sincerity in providing support at any time, even if clients did not want to do so. At the same time, pay close attention to the clients' body language. As you are aware, talking too much can have bad effects, and some clients may not be in the mood to discuss, so throughout the meeting, only compelling insights will be discussed in order to keep it brief, and the main goal of the meeting is to let them know we are available to assist them at any time. Also, holding a virtual meeting at home helps a lot because it is much more relaxing than working in an office. As a result, this is how I interact with clients during the pandemic, and it has proven to be quite effective so far, and we must realize that digital technology is used to keep projects moving forward and as a fresh option, also being flexible is important.

Me: That is new to me, and it is certainly beneficial for me to learn.

Mr. B: Yes, Nigel, as humans, we must be adaptable because situations change constantly, and we never know what will happen in the future. As a result, it is critical that we embrace the future and empower ourselves with the tools necessary.

Me: Yes, Mr. B, I agree with you. Do you want to take a 5-minute break before I ask the next question?

Mr. B: Nope, I am totally fine with it. You may start with your next question.

Me: Ok, my next question will be what the challenges are applying digital technologies while managing a project?

Mr. B: I believe that when people are at ease with something, they are less likely to want to change it. Humans are rituals, and there's a reason they're called the comfort zone. When our routines are disrupted and ambiguity enters our lives, things can quickly become depressing. Because going through a digital transformation is the embodiment of anxiety, employees may feel threatened. Also, the network issue has always been an inevitable problem; when the network goes bad, I can't do anything, so that's the main issue. Furthermore, I would like to point out that using digital technology while managing a project can be difficult at times, for example when having a discussion with a team member, I couldn't feel their engagement throughout the discussion and productivity has been declined slightly, and it can be difficult not to say something face to face at times. Things started to get bad when I couldn't go to the jobsite and had to depend largely on updates from team members who are working on site, so it can be stressful at times. For me, communication within the project team is critical; any miscommunication in any project can lead to project failure, so I occasionally experienced the same uncertainty. However, by utilising WhatsApp, all information can be easily shared, accessed, and discussed in a timely manner throughout the project life cycle. Another aspect I'd want to emphasise is that disseminating incorrect information

is also a problem. As you may be aware, some people may mistakenly share information with others. This might also cause havoc.

Me: What about distraction when using digital technology while working? And how do you manage it?

Mr. B: Hmmm, I'd say there's a lot of noise, but we need to be clear and precise. To be honest, I get distracted too. Sometimes there will be notifications like Shoppe or Lazada, and these will entice you to check it out. So I try to be disciplined and avoid distractions. For example, I'll keep my phone away from my workstation and check it every hour to see if I've missed any important messages. In addition, I will set my phone to silent mode to disable all incoming notifications. It helped me stay productive and efficient throughout the day.

Me: I see, that’s great. We have come to the last part of the question, my last question will be any suggestions for further digital technology application in PM/ and any comments (advice) on digital applications in Project management

Mr. B: Nigel, in this fast-paced world, we must embrace that digital technology is the future of project management; as more and more tasks will be executed using digital technology and repetitive tasks will be performed using digital technology as well. Also, it is critical to remain competitive; for example, nowadays, managing a project entails not only meeting the deadline within the budget and scope, but also considering sustainability and long-term goals. Furthermore, AI is likely to automate much of that functionality, shifting the Project Manager's primary focus to understanding how to utilise this technology to provide further value to customers, but it still cannot replace the role of project manager, as I mentioned earlier. Therefore, in the future, as a project manager must be excel in soft skills and multi-tasking. Another piece of advice is that using a hybrid approach is critical in today's project management. The hybrid approach is far more effective than the traditional approach because it can seek flexibility and address priorities throughout the project lifecycle.

Nigel: Could you share more on hybrid approach in project management?

Mr. B: Traditional project management techniques are combined with agile project management techniques in the hybrid approach. Traditional project management, for example, is a well-planned and sequential process. Each life cycle has fixed variables and scope and includes stages such as feasibility, planning, designing, building, testing, and production. In comparison to the hybrid approach, the hybrid approach can be used in either sequence or parallel mode as long as there are no interconnections, and it allows for overlapping phases without having to wait for the previous one to finish. As a result, in a hybrid approach, there is flexibility there, and it is suitable to be used in major projects where flexibility is considered necessary and we cannot depend on the traditional approach in which the next development step is not undertaken until the previous step is completed. As I previously stated, in the future we must adapt to the situation and cannot be rigid in project management because every project differs in terms of scope, timeline, and deliverables. As a result, it is critical to take the proper approach.

Nigel: Thank you for the opportunity to conduct this interview with you. I learned a lot during the session, and I appreciate your time, Mr. B.

Mr. B: No problem, you are welcome, Nigel.

APPENDICES

APPENDIX A: Interview Transcript Samples

Interview: C

Transcribed: 25 July 2021

Me: Hi Mr. C, first of all, I would like to express my gratitude and thanks for accepting the interview session. It has been a difficult period this year and we have to conduct the interview session by zoom meeting and I hope you are totally fine with it.

Mr. C: Good morning Nigel, can you hear me.

Me: Yes Mr. C, I can hear you.

Mr. C: Glad to hear that. Good morning Nigel.

Me: Good morning Mr. C, without further ado, can I start the interview session?

Mr. C: Sure Nigel, you may begin.

Me: Ok, Thanks. I will like to start my first question on could you share with me your background such as alma mater, professional experience.

Mr. C: Ok. I was graduated way back in 2010, graduated with a Bachelor of Chemical Engineering from University of Nottingham Malaysia and currently I work as a project manager at COC Sdn Bhd, a manufacturing sector and accountable for the overall management of the project's contract in full compliance with procedures and regulations, preparing timeframes for all project deliverables under the project, tracking and controlling construction schedule and associated costs to achieve project completion within time and resources allocated, overall management of budgeting and financial control, withdrawal applications payments etc. issues of the Project, and last but not least build strong relationships with the customer through demonstrated successes in the execution of projects and technical positioning. What else? Actually there are many, preparing progressive report and update also part of it and perform job site visit as well.

Me: How long have you been working there?

Mr. C: I began working there in 2011, as a young and inexperienced engineer, and this year marks my tenth anniversary with COC Sdn Bhd.

Me: How does it feel to work for such a well-known Malaysian company?

Mr. C: To be honest, it was difficult at first because there were requirements such as written and communication skills that had to be at a certain level, as well as literacy that had to meet certain standards. Furthermore, I was a young engineer at the time, and the learning process was difficult; everything was taught from the ground up, and luckily, I was assigned to a mentor who was always helpful. Working for such a well-known company can be stressful because it requires constant multitasking. As a result, a project manager must be capable of multitasking, managing team members, and completing the job all at the same time.

Me: So, now that I've finished the first question, my next one will be, do you use digital technology in project management?

Mr. C: Yes.

Me: Could you tell me more about where do you apply digital technology in project management?

Mr. C: Generally, digital technology is applied everywhere. I would give you some example, first of all, as a project manager, it is important to keep the team member connected, so I often communicate with them by using social media such as Facebook, WhatsApp, etc. It allows me to communicate with them easily and to share information with them. Also, by using social media, it facilitates the relationship among the team, and therefore I have a really good relationship with the team member. Besides, when there is an issue arising, we are able to communicate immediately via social media to address the following issue, and it helps to improved project processes and helped to circumvent issues. Another point will be info sharing is convenient, where all project info can be shared easily to the team as I don’t have to gather everyone and share it out.

Me: Anymore to be added Mr. Afiq?

Mr. C: What else ya? What is the name of the most recent trending virtual meeting platform?

Me: Zoom and Microsoft Team.

Mr. C: Yes, I couldn't recall it all of a sudden. Even before the pandemic, I used Zoom to have meetings with clients from other countries to discuss on certain project progress. It is much more convenient and reduce hassle.

Me: I see, how about artificial intelligence and Big Data?

Mr. C: In my opinion, artificial intelligence is the key to the future, and it tends to make everyone's life easier. AI also adds more convenience to all types of processes that would otherwise require human effort and time.

I believe that nowadays, most projects are completed with the assistance of artificial intelligence, and the success rate has increased significantly. AI system is used to handle scheduling, reminders, and follow-ups effectively, expelling the need for human intervention. This is one of many effective ways in which these systems can save humans time on their numerous initiatives by ensuring that nothing will be neglected.

Me: How AI assists project manager in managing project?

Mr. C: Since we live in an age of digital, and we are heavily dependent on digital technology. More developments have been made in the field of project management, for example: effective practises of AI can make schedule enhancement even more effective by identifying all of the future and current projects going on in the organisation instead of just taking into account some particular project. Furthermore, the value of the outcome increases as more information is provided to Artificial Intelligence tools. Furthermore, project managers could use AI to automate tasks such as setting up an alert system, managing the flow of work, and managing some repetitive procedures.

Me: Anymore to be added?

Mr. C: Another benefit, in my opinion, AI helps to increase project manager productivity.

Me: Could you share few examples?

Mr. C: There are a few examples of how AI could increase project manager productivity. The first one is that humans are more emotional, and people allow their personal biases and feelings to influence their decisions even when they are dealing with numbers. Artificial Intelligence has its own points of view. I'll give you an example: selecting a candidate for a job. You may be biased in your selection of an individual who you believe is qualified for the position or with whom you are comfortable with however AI will only filter individuals who have the best information and data for the job. Furthermore, the

results obtained through the use of AI tend to be more accurate, as they are free of human error or personal bias. The second example is that when there is more data to work with, Artificial Intelligence is better at predicting future outcomes and trends. However, such predictions are ineffective when only a small portion of them are used. For example, determining monthly profitability can be more precise. At this point, project managers are given the opportunity. Project managers who are capable of using resources to plan for the future, which may include increased creativity. Individuals who use AI get the assistance they need without having to hire a full-time employee. The significance of project managers is highlighted as a result of these human-centred solutions.

Me: What do you think? Is AI the future and will it eventually replace the role of project manager?

Mr. C: Yes, AI is the future to be used in enhancing project process, and as a tool to assist the project manager. But in terms of replacing, project manager role is still needed.

Me: Why AI cannot replace the role of project manager?

Mr. C: A project manager is still needed to oversee the entire activity, and use of AI can help to keep things simple. However, there can be no interaction or teamwork within the team. Face-to-face interaction is still required to improve team communication because it is an important part of building trust within your team. Relationships do not develop in a matter of days, but rather over time. As a result, only the project manager can communicate with the team members. In project management, collaboration leads to increased efficiency and productivity.

Me: That's great. Okay, my next question is about how does digital technology influence you.

Mr. C: What is the impact of digital technology on me? I'd say digital technology has altered my way of life.

Me: What difference has it made in your life? Could you please elaborate?

Mr. C: First and foremost, I would say mobile phone; I use it every day and spend approximately 5-6 hours per day on it. Mobile phone is one of the best invention, I would say. Life has been convenient and comfortable with digital technology. The first thing I do in the morning is check my phone, have a quick read of the global news, and keep up to date on global issues. Also, on my way to work, I'll listen to some music, which is connected to my car stereo; it's very relaxing and ideal for de-stressing. When I arrive at work, the first thing I do is check my email for any overlooked emails that I need to reply back to. Another thing I'd like to highlight is that I've recently picked up baking as a new skill. I decided to learn to bake during the lockdown because it was so boring at the time. So I spent hours learning how to bake on YouTube, and it was an unforgettable experience. It had been a lot of fun and a lot of excitement. Also, I managed to earn some money selling cakes during the pandemic.

Me: That’s great, baking is one of my hobby too.

Mr. C: Really? It seems that I have a baking buddy.

Me: Ha-ha, I am just a beginner, need more time to learn.

Mr. C: Me too.

Me: Besides that, could you elaborate on how social media assists project communication?

Mr. C: Nigel, communication is essential to the project's success. The project will be jeopardised if there is any miscommunication. As a result, social media is an effective tool for improving project management communication. For example, teamwork is critical in a project team, so I must maintain a positive relationship with the team to ensure that everything is in order. So, communication will be the means by which I will forge my relationship with them in order to accomplish this. Furthermore, any issues that the team encounters can be immediately reported to me, and communication will be smooth. Also, I can easily

communicate with the stakeholder via social media. I can send them out once a week via email or messaging to keep them engaged and up to date on the project's progress.

Me: Okay. Mr. C, my next question is, given that we are currently in a bad situation, how was the work done during the pandemic? Could you please share some of your experience managing projects during a difficult time, as well as any changes that have occurred since the pandemic?

Mr. C: Managing a project during the pandemic was difficult, and I needed to accomplish something despite the odds. For example, during the first lockdown, we were forced to stay at home, which was extremely stressful because I had no idea what to do. We were not allowed to go to work, were unable to visit the jobsite, the supply chain was disrupted, and everything turned against you all of a sudden, and you had to face it and solve it. Also, I became used to meeting with my team members every day, having a morning meeting every day, and then everything went wrong and we couldn't do anything. During the pandemic time, I learn to be flexible, try not to be rigid and think out of the box. For example, physical interaction is no longer the sole method, virtual meeting, Zoom, or Microsoft team was adopted and I found it very useful and convenient. You know, in the beginning it was tough, as I have to adapt something new as I was used to it to physical meeting and I not really a tech savvy like the young generation, but somehow I managed to overcome my barrier and eventually I used it well to date. The next step will be to assume leadership. As the team's leader, I must maintain the team's spirit and cohesion, so I will hold a daily meeting with them via Zoom meeting to keep them connected as a team and engaged. Also, be completely clear with them about the goals I intend to focus on improving and never ever leave them with ambiguity and a question mark, as this could lead to trouble. When team members are experiencing anxiety, for example at this period of time, people is fear of retrenchment, and job loss. So, at this time, it is critical to keep them believing, to maintain their morale and spirit. So there were many

changes; it was extremely difficult for me at the time, and a few of my team members were dissatisfied with the pay cut and considered quitting. I took a few weeks to communicate with them, and the good news is that they have decided to stay and be a part of the team.

Me: Certainly it was tough back then. How did you interact with your clients during the pandemic? Could you tell me about your experience?

Mr. C: Also, client interaction was difficult because I was not permitted to visit, and the majority of them worked remotely from home. So, as I previously stated, I used a similar method, Zoom Meeting, to communicate with them, keep them updated on progress, and demonstrate our willingness to assist during difficult times. For example, if a client is experiencing a problem, I am still available to assist him during this difficult time, and we can hold a virtual meeting to assist them in resolving the problem. Another one will be concentrate on integration and interaction risks. Nigel, a risk management plan should be created to identify and mitigate existing or future risks in order to be a successful project manager. A risk plan should be developed, with the risk plan emphasising specific risks associated with integration, interactions among project team members, and assumptions about serving clients. For example, we can't expect physical meetings to resume as usual until the pandemic has passed. As a result, in order to proceed, we must seek substitution. Last but not least, when managing a project during a pandemic, it is critical to remain calm at all times. Keeping my cool during a critical period is critical, as I must remain calm at all times and avoid making any impulsive decisions that could put the project in jeopardy. I recall a quote that said, "Life is much easier when you keep your cool."

Me: That’s great, would you like to take a quick 5 minute break?

Mr. C: Ok, a quick one will be good.

Me: Ok, we are back and are you ready?

Mr. C: Yes, you may start.

Me: My next question will be what the challenges are applying digital technologies while managing a project.

Mr. C: There are several challenges, in my opinion. I'll give you a couple of examples, the first of which is adaptation. It was difficult at first because I was so used to physical meetings and now I had to change my daily routine, which was difficult. As you are aware, I am not a tech savvy individual, and using digital technology such as Zoom meetings was alien to me. For example, I have no idea how to organise a meeting, share a screen, and so on. It was just difficult at first. The network problem will be the second challenge. I don't want to cause an offence, but as you know, the network problem has never been resolved in Malaysia. Also I'd like to share some of my experience with you, a meeting could not be held on a few occasions due to a service disruption. I had to restart my WIFI router so many times that I gave up and decided to reschedule the meeting for the following day. When there is a network interruption, it can be extremely stressful, and you may become enraged at times. The third challenge will be that I do not always feel engaged with the team. Sometimes I'm not sure if they're listening or not, if they're paying full attention or not, and this varies greatly when compared to a physical meeting. Besides, I may become distracted from time to time by messages from Shoppe and Lazada regarding promotion sales. It can be difficult to maintain focus at times, and the project team is no exception. Because everyone is working from home due to the pandemic, I have no idea what they are doing, despite the fact that tasks have been delegated to them. During one of the virtual meetings, I noticed that some of the team members were not paying attention because their eyes were on something other than the screen.

Me: What about distraction when using digital technology while working? And how do you overcome it?

Mr. C: Every day, I believe it is critical to have a to-do list. For example, we might make a list of tasks that we want to complete today, tomorrow, and so on, and then try to complete them within a specific time frame.

As a result, I found it to be quite useful, and it is something that can be implemented in the project team. As you are aware, it is difficult to monitor someone who is not visible, so why not simply share their method for remaining productive and effective during the pandemic period? Simultaneously, another method will be to set SMART goals. I found it on a website and applied for it for a while, and I found it useful. For example, the project will be divided into sections, with each section concentrating and focusing on a specific task. A project team member will only focus on a specific task rather than the entire project because it may lose focus and so on.

Me: Are the two methods workable?

Mr. C: I would say 80%.

Me: Anymore to be added?

Mr. C: Not really.

Me: Ok, We have come to the last part of the question, my last question will be any suggestions for further digital technology application in PM/ and any comments (advice) on digital applications in Project management?

Mr. C: Digital technology has rapidly emerged nowadays and has gradually transformed everything and same goes to project management. We have to make good use of digital technology and finding the right tools for the project. For example, we must first embrace digital technology, and some individuals still choose to stay in their comfort zones and refuse to venture out, and this is the first phase. The second point is by adopting digital technology, projects can be done more easily and on time when there is less hassle. Don't you think so? Besides relying on digital technology, I feel that nowadays people has overlooked on some areas.

Me: Area such as?

Mr. C: Managing a project is never an easy task, and we have to be good at certain areas. For example, as a project manager, we have to be good at planning. Planning on schedule, resources, and budget should be

planned well ahead, also risk plan should be created to address any present or future risk. Risk should be treated immediately to prevent any misfortune happens to the project, also as a project manager, must be good at communication with the team. Try to imagine that if you don't communicate well with the team, do you think they will assist you sincerely, also must be transparent with them, let them know what the expectation is and target to be achieved.

Me: Are there any more?

Mr. C: Also, managing a project. Selection of manpower is important to get the job done. For example, we have to look for unexpected strengths in the people around you, and find the right people for the right tasks. Don't put the person who always procrastinates in charge of enforcing deadlines, and it will cause an unhealthy working environment among the team. Therefore, as a project manager, it is important to assigning right tasks to the right people for better productivity.

Me: I see. Thank you Mr. C for your sharing, appreciate it very much. Thank you very much, I have gained a lot throughout the interview session.

Mr. C: You are welcome.

APPENDICES

APPENDIX A: Interview Transcript Samples

Interview: D

Transcribed: 25 July 2021

Me: Hi Mr. D, first of all, I would like to express my gratitude and thanks for accepting the interview session. It has been a difficult period this year and we have to conduct the interview session by zoom meeting and I hope you are totally fine with it.

Mr. D: Good morning D, can you hear me.

Me: Yes Mr. D, I can hear you.

Mr. D: Glad to hear that. How are you Nigel?

Me: I am fine, thank you. How about you?

Mr. D: All good here.

Me: Happy to hear that, without further ado, can I start the interview session?

Mr. D: Sure Nigel.

Me: Ok, I would start up with the first question, can you share me some of your background and experience in project management?

Mr. D: Ok, I graduated from UITM Shah Alam with a bachelor in System management technology and currently I am working at III Sdn Bhd as an assistant regional manager which cover the east coast regions. I have approximately 7 years of experience in project management.

Me: III Sdn Bhd? May I know what sector are you working at, and what your company does? Also can you share some of your experience in project management?

Mr. D: III Sdn Bhd, also known as III oil, is a Malaysian company that specialises in supplying petrol and diesel to rural areas. The fuel station was developed to help residents in rural areas who have to travel 30-40 minutes to town just to get their car fuelled up. My current task is to oversee all activities in the East Coast region and to increase the number of III fuel stations in the region. My daily tasks include dealing with the local contractor, Ketua kampong (Village Head Chief), who owns the land, and meeting with him to discuss the terms and what we can bring to the table, either to buy over his land or to rent. In addition, I must deal with the local authorities (Government council) to get their approval and etc. Therefore I would say I have to manage from the beginning till the end, and a lot of travelling required.

Me: I see, my next question is, do you use digital technology in project management?

Mr. D: Yes, certainly.

Me: Could you share the areas that you applied and some of your experience?

Mr. D: Digital technology makes things a lot easier. As an assistant regional manager, I am responsible for overseeing daily operations as well as collaborating with headquarters. By using digital technology I can easily schedule sales calls, track employee time, and complete many complex stuff that used to take hours in minutes by leveraging digital technology. As well, because being competitive is so important nowadays, many businesses have started to utilize digital technology in the workplace, such as using digital marketing to promote company profiles and online sales tools to advertise across the street and around the world. Furthermore, by utilising digital technology such as a mobile phone or social media, I am able to communicate more effectively, and remove barriers of time, location, devices, and network connections, providing employees with greater work-life balance and info sharing while increasing efficiency and agility for the organisation.

Me: How about artificial intelligence and Big Data? Are you aware of it?

Mr. D: Yes.

Me: Could you share some of the application in project management?

Mr. D: I would say Artificial Technology is shaping world of project management and has totally transformed it. For example, AI has already been used for administrative duties such as retaining registers and logs, automating meeting preparation such as room booking, emailing invitations, and agenda drafting, and etc. Therefore, I would conclude that AI will improve significantly its ability to manage more difficult and complicated activities of the project. Although AI excels at repetitive, data-driven tasks, it struggles with innovation, interpersonal skills, and perceptiveness. For example, AI can predict deviations from a program's schedule, but it cannot solve them. It is incapable of resolving the conflicts caused by a deviation or gaining the consensus required to get a project back on track.

Me: So how does AI play a part in project management exactly?

Mr. D: Integrating project agility and AI-powered solutions in project management empowers project managers to process complex project information in seconds and uncover patterns that may influence entire project. Also, part of the AI revolution is also about improving automation and eliminating repetitive tasks from daily work. Using AI technology to revolutionise project management, organisations may reinvent the role of PMPs. They will be in charge of more than just tracking project progress and deliverables. Rather, project managers of the future will be involved in strategic decision-making with assistance of AI technology. Another point I'd like to emphasise is that every project is fraught with risk. Each project has different risks, so the easiest way to mitigate them is to anticipate them based on past events and notify the team so that they can start making effective yet data-backed decisions.

Me: Yes, totally agreed with it, anything more to be added?

Mr. D: In addition, AI can be used to analyse project data to predict team progress rates and project completion dates. They do, however, require manual assessment and modification to assist project managers in guiding a project toward success while avoiding possible problems.

Me: What do you think? Is AI the future and will it eventually replace the role of project manager?

Mr. D: As I mentioned earlier, AI excels at repetitive, data-driven tasks, but it struggles with innovation, interpersonal skills, and perceptiveness. AI is a tool that can help the project manager by easing some of his responsibilities, but it cannot completely replace him. For example, AI can anticipate risk by analysing previous projects, but a project manager is still required to carry out the tasks, and AI cannot act as a communication agent. A project manager must still perform the communication role in the team, ensuring that all team members are pleased and receiving the same information, and so on.

Me: Great, I will move on to the next question. How does digital technology influence you?

Mr. D: Digital technology has influence me in many ways. I will give you an example, digital technology has really benefited me a lot. Just for your info, during the first lockdown, I was staying in Kuala Lumpur for job purposes and my family was in Kelantan. It was so tough at that time I could not meet them and my wife had to bear all the responsibilities while I was away. Insyallah, during the lockdown I was able to communicate with her everyday using video call, it was convenient, and I was able to see her and my kids through the video chat, and it was just overwhelmed. My family is my pillar of strength, and my daily issue was resolved at that time after chatting with them. Meanwhile, I communicated with project team members via social media. It was really convenient, and thanks to modern technology, communication has never been easier or more convenient than it is now.

Me: I see, I believed it was so tough at that time, you was unable to return to Kelantan.

Mr. D: Certainly, It was tough.

Me: Anymore to add on?

Mr. D: For me, digitalization has led to a revolution in financial matters. For example, I don't really go to bank nowadays, and mostly the transaction is done through using the apps. It is so convenient compared to before, where we have to experience the traffic jam and no parking space, and we have to queue up for so long. Also, with a mobile phone, we can do anything literally. For example, I can use it for internet surfing, working as calculators, planning journeys, capturing and playing photos, audio, and videos, entertainment purpose and etc. Therefore, I would say digital technology has transformed my lifestyle and has benefited me in many aspects, and also it plays a crucial role during the pandemic. Can you imagine that without digital technology at this period of time, you will be bored to death and people will just go crazy staying at home doing nothing?

Me: How does digital technology plays a crucial role during the pandemic?

Mr. D: The first role will be to alleviate anxiety and stress. As you are aware, job cuts and retrenchment are on the emergence not only in Malaysia, but around the world. As a result, digital technology plays an important role, such as disseminating useful and beneficial information to everyone in order to keep everyone calm during this period of time. The Malaysian government, for example, has been using websites and social messaging platforms on a daily basis to keep the population informed and advised on what to do to reduce the risk of infection. Similarly, doctors and health care providers could use social media and video calls to provide reliable information to their patients and communities. Without digital technology, people will mostly receive information from one another, and we all know that sometimes people could provide misleading info, and people will likely think it. Also, the second role will be it helps people to cope with this difficult time, by using digital technology, it keeps us occupied and entertained for most the times. When we are stressed, we need to find a way to relieve it, so by using digital technology, it could help us. For example, listening to music, or communicate with someone could help to reduce stress. As I mentioned earlier, during the first lockdown, I was in Kuala Lumpur for job purposes and my family was in Kelantan. It was so tough at that time I could not meet them, and digital technology was the sole option to connect us together. As you know that, everyone has different ways of relieving stress, but digital technology is one of the most workable method.

Me: Yes, I completely agree with you. However, how do you view social media platforms, which are well-known for disseminating misinformation and "fake news"?

Mr. D: It is extremely difficult to control all of the misinformation on social media; therefore, we should adhere to all of the reliable sources; for example, in Malaysia, we may refer to MKN or the World Health Organization to obtain truthful and reliable information; and I just don't

understand why people so easily believe untrustworthy information on social media.

Me: How do you view that?

Mr. D: For my point of view, people easily believe with fake news is due to the emergence of social media nowadays, and people spend easily 8-10 hours per day on social media, and people make fast judgment without thinking and don't really think much. As a result, I believe we should improve our ability to distinguish between fake and real news headlines.

Me: Yes, we should think and justify before making any assumption.

Mr. D: Certainly.

Me: Okay. Mr. D, my next question is, given that we are currently in a bad situation, how was project done during the pandemic? Could you please share some of your experience managing projects during a difficult time, as well as any changes that have occurred since the pandemic?

Mr. D: First of all, oil and sector was allowed to operate during the first lockdown and most of the project was still in progress. The first thing we need is, a mobile phone and laptop is required for each member for communication and work purposes as we are no longer travel to office due to restrictions. However, there were few changes where most of the meetings were conducted virtually due to reduce the amount of manpower in workplace, and document signing all have to be conducted digitally. Also, to develop a new working habit is tough, as I am so used to working in the office, and out of sudden I have to develop a new ritual and accustomed to working remotely from home. Also, it was tough back then, as something has disrupted our lifestyle and we have to adapt to something new, also it is important to identify the crucial task instead of focusing on all the tasks. For me, what the pandemic has taught me was, to deal with continuous adversity, we need resilience, flexibility and endurance in managing a project during the pandemic, and adopting digital technology is the solution. These are

the keys to assist me since last year till now. Another point worth mentioning is that, in addition to the lessons learned, a contingency and risk strategy should be developed. I'd like to provide a few examples. The first is the development of a contingency plan, for example, how work will be carried out during a lockdown, so virtual meetings will replace present physical meetings, and email and WhatsApp will be the communication channels because we couldn't rely on face-to-face meetings as much as we used to. Second, as a team leader, being agile and flexible is critical; all we have to do is be understanding, patient, and adapt to a new form, thus digital technology is the new norm for keeping the project moving.

Me: What about distraction when using digital technology while working? And how do you overcome it?

Mr. D: I was being alone during the lockdown, and my family was not around, so there was no much of issues. For me, there is a distraction everywhere, so personally I think we have to resolve it.

Me: How do you resolve distraction?

Mr. D: I would say it is important to set goal and objective throughout the day, and once you have completed that, that’s done. Once goal has been set, ensure that it must be completed before proceeding to others.

Me: My next question will be what the challenges are applying digital technologies while managing a project?

Mr. D: The first challenge will be the network issue. I have encountered network issue during the lockdown. When network is bad, I literally could not do anything and it just screwed up the day. Another issue I would like to pinpoint is the network in Malaysia is bad, and I just don’t understand why. In addition, productivity will be slightly affected. For example, since most of the team members were working from home during the pandemic, I noticed that there was a slight decrease in productivity.

Me: How do you measure your employees' productivity and eventually review them on that work?

Mr. D: As you know, I could not spend time monitoring them, I will just need the outcome. So, if they could achieve the job by meeting the objectives, I don't really care, but if there is something disrupting the progress, then it needed to be addressed. But to speak the truth, there was a decrease in productivity when work from home method was introduced.

Me: Ok, my last question will be any suggestions for further digital technology application in project management?

Mr. D: For my point of view, digital technology has played an important role in everything, not only in project management. In the future, it is important to anyone of us to adopt or well equipped with digital technology to stay competitive in managing a project. So, I would suggest all the companies are accountable of providing training to their employees. I would say yearly training on digital technology should be provided frequently to the employees, by attending the training program, each employees will be developed to another level, and reduce any weak links within the company who rely heavily on others to complete basic work tasks. For example, some employees might good at using digital technology and some might not. Therefore, it is important to have that balance in the workplace, so that we don't over rely on an individual. Try to imagine that what if that particular individual wanted to leave and it will cause a havoc in the company.

Me: I agreed with that, anymore to be added?

Mr. D: Digital technology has completely transformed project management into another level. For example, project manager has been relying heavily on digital technology, to check on the schedule, inventory, progress and etc. Also, digital technology has fundamentally changes how one operates and delivers value to customers. It improves efficiency, increases transparency, provides better customer experience, employee engagement, and culture, and saves time and

costs. Digital technology is assisting the project manager, therefore he should make good use of digital technology, and for example communication is easier compared to before, and he should communicate well with the project team, stakeholder and client to ensure everyone is satisfied. In addition, the COVID-19 pandemic has disrupted most of the businesses and same go to managing a project, and digital tools are the keys to take project management into another level.

Me: How digital tools take project management into another level? Could you share more?

Mr. D: The pandemic has disrupted our lifestyle, for example putting on a facemask has become a necessity and a must, and it same goes to project management as well. For example, digital technology have made collaboration between team members easier. A project manager could rely on digital technology to disseminate information to the team easily, information can be sent out within few secs, at the same time, he could held a virtual meeting with the team anytime as physical meeting nowadays is no longer the sole solution. Another point will be working remotely from home has slightly affected the spirit among the team, but with digital technology, it connects everyone together and communication will never be a problem. Besides, project management task has become oriented, for example scheduling task is automated nowadays by using digital technology, and therefore a project manager could spend most of his time focusing on others which require his attention. Last but not least, project managers must stay updated on the latest AI applications in the project management space. We must invest in the honing of skills like leadership, emotional intelligence, personal communication (conflict resolution, consensus building and persuasion) and creative problem solving–skills that complement AI.

Me: Agreed with you, digital technology could help a project manager in many ways and project management has transformed into another level with adoption of digital technology.

Mr. D: Yes, absolutely.

Me: Thank you very much Mr. D for your time and sharing. Appreciate it.

Mr. D: You are welcome.

APPENDICES

APPENDIX A: Interview Transcript Samples

Interview: E

Transcribed: 25 July 2021

Me: Hi Mr. E, first of all, I would like to express my gratitude and thanks for accepting the interview session. It has been a difficult period this year and we have to conduct the interview session by zoom meeting and I hope you are totally fine with it.

Mr. E: Good morning Nigel, can you hear me.

Me: Yes Mr. E, I can hear you.

Mr. E: Glad to hear that. How are you Nigel?

Me: I am fine, thank you. How about you?

Mr. E: All good here.

Me: Happy to hear that, without further ado, can I start the interview session?

Mr. E: Sure Nigel.

Me: Ok, I would start up with the first question, can you share me some of your background and experience in project management?

Mr. E: Okay, I'm currently employed as a project manager at XYZ Company, and I've been managing projects for 10 years. Dealing with contractors, vendors, clients, and others is core of my job description.

Me: Could you tell me more about the projects?

Mr. E: My Company's main business is supplying conveyor belt to sectors like cement plants and petrochemical plants, which require material to be transferred from one location to another. My job is to ensure the conveyor belt is installed correctly and according to the requirements. For example, we have rip stop belts, auto stable belts, transpipe belts, and so on. Because the features and applications of each conveyor belt differ, we must completely comprehend the needs of our clients.

Me: Do you provide services such as jointing of conveyor belt such as cold and hot joints?

Mr. E: Yes, we do have a team who can perform the task.

Me: I see, my next question is, do you use digital technology in project management?

Mr. E: Yes, of course.

Me: Could you share some of the area that you use digital technology in project management.

Mr. E: Every day, I connect with project team members using digital technology such as WhatsApp. It's also how I communicate with contractors and clients. I found it to be highly user-friendly and convenient, as quick and effective communication is critical in today's project management. Also, info sharing in the project team, all can be done easily and I don't have to inform one and another which is time consuming. Besides that, meeting can be conducted virtually using Microsoft team which is free of charge and convenient. Sometimes, it can be frustrated to get stuck in the jam just to attend a meeting. Don't you thinks so?

Me: Yes, totally agreed with you. Why is effective communication critical for project management?

Mr. E: At all levels of project management, effective communication is a critical tool for building good, long-term working relationships. As a result, by incorporating digital technology into project management, it is possible to enhance productivity, output, morale, and other factors.

Me: How can effective communication help you sustain long-term professional relationships while also increasing productivity, morale, and other factors?

Mr. E: For example, digital technology may be used to disseminate information among a group such that everyone receives the same information and no one is left behind. WhatsApp and WeChat are examples of free and user-friendly digital technology. With just one click, all information may be disseminated. As a result, when everyone receives the same information, there will be no issues with unfair or

biased treatment, and everyone will be able to focus entirely on their allocated job obligations.

Me: Yes, totally agrees with you.

Mr. E: Aside from that, digital technology can be leveraged to improve project team relationships. For instance, I use WhatsApp to interact with my colleagues. When they run into any problems on the job, they can send me photos or videos over WhatsApp, and I'll figure out what's going on and how to resolve it. Also, I observed that communication is critical within the project team, as I discovered that many project failures are due to bad communication, poor leadership, and other issues. As a result, in my opinion, digital technology is a good tool for facilitating project team member relationships and maintaining a positive team spirit.

Me: Yes, totally agrees with you. Besides that, are you familiar with AI technology or Big Data?

Mr. E: Yes.

Me: Could you share some of the application?

Mr. E: For example, AI is a predictive analytics that extracts information from existing data sets in order to detect patterns and anticipate future events and trends, it can save time and user friendly. Also, AI Chabot is used in project management at some of my client companies, which operate 24 hours a day, seven days a week. When a problem arises, AI Chabot is used to respond to the client's questions and meet their demands. As a result, it's incredibly convenient and user friendly because I don't have to stay up late merely to answer such questions at 2 a.m., because AI Chabot will do it for me. Meanwhile, AI technology may be used to automate repetitive tasks, check for errors in papers, and many other tasks, as humans are prone to making mistakes for a variety of reasons. As a result, I believe AI technology may be used to handle a wide range of repetitive and hard tasks.

Me: Ok, I will move on to the next question. How does digital technology influence you?

Mr. E: In many ways, for example, digital technology has become deeply ingrained in our lifestyle, and we use it on a daily basis as it is user friendly and convenient. It has become a necessity for us in recent decades. Aren't you convinced? I check information using digital technology, and I can get all of it in a matter of seconds and it is so convenient. In addition, I frequently watch movies on YouTube since I find it to be both calming and enjoyable. Digital technology, in my opinion, is also an effective tool for relaxing. Also, ease of communication as I mentioned earlier, communication is way more convenient compared to the old days.

Me: Anymore to be added?

Mr. E: Not really.

Me: Okay. Mr. E, my next question is, given that we are currently in a bad situation, how was the work being done during the pandemic? Could you please share some of your experience managing projects during a difficult time, as well as any changes that have occurred since the pandemic?

Mr. E: The first change was that we were required to work from home and stay at home. Human movement has been severely restricted in order to prevent the virus from spreading, and this has drastically disturbed our usual working schedule. Furthermore, there are a number of changes, such as the fact that most projects have been halted due to the state-wide lockdown; capital projects have been particularly badly hit, with labour absences and supply-chain interruptions. As a result, there are only a few options for project management during this difficult period. For example, we must be flexible and adjust to the new norm by using virtual meetings to substitute real meetings in order to keep the project running and ensure that task is done even if the country is in lockdown. Furthermore, in this pandemic period, we cannot be too rigid in project management; for example, a contingency plan should be established to

handle the priority, as managing projects in difficult times is difficult. In this pandemic moment, acting swiftly is critical to keeping the project on track and identifying any hazards. Also, risk management plan should be developed to identify new risk, For example, if coronavirus is a newly identified risk in the project, what will be the risk management technique and how will it be addressed? For example, wearing a facemask is required at all times, temperature scanning is required at all times, and what will happen if one person becomes infected? As a result, it must be explained clearly and precisely.

Me: Yes, in this challenging time, project management requires quick action and flexibility.

Mr. E: Keeping calm at all times is also necessary; making decisions in a hurry could endanger the project.

Me: Certainly, any more to be added?

Mr. E: Yes, despite the fact that we are going through a difficult time, we must ensure that the project's performance remains consistent. Cash flow should also be preserved, for example, by negotiating discounts and payment-deferral plans with contractors, aggregating demand for commoditized materials across multiple projects to take advantage of bulk discounts.

Me: That’s great, before I move on, do you want to take a short break.

Mr. E: Sure, a 5 mins will do.

Me: Ok, can we resume back the interview session?

Mr. E: Sure.

Me: My next question will be what the challenges are applying digital technologies while managing a project.

Mr. E: Hmm, I'd think there are a few challenges.

Me: Could you share what are the challenges.

Mr. E: The first issue is a network problem. For example, during a lockdown, we are obliged to work from home, and network disruptions are regular; once, I experienced a network outage and was unable to do anything for three days. This has wreaked havoc, and all project concerns had to be postponed until the network is back up and running. At the time, it was really stressful. Furthermore, I believe there will be a decrease in production. Because most of us are working from home during the lockdown, I've noticed that some of the team members aren't performing their best work and aren't responding to group messages. This can get a little annoying at times.

Me: I see that there is still more to be added. Is there a perfect answer to the above decline in productivity?

Mr. E: hmm, in my opinion, it is beneficial for anyone to prepare a to-do list every day, as long as the to-do list is finished. Meanwhile, we should be strict with ourselves, such as putting a time limit on the phone and attempting to regulate how much time we spend on it.

Me: I agree with that, anymore to be added?

Mr. E: Nope.

Me: Ok. My last question will be will be any suggestions for further digital technology application in project management?

Mr. E: Nigel, Digital technology, in my opinion, has been widely used in project management. However, you may not be aware that some businesses prefer to stay in their comfort zones rather than embrace modern technologies. Due to lengthy processes and large workloads, these companies will be wiped out one day. As a result, the first suggestion is that we must embrace and accept digital technology's use in project management, as well as the fact that digital technology is a tool for bettering project management. Another suggestion is that project team members receive training on a regular basis to keep them up to date on current trends. Because each project is different and

distinct, it is critical to give the team with the most up-to-date digital technology training.

Me: Yes, I agree entirely with you. Thank you so much for giving this information; I really appreciate it.

Mr. E: You are welcome, Nigel.

APPENDICES

APPENDIX A: Interview Transcript Samples

Interview: F

Transcribed: 25 July 2021

Me: Hi Mr. F, first of all, I would like to express my gratitude and thanks for accepting the interview session. It has been a difficult period this year and we have to conduct the interview session by zoom meeting and I hope you are totally fine with it.

Mr. F: Good morning Nigel, can you hear me.

Me: Yes Mr. F, I can hear you.

Mr. F: Glad to hear that. How are you Nigel?

Me: I am fine, thank you. How about you?

Mr. F: All good here.

Me: Happy to hear that, without further ado, can I start the interview session?

Mr. F: Sure Nigel.

Me: Ok, I would start up with the first question, can you share me some of your background and experience in project management?

Mr. F: I am currently working at DCU Company as a project manager. I have more than 10 years' experience in project management, and accountable for planning, overseeing the whole project progress and ensuring project is completed on time and within budget.

Me: What does your company do?

Mr. F: We manufacture nitrile glove, and we are one of the largest producer of nitrile glove in the world.

Me: I see, that's great. My next question is, do you use digital technology in project management?

Mr. F: Yes, of course.

Me: Could you share some of the area that you use digital technology in project management.

Mr. F: Digital technology is used in a variety of methods, including scheduling work, keeping track of requests and vacation time, analysing labour needs, and reducing needless admin. Furthermore, digital technology is beneficial for information dissemination; for example, I use digital technology such as WhatsApp or Email to share information and communicate with my team. In my opinion, it is really beneficial and convenient because I can efficiently and rapidly share the information with anyone. Also, I won't have to worry about disseminating incorrect information because everyone in the group will obtain the same information. Furthermore, team communication is extremely important and crucial. As a project manager as well as human being, I have always been focused on team communication because I believe that when a team has good morale, open communication, and a smooth project

process, the project process can be facilitated, and the project rate of success can be enhanced.

Me: That’s great, anymore to be shared.

Mr. F: Furthermore, it is used for meetings. Even before the pandemic, I used Skype for Business to host a meeting with clients from other countries, as it would be absurd to travel from Malaysia to the United States for a brief appointment. As a result, I believe that Skype Meeting, or any other platform such as Zoom, or Microsoft Team, should be used even after the epidemic has ended.

Me: Agreed with you, how about artificial technology and Big data? Are you familiar with it?

Mr. F: Yes, I've heard of both of them. Big data, for example, is used to evaluate large amounts of project data. Meanwhile, it allows me to identify, rectify, and streamline process bottlenecks and inefficient systems. Big data is used as it allows us to plan more realistically based on the data we have, and project data can be managed appropriately to help predict, decide on important resources.

Me: That’s great. My second question will be how does digital technology influence you?

Mr. F: In a variety of ways, I'd say. For the first, I'd say digital technology has had a significant impact on me, lol. I routinely use digital technology for communication and information gathering, such as social media and my mobile phone. It is so convenient and user friendly. Communication is no longer an issue. Furthermore, I believe that digital technology has alleviated the majority of our burdens; for example, to access information, I can just browse on a website and obtain it in a matter of seconds; I no longer need to go to a bookstore or library to obtain that information. Digital technology's main qualities and benefits are its user-friendliness and convenience. As you can see, there are no age constraints nowadays; even my parents, who are in their seventies, are proficient at using a mobile phone and have a social media account.

Also, by using mobile phone, I communicate with them every day, for me, it is important to communicate with them. So can you imagine that, the influence of digital technology nowadays?

Me: My parents, for example, are adept at using a mobile phone and frequently communicate all of the most recent information, as well as any health information, with me. It was a little annoying at times, LOL. I'm joking.

Mr. F: Indeed, I believe the world has transformed as a result of the digital revolution.

Me: Agreed. My next question is, given that we are currently in a bad situation, how was the work done during the pandemic? Could you please share some of your experience managing projects during a difficult time, as well as any changes that have occurred since the pandemic?

Mr. F: During the pandemic, I believe there have been numerous changes, both positive and negative. As we all know, most sectors were shut down during the lockdown to prevent the virus from spreading, but as you know, my company produces healthcare products, and we are allowed to operate as usual. It was terrifying at the time, because awareness was still low, and there was no vaccine; facemasks and hand sanitizers were the only protective gear available. At that time, there were few ongoing project, and I was hesitant to go to work at the time because I was afraid of becoming infected, and I have old and young family members at home, and I didn't want to spread the diseases to them. It was challenging at the time, but after a few weeks of discussions, the company decided to implement a work-from-home policy, with the caveat that I must come to the office if there are any severe concerns that need to be addressed; otherwise, I would be working from home at all times. Aside from that, this pandemic has taught me to be more adaptable and flexible of my surroundings at all times. Working from home, for example, is a new practise for me, and I have to embrace it; I can't make a big deal out of it because I am much

more at ease at the office. Also, as a team leader, I had to be flexible because most of the team members worked from home, and I couldn't constantly monitor them as long as they submitted their report on time and completed the task correctly.

Me: I see there are a lot of changes, anymore changes to be added to project management?

Mr. F: Nope.

Me: That’s great, before I move on, do you want to take a short break.

Mr. F: Sure, a 5 mins will do.

Me: Ok, can we resume back the interview session?

Mr. F: Sure.

Me: My next question will be what the challenges are applying digital technologies while managing a project.

Mr. F: Hmm, I'd think there are a few challenges.

Me: Could you share what are the challenges.

Mr. F: The first issue will be concern on privacy and security, as most of us are aware that there are many fraudsters nowadays, and that clicking on an unfamiliar file could result in the loss of data, including project data. Another concern I'd want to bring up is that, as you may be aware, there are a lot of scammers and hackers nowadays, so if we're not careful, we might get hacked and lose some vital project data, which we'd then have to reveal publicly. False information dissemination can also occur as a result of us or others disclosing incorrect information to others, therefore this is another difficulty when using digital technology in project management. As a result, we must be particularly vigilant in detecting and preventing cyber-threats. Last but not least, digital counterfeiting is a major challenge; for example, some hackers may copy someone's signature and seek confidential material. The hackers may clone the signature of your company's director and request information, and the person who provides the information will

immediately share it because the director requested it but didn't even realise it was the hacker. This act may cause the company to lose a significant amount of project data and result in further failures.

Me: Yes, totally agreed with that. My last question will be will be any suggestions for further digital technology application in project management?

Mr. F: As most of us know that, digital revolution in project management enables team members to be more productive and add value from the first day on the job by allowing them to communicate with clients and co-workers. Also, digital technology has become more crucial in the post COVID-19 era as the pandemic has disrupted traditional business processes, same goes to project management. Therefore, I would suggest digital technology should be adopted as it improves efficiency, increases transparency, provides better customer experience, employee engagement, and culture, and saves time and costs. The next suggestion will be since digital technology is adopted by most of the companies nowadays, therefore it is important to keep up-to-date. For example, keeping up to trend with latest edition or software, and etc. These are the two suggestions.

Me: Yes, I agree entirely with you. Thank you so much for giving this information; I really appreciate it.

Mr. F: You are welcome, Nigel.

APPENDICES

APPENDIX A: Interview Transcript Samples

Interview: G

Transcribed: 25 July 2021

Me: Hi Mr. G, first of all, I would like to express my gratitude and thanks for accepting the interview session. It has been a difficult period this year and we have to conduct the interview session by zoom meeting and I hope you are totally fine with it.

Mr. G: Good afternoon Nigel, can you hear me.

Me: Yes Mr. G, I can hear you.

Mr. G: Glad to hear that. How are you Nigel?

Me: I am fine, thank you. How about you?

Mr. G: All good here.

Me: Happy to hear that, without further ado, can I start the interview session?

Mr. G: Sure Nigel.

Me: Ok, I would start up with the first question, can you share me some of your background and experience in project management?

Mr. G: Currently, I am assigned as an assistant project manager in a oil and gas company, and I have more than 5 years' experience in project management. Most of my job scopes are primarily scheduling, monitoring and holding meeting with existing and prospective clients.

Me: I see, that's great. My next question is, do you use digital technology in project management?

Mr. G: Yes, I would say most of the time.

Me: Could you share some of the area that you use digital technology in project management?

Mr. G: There are many areas, digital technology can be applied in project management. For instance, I used digital technology for scheduling, monitoring, tracking purposes. Moreover, digital technology such as Clarizen, can be used to share views, such as roadmaps, module views, project views, and reports and dashboards. It facilitate the project process and make things easier, based on my view. Also, information sharing can be done in a proper and professional way, for example, an email can be sent to inform on a specific agenda, or WhatsApp can be used informally.

Me: I see, anymore to be added?

Mr. G: Besides that, it can be used for communication purposes, communication with the project team can be conducted easily, and for instance, I can contact any of my team member to obtain info. Another point that I would like to share is Artificial Intelligence, I found it very useful to project management. As we know that, every project varies and challenging. Therefore, as a project manager, I can make good use of digital technology such as AI to increase project success.

Me: Could you share more on AI technology? How it increase project success?

Mr. G: AI can assist the project manager in keeping track of the project's progress and improving project planning accuracy. When working on huge, complex projects, this is tremendously handy. Artificial intelligence-enhanced project management software can help you make the best resource allocation decision for your project. AI may also give real-time data and project status updates via data visualisation. This lets the team and management to assess the project's current status and make informed decisions about its duration, cost, and strategy.

Me: That’s great. I will move on to the next question, how does digital technology influence you?

Mr. G: In many ways, Nigel.

Me: Could you share some of it.

Mr. G: Sure, the first one will be communication has become easier and convenient. For instance, I am able to contact anyone easily, using mobile phone. I would say it is user friendly, convenient, and most importantly time saving. Info dissemination is much easier, faster and efficient. Another point I would like to share is, this is something really special to me. During the lockdown, I was so bored at home, and that time I learned how to make video content. It was tough, challenging as I was a newbie and did not have any experience on that. I took this opportunity to learn to shoot, edit and make video content. Give me a moment, I want to show you some of the videos that I created during the lockdown.

Me: Ok.

Mr. G: Ok, these are the videos, it is basically a vlog, showing my daily life.

Me: That's great, amazing videos. So, you have acquire a new skills using digital technology.

Mr. G: Yes Nigel, it is one of the skills that I acquired during the pandemic. I was so free at that time, and I decided to do something at home. Also, another interesting point is I have learned something new, during the lockdown, I have browsed through the social media and I saw many people have developed DIY habit, for example: Building a hand phone holder, some woodwork furniture. So I have started to construct some, so I purchased some tools and materials from online, and it kept me occupied during the weekend. Even though the masterpiece that came out was not good, but it gave me a sense of accomplishment and I just happy about it.

Me: That's great, so you have acquired two new skills using digital technology.

Mr. G: Yes.

Me: My next question is, given that we are currently in a bad situation, how was the work done during the pandemic? Could you please share some

of your experience managing projects during a difficult time, as well as any changes that have occurred since the pandemic?

Mr. G: Our working styles have automatically changed as a result of the COVID-19. As a result, we must ensure that we do not return to work as we did in the past, but rather shift to a new normal age. Working from home, for example, is a viable option. Furthermore, as a team leader, flexibility is critical, for example, having frequent discussions with the team, understanding their current problems, and providing the best support possible. We could not be too rigid at certain period, sometimes we have to flexible at one time.

Me: I see, anymore to be added?

Mr. G: At that time, a risk management plan was developed, for example, if the project could not be completed on time. So, what is going to be the solution? So, prior to the lockdown, I held a meeting with the clients to reaffirm some agreements regarding jobs that cannot be completed after the pandemic. Before the shutdown, for example, the client requested that the project be completed in the 16th month. However, due to unforeseen circumstances, the project will take longer to complete, possibly after the lockdown is released. As a result, a good relationship with the clients must be created in order to ensure that the project is delivered within a specified budget and not on a set deadline.

Me: I see, being flexible and develop a risk management plan is extremely crucial.

Mr. G: Yes, certainly.

Me: My next question will be what the challenges are applying digital technologies while managing a project.

Mr. G: Hmm, I'd think there are a few challenges.

Me: Could you share what are the challenges using digital technologies in project management.

Mr. G: The first one will be a decrease in productivity, since most of us are aware that humans are often distracted, and not everyone has the self-discipline to avoid looking at their phone during work hours. Furthermore, I'd like to mention that there was an issue with productivity with the implementation of the work-from-home policy, which I noted.

Me: How did you address it?

Mr. G: It can be solved in several ways. The first is to set a goal that they must meet if they are to succeed. Another will be a weekly meeting, from which I will be able to track their progress.

Me: That’s one the way, anymore to be added on the challenges.

Mr. G: The final point will be on privacy and security, as there are a number of scammer issues that we must be aware of today. After stealing project data, it can be a big issue, and hacker might seek for ransom or some other benefits. In addition, there have been multiple cases of digital counterfeiting, in which someone impersonates another's signature in order to obtain something. Meanwhile, falsified documentation will put the project's future in jeopardy. As a result, as I already mentioned, we must remain watchful at all times. A single carelessness could result in a terrible outcome. To add on when we receive an unfamiliar email, and we open it without considering, and we are scammed, losing crucial project data, and so on. As a result, using digital technology in project management raises concerns about privacy and security.

Me: Yes, totally agreed with that. My last question will be will be any suggestions for further digital technology application in project management?

Mr. G: As most of us know that, digital revolution in project management enables team members to be more productive and add value from the first day on the job by allowing them to communicate with clients and co-workers. Also, digital technology has become more crucial in the

post COVID-19 era as the pandemic has disrupted traditional business processes, same goes to project management. The first suggestion will be since digital technology is adopted by most of the companies nowadays, therefore it is important to keep up-to-date. For example, training should be provided to keep up to trend with latest edition or software, and when they are well equipped with the skill set, it will be a boost to the project. In addition, project manager should be well with and adopt artificial intelligence, which will most likely automate many administrative project management functions.

Me: Yes, I agree entirely with you. Thank you so much for giving this information; I really appreciate it.

Mr. G: You are welcome, Nigel.