MITIGATING THE IMPACT OF GLOBAL PANDEMIC POST COVID-19 IN MANAGING PROJECT

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MASTER OF PROJECT MANAGEMENT

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DECLARATION

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

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APPROVAL FOR SUBMISSION

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ABSTRACT

The Covid-19 condition has created an unprecedented situation for companies involved in all levels of projects. Project team members have had to face unparalleled challenges, which caused companies to change the way they approach project management activities. As part of this adaptation, the study wanted to observe whether there are tangible changes taking place, and if so what is the impact of those changes within organizations. To explore this, a quantitative study with 100 participants was carried out. The variables under study included looking at methods used for project management, human resource factors and their organizational approach, the impact on key success factors and how delays have impacted these project execution techniques. The results indicated that the variables used have all impacted project execution, indicating their importance during this unprecedented period. With these findings, project team members and organizations can start developing systems which can mitigate the external risk and its transfer onto projects, something which has come full force in the current business environment. There were several key findings which were part of the current study. The current study looked at for different variables and their impact on how projects were being executed, and the results indicated that all of the factors including the impact of delays, key success factors, methods used, as well as human resource upskill were all significantly correlated with the variable. This clearly indicates, the project team members will face differential headwinds as they go into this coronavirus situation, which then requires them to influence the way they carry out their projects, requiring them to tweak important factors around how the project execution takes place.

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Introduction

1.1 General Introduction

The first chapter provides the basic overview of the research which is being pursued. There are many different aspects which are covered in the first chapter. One of these is to understand the background of the research thus far. There is also the description of the research objectives and research questions, along with the rationale in which the research is being carried out. Along with this, there is a focus on the benefits of this research, which will be divided between academic benefits as well as practical benefits. Given that the study has practical implications, it is likely that these benefits would need to be segregated accordingly. Lastly there is a general outline of the chapter which indicates how the thesis will flow from the first chapter onwards and what will be covered within the chapters as well. This gives outside stakeholders' point of view how the logical flow will develop.

A project can be considered to be the achievement of a specific objective, which involves a series of activities and tasks which consume resources. It has to be completed within a set specification, having definite start and end dates (Munns and Bjeirmi 1996).

This post covid-19 pandemic's silver lining has been a chance to experiment with technologies whilst using cooperative measures across borders that would lead to safer, more sustainable and more inclusive international features. The current state of crisis forces us to consider the necessity of structural shifts not only in our relationship with the environment but also how we conduct ourselves as a global community. The unprecedented context is simultaneously driving us to become far more dependent on digital breakthrough, biological and physical technologies. As well as, driving dependencies on us to be far more inventive about how we can use these emerging technologies to create value in new ways. Leveraging on such technologies post this pandemic to mitigate the impact of covid-19 to manage projects whilst ensuring quality is not compromised is a big deal to fortify project success.

In such crisis, leadership is extremely important as well. It is vital to have objectives and missions in place to provide guidance and support to team members. This is so no one in the team is felt left out or demotivated during this outburst. It is important to ensure everyone is on the same page to ensure work flows. As project managers or leaders, we have to take lead and take charge it terms of planning, action, direction and knowledge sharing. For example, is there enough technology bandwidth to cope? How will communication with team members be

managed? It is extremely important to be able to gather such accurate information quickly. As well as to share this information with the rest of the team. We need to carve the path and lay the foundation to provide assistance to the team members so that work continues smoothly.

A lot of people are working from home these day. Some are used to it but many of those people are not used to it and some have never done it before. As the saying goes, “there is a first to everything”. It is going to require lot of adjustment especially during this severe restriction on social interaction. However, this does not mean that work has to be put on hold or will be jeopardize. There might be limitations but we can still work together to deliver a successful outcome. Nothing is possible nor stronger than our mind. What we perceive, we can achieve.

Various authors and researchers have identified a number of factors, either from experience or research that are important to project success. (De Wit 1988) and other writers distinguish between project success (measured against the overall objectives of the project) and project management success (measured against the widespread and traditional measures of performance against cost, time and quality).

Critical success factor (CSFs) is the term for an element that is necessary for an organization or project to achieve its mission. It is a critical factor or activity required for ensuring the success of a company or an organization. "Critical success factors (CSFs) are those few things that must go well to ensure success for a manager or an organization, and, therefore, they represent those managerial or enterprise area, that must be given special and continual attention to bring about high performance. CSFs include issues vital to an organization's current operating activities and to its future success." (Boynton and Zmud 1984).

In any discussion on success, it is essential that a distinction must be made between project success and the success of the project management effort, bearing in mind that good project management can contribute towards project success but is unlikely to be able to prevent failure (De Wit 1988). In contrast, project management can be defined as the process of controlling the achievement of the project objectives. Utilizing the existing organizational structures and resources, it seeks to manage the project by applying a collection of tools and techniques, without adversely disturbing the routine operation of the company (Munns and Bjeirmi 1996).

The function of project management includes defining the requirement of work, establishing the extent of work, allocating the resources required, planning the execution of the work, monitoring the progress of the work and adjusting deviations from the plan.

1.2 Importance of the Study

The rationale for conducting the research is due to the destructive impact of the coronavirus situation on projects around Malaysia as well as globally. Most infrastructure projects have to be stopped due to the coronavirus which is causing major delays and has also put into question the survivability in possibility of many projects which were seen to be instrumental for the transformation of the economy. For example, the East Coast Railway will not be built because the government does not have enough funds to push through with these projects. Additionally, the fear of external events has created an environment in which project managers have to be fully aware about the expected implications. Even though the coronavirus situation is outside of the construction industry, it is still expected to have an impact on a frequent basis. In the future, the types of viruses which are expected to impact economies will also change requiring project managers to remain flexible and take lessons from the current coronavirus situation and the handling of projects within that.

1.3 Problem Statement

The pandemic situation is a first for many stakeholders in a very long time. This has created many different panic reactions from stakeholders, eventually causing delays in the projects which were announced. It goes without saying that cancellation of projects has a dominant effect on the economy, as the construction sector provide one of the highest levels of output to any economy. As such, it is important to understand what are some of the reasons which are causing these delays, and what project managers can be doing to stem the issue which arises out of these delays. Delays are extremely costly, and projects then have to either cut down resources or cut down the quality of materials to be able to make the deadline within the given budget.

Additionally, as many different projects have been delayed due to the pandemic situation, this creates a dormant scenario within which project managers are expected to up skill themselves and understand what they need to be doing to restart projects once the situation returned back to normal. It is expected that in 2021, the situation should be largely back to

normal once the vaccine is available. As such the current study provides some insight into the factors which are causing delays, and what can be done to overcome them, or at the very least identify them within their own projects or those under the influence. They can then combine this knowledge with that of the wider environment to make decisions about where the resources should be allocated.

1.4 Aims and Objectives

The aim of the research is to develop a strategy framework of critical success factors in managing projects post Covid - 19.

The main objectives of the research are formulated as follows:

1. To identify ways projects were executed post Covid-19.
2. To establish the critical factors that dictates the success of managing projects post Covid -19.
3. To investigate the significant impact of the critical success rates of managing projects post Covid -19.

The objective of this study is to help the researcher answer the research questions which are:

Research Question 1 – What are the ways used to manage projects post Covid – 19?

Research Question 2 – What are the critical success factors that contributes to managing projects post Covid -19?

Research Question 3 – Does post Covid – 19 have a significant impact on the critical success rates of managing projects?

1.5 Scope and Limitations

The scope of the study is to understand the impact of the coronavirus on project execution in Malaysia.

The first limitation of the study is that the sample size is restricted to the number of individuals that will be chosen. This limitation can be improved in the future by improving the sample size in studying a larger sample size with more time for data analysis.

The second limitation of the study is that the focus of the study is on how project execution is being delayed through the coronavirus. The focus may be more on the problem aspect rather than the solution aspects which can be considered the second limitation.

1.6 Contribution of the Study

This study will be beneficial to practitioners who specializes in projects by adopting the finding from the research into their project implementation especially during this post pandemic Covid-19. The analysis results shall be of great interests of project managers whose tasks are to manage projects successfully even during these tough times (Klum, 2006) . It is crucial for project manager to understand the different critical factors available throughout the project life cycle. This is because different factors will pose different effect to the different stages of a project lifecycle. What more during such an epidemic?! The identification of the critical success factors will be very useful to provide industry practitioners and stakeholders with lessons learned from past projects.

The results of the study will provide a guide for industry practitioners to design their future plans and solutions in order to encourage broader implementation and use of critical success factors method in their future projects.

It is hoped that the study will contribute to the industry by providing better understanding on which critical success factors that dictates the success of projects post Covid-19. It is also expected to able to provide project managers from the industry valuable insights into how they can consistently achieve superior results on their project despite the post Covid-19 catastrophe.

1.7 Outline of Report

Chapter 1: this is the first chapter which introduces all of the specific variables that will be studied. It is also the chapter which will introduce the research background which will be benefiting from the research.

Chapter 2: this is the literature review chapter. The goal of the literature review chapter is to review all of the major literature which explored the relationship of the variables. There is also the chapter within which will be a discussion of the conceptual framework which will dictate

what sort of variables will need to be studied and how they can be studied within one framework.

Chapter 3: this is the data methodology chapter. The goal of this chapter is to outline all of the important aspects of the research itself. This includes the type of sampling method which will be used as well as how and what type of study will be conducted. There will be decisions made between qualitative and quantitative studies which will help exemplify to researchers how the author wishes to carry out the research.

Chapter 4: this is the data analysis, results and discussion chapter. In this chapter, the data which has been collected from respondents will be analysed using the statistical software. The numerical results of this will be presented along with some insights about what the results mean.

Chapter 5: is the conclusion chapter. In this chapter, all information will be synthesised into one area which allows researchers to understand what has been covered in the study and how this study adds to the body of literature which is available on the topic as well. Implications of the study will also be explored within the conclusion for future researchers. This topic will also outline future studies which can be undertaken using the variables that have been looked at as well as improvements which can be done to the existing studies.

Chapter 2
Literature Review

2.0 Introduction

The second chapter will give more details about the literature review, which is where most of the important literature is looked at and broken down into successive themes. Since the focus is on understanding the impact on project management during the pandemic period, there will be a heavy influence of pandemic literature in trying to see the impact and also forecast the impact moving forward. The goal is not to look at the past, but look at the future and how the variables are expected to work closely with each other.

2.1 Project Management Techniques

Project management is defined as a set of activities around managing a project successfully. There are many different techniques which are available from a project management perspective and help project managers to understand and move forward with executing projects within the established timeline (Klum, 2006). Project management techniques are focused on improvising the current resources and also helping overcome any delays in the project management process.

One concept which has been applied successfully within many different contexts is that of using agile methodology with project management techniques. Agility bring strength within the project management framework as it makes it easier to incorporate any changes which can take place during the process, even as the process is executed. This methodology has been confirmed to be in the literature as bringing value to organisations by making the supply chain more effective as well (Atherton, et al., 2007). A project management perspective, it also allows the incorporation of feedback within the communication loop which then also adds an extra layer of robustness on the system that the company is trying to execute. The goal is to execute projects within short sprints, and to understand what are the needs of the organisation to be able to complete that within a specific time frame.

Other more classic techniques such as the waterfall technique are useful for project managers and have been used for many years. The waterfall technique allows managers to get a better overview of how the project is supposed to be executed, and also list out many of the dependencies which will make the project a reality (Balakrishnan, et al., 2014). The waterfall technique has been helpful for project managers; however, it is limited in its implications which

is why project management requires many different techniques to be executed within the same project. Attached to the idea of the waterfall technique is that of the critical path management. Finding the critical path and making sure that the changes in the critical path are reflected adequately are just some of the concerns with project managers have when it comes to deploying this technique.

In essence, the literature has listed many different project management techniques and all of them are focused on trying to overcome the barriers which exist within the project itself. It is also focused on giving better visibility to Project managers and other stakeholders that are looking to understand the information in front of them and then use that for specific decision-making.

Table 2-1:Techniques Used for Project Management

Methods Used	Author/Date
Delaying of payments	(Klum, 2006)
Status Quo practices	(Atherton, et al., 2007)
Cash flow management	(Atherton, et al., 2007)
Agile project management	(Klum, 2006)

2.2 Critical Success Factors in Projects

Critical success factors within projects vary significantly depending on the nature of the project. Different projects have different levels of complexity which then can critically chain some of the success factors necessary to execute the project. Many different research has been carried out to try to understand what are some of the major critical success factors necessary to execute projects of any size (Chawana & Bogaert, 2011). This then lead to specific factors to be identified, all of which have to be present within Project managers.

The first of these factors is that of the competence of the project manager. This is considered to be one of the more significant variables that is impacting critical success. Project manager through his own ability is able to provide the necessary skills and framework for the project to be successful (Garrett, et al., 2009). The project manager and his ability to bring efficiency in the process and create greater transparency are just some of the factors which impact the performance of any project.

The second important factor is that of the quality of subcontractor's services. Construction is one of those unique feels in which subcontractors have to come together with the major contract is to execute the project (Carr, et al., 2011). Research is essentially sure that subcontractors and the quality has a significant relationship with success in projects and it is their timeliness and their quality factors which will make the project a success or even a failure.

Among other factors, the last factor which has importance is that of the top management support. Top management support is seen to be crucial especially when projects hit specific roadblocks. The top management has to provide the necessary resources and also has to look at some of these issues in a fashion which makes it easy for them to develop the project effectively. Top management support is necessary for project managers as well that are looking to overcome some of these challenges, which makes their position extremely dependent on support from top management for various types of resources and capabilities.

As such, critical success factors are also dependent on external situation of the project. The current pandemic situation is an example of how external factors will be impacting the project management process (Wyk, et al., 2004). From impacting the time required to manage the process and also managing the delays are just some of the factors which will become hyper clear in an environment where everything has become a factor of being shut down depending on whether the government is able to successfully fight the pandemic situation.

Table 2.2: Key Success Factors Identification in Projects

Key Success Factor	Author/Date
Flexibility	(Chawana & Bogaert, 2011)
IT Systems and their usage	(Garrett, et al., 2009)
Subcontractors and their impact	(Carr, et al., 2011)
Project managers	(Garrett, et al., 2009)

2.3. Impact of Pandemics on Society

Pandemics are defined as specific outbreaks of diseases which can lead to an entire social structure to be impacted. Even though there have been many different pandemics before, such as the Black plague, recent pandemics are becoming common, and in 2020 the world has to face the pandemic situation caused by the coronavirus. Almost a year, different societies around the world had to quickly adapt to the new situation which also impacted all aspects of society including economic, social, and even political aspects (Bego & Bodinaku, 2006).

All of the many study, the impacts of pandemics, some of the more important ones for society are those relating to overall mental health. The stress which individuals have to face by isolating themselves or their loved ones are going through the process of keeping themselves safe is becoming clearer (Jonas & Warford, 2014). Mental health within societies impacted negatively, when large amounts of individuals are forced to stay home. As such, mental health will be impacted on a societal level which indicate that greater level of emotional support would be required to keep society working effectively through a pandemic period.

From a business perspective, pandemics have a disastrous effect. Projects which is likely that major projects would be delayed as supply may not be able to be procured or even worse the funds which are necessary for the project might not be available anymore. This then puts on hold all different projects which the company might be looking to execute (Greene, et al., 2012). The overall impact on society is that output decreases, and in an extreme case, countries can go into recession. Given the current situation that the world is going through, there is a full expectation that most countries will hit a recession in 2021, which is considered to be a material impact on society, a society suffers through reduction in wealth.

There are other types of social costs which are also being fulfil by institutions and governments. For example, subsidising the cost related to importing masks within a country has to be taken up by the government. At the same time, most governments around the world have gone on a quantitative easing which is forcing them to print more money so that they can support the economy. In essence, all countries around the world have to dig deep when it comes to coming up with new resources that can help them keep stability within the economy and also fight of the economic impact of the pandemic.

Table 2.3: Type of impacts investigation within pandemic periods

Type of Impacts	Author/Date
Upskilling HR	(Buzzetto-More, 2013)
Delay in projects	(Atherton, et al., 2007)
Uncertainty about future	(Chawana & Bogaert, 2011)
Project cancellation	(Klum, 2006)

2.4 Impact of Covid on Project Execution

As such, when it comes to the impact of Covid on project execution, according to recent literature which is being studied on the topic, it becomes clear that there are many different aspects of how the pandemic is impacting project execution. Many examples can be seen from the business environment within which individuals are making decisions and companies are forcing delays all of which are aspects of project execution.

One large impact which is clear in many of the infrastructure projects is that there are overall delays when it comes to project execution (DeBruin, et al., 2012). Most infrastructure projects have been delayed indefinitely, till the situation clears up. In many cases, the resources and liabilities which have been committed to that project also has to be suspended as well. This for many is an unprecedented situation in which such cancellations are taking place. In most cases, there has never been such a pandemic in which projects have been deferred to this extent, which indicates that dealing with project delays will be one of the major challenges which project managers will face.

Additionally, project managers are now becoming more aware about the impact of external factors within their own project execution (Hashim, et al., 2012). The coronavirus has made it clear that external factors of the construction industry are expected to impact the company just as much as the internal factors. This is especially true for pandemic situation in which movement of people cannot take place as easily as it should.

Project execution has also run into many different bumps mostly because of the safety protocols which have to be incorporated. Aspects such as social distancing has to be practised on project sites, which limits the number of the individual which can be put on any site. There are specific guidelines as well as to what type of vaccinations individuals need to have and also the provision of face masks for the entire employee base (Atherton, et al., 2007). In essence, it

has created many different cost for the project process, which then has an impact on creating a new perspective on how procurement is expected to take place. Procurement may take longer, because there is now a hyper focus on safety and wellness, which has to be completed before any other factors can be pursued.

Additionally, project execution is also facing delays especially for existing projects. Many companies which had the funds to carry out the project do not have the funds anymore, because the upstream has dried up quite quickly (Chawana & Bogaert, 2011). As such project managers are now faced with situations in which they have to execute projects without the proper resources something which is putting a strain on many project managers around the world. Dealing with the problems associated with project management is hard enough, and then putting in a pandemic situation makes it extremely hard just the same. As such, project execution is facing more shortages of resources than it has ever before requiring managers to become creative as to how they wish to control the cost coming out of the project base.

As can be seen, the coronavirus situation is creating a unique situation for project managers. It is forcing them to become more adaptable and also focusing their attention towards the external environment (Carr, et al., 2011). As such, project managers are expected to upgrade their skill set which also includes upgradation of the type of methodologies which are being used to execute the project. It is not enough to use traditional method such as the waterfall method, but requires active input from all departments within an organisation that can help bring greater clarity to the process which then extends itself to the overall situation.

Table 2.4: Impact of Covid on Project Execution During Coronavirus

Type of Impacts	Author/Date
Focus on safety	(Atherton, et al., 2007)
External factors impacting the project	(Carr, et al., 2011)
Delays	(DeBruin, et al., 2012)

2.5 Gap Analysis

A gap analysis will now be conducted to understand the need for the current study.

The pandemic situation is a first for many stakeholders in a very long time. This has created many different panic reactions from stakeholders, eventually causing delays in the projects which were announced. It goes without saying that cancellation of projects as a dominant effect on the economy, as the construction sector provide one of the highest levels of output to any economy (Chawana & Bogaert, 2011). As such, it is important to understand what are some of the reasons which are causing these delays, and what project managers can be doing to stem the issue which arises out of these delays. Delays are extremely costly, and projects then have to either cut down resources or cut down the quality of materials to be able to make the deadline within the given budget.

Additionally, as many different projects have been delayed due to the pandemic situation this creates a dormant scenario within which project managers are expected to up skill themselves and understand what they need to be doing to restart projects once the situation returned back to normal. It is expected that in 2021, the situation should be largely back to normal once the vaccine is available. As such the current study provides some insight into the factors which are causing delays, and what can be done to overcome them, or at the very least identify them within their own projects or those under the influence. They can then combine this knowledge with that of the wider environment to make decisions about where the resources should be allocated (Klum, 2006).

2.6 Conceptual Framework

The diagram below gives the fairer indication of what the conceptual framework is expected to be.

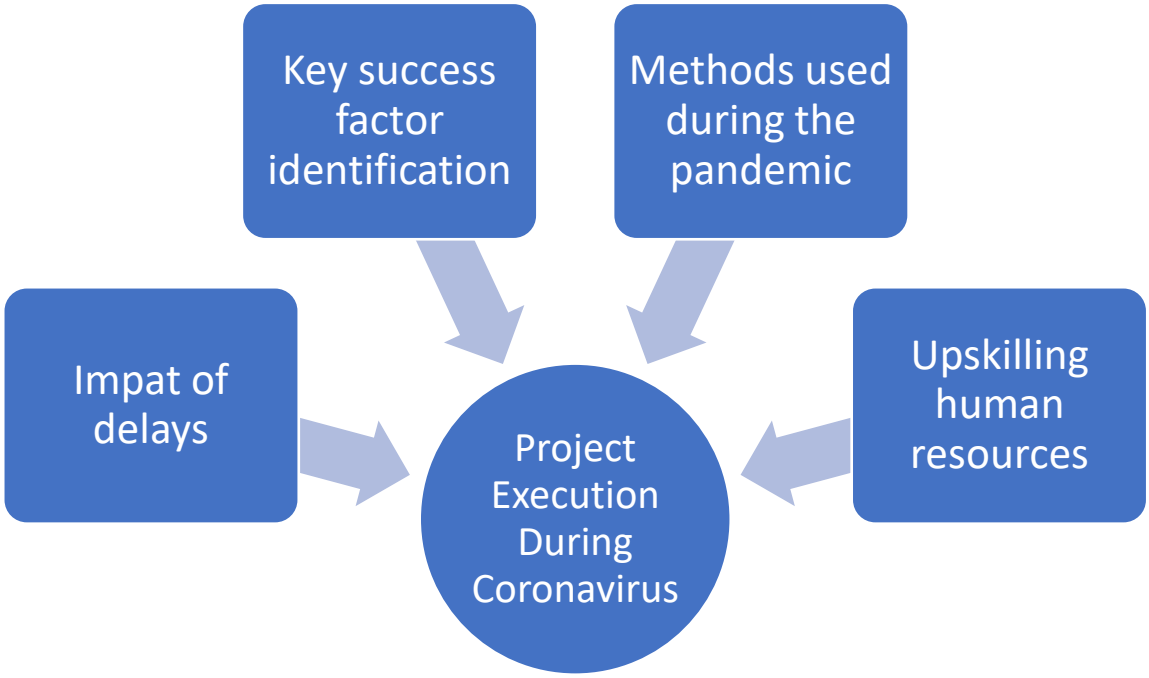

Figure 1: Conceptual Framework

The dependent variable in this case is project execution during the coronavirus, because the overall study wants to understand what are some of the changes from a pre-coronavirus to oppose coronavirus situation. This comparison then helps create a better understanding of how project management has change, which focus on the four independent variables.

The first independent variable is key success factor identification. Key success factor identification is important because the success factors have changed during the coronavirus. There is a better focus now on using different types of factors together in a different context.

Additionally, the second variable is about what type of project management methods are being used during the pandemic. With delays causing major projects to go off-line, project managers are then using new types of methods to deal with existing projects that have resource problems. Understanding these methods is important.

Upskilling the workforce is also necessary, as the pandemic creates new challenges for employees and organisations. The organisation then have to understand what type of new skills they need to give to the employees so that they can execute projects more effectively within the situation that companies have been forced to adapt themselves to.

Lastly there is that of delays. Delays is one of the most common outcomes of the pandemic in project execution. As such, understanding the type of delays which are taking place on what type of projects are impacted through these delays will also be part of the investigation.

2.7 Conclusion

The focus on outcome of the second chapter was to comprehensively review all of the findings around the current research and to understand the various implications of how the variables operationalise themselves within research. All of these variables have been studied in many different contexts as well which is one of the reasons why literature review has so much value. The ultimate goal however of the chapter was to create the conceptual framework identified independent variables. These variables are able to provide a glimpse as to whether they will have a relationship which will then create the basis for the next chapter which focuses on methodology. The literature reviews also concluded that all of the variables have a significant relationship with them literature hence requiring that the methodology reflect some of the needs of how these variables can be operationalised using survey instruments.

Chapter 3
Methodology

3.1 Introduction

The introduction section will focus on describing the purpose of the methodology section. The purpose of the methodology section is to provide a detailed understanding of how the research will be carried out and what are some of the specific factors around the research. It will also take a deeper look at the sample size as well is the instrumentation which is being used all of which will have an impact on the final results.

3.2 Research Design

Research design is the overall methodology which has been chosen for the research. There are many different kinds of methodologies which can be incorporated within research design. There are qualitative and quantitative type of research design which then require further elaboration as to the type of approach which will be adopted.

The research design for the current study is considered to be a quantitative research design with the focus on positivism (Mouselli & Massoud, 2018). Positivism is the paradigms in which an individual focus on trying to create objective relationship between the variables. The research design will usually use a deductive approach to reasoning, in which a small sample through its findings will then be applied to a larger population base. This is to the opposite of inductive reasoning in which larger sample sizes are used to distil some truths.

At the same time, the research design is expected to be cross-sectional in nature. Cross-sectional because it is looking at information at a certain point of time and is unlike a longitudinal study in which the focus is to look on data from a long-term perspective (Crane, et al., 2018). Given the limitation of time, it is necessary to look at the cross-sectional design as it allows for robust understanding of the relationship between independent and dependent variables.

3.3 Population and Sampling Design

The population and sampling design will consist mostly of looking at individuals that are involved directly in projects of some scale in Malaysia. The population then consists of all project team members that are executing projects in Malaysia, and have been impacted by the coronavirus. Given the overall impact on the economy, it is expected that there will be a large-scale impact.

The main sample which will be used is that of project team members that are located in Malaysia. These project managers are expected to come from many different industries, however primarily involved within the construction industry. (Mouselli & Massoud, 2018) Another level of filter is that they will only be chosen from companies that have been directly impacted from the coronavirus situation. It is expected that most companies especially in the construction sector are impacted which will then increase the overall sample size which is available and given that there are no geographic boundaries within Malaysia, it makes it extremely easy to have access to.

From a sampling perspective, the sampling design which has been chosen for the study is that of a random sampling design. A random sampling design will use that establish database of project team members which will then be used to understand the impact of the coronavirus. The sampling design will also have some aspects of convenience sampling as well, as certain individuals were known personally will be used for their feedback on the survey as well. However, given that the overall sample size will be much larger than a few individuals, the more important sampling design is still that related to randomness.

The big advantage of using a random sampling design is that it avoids many of the problems of the convenient sampling. Convenience sampling brings certain level of bias within the calculations, which then can skew results when the data analysis is taking place. Random sampling avoids this by giving equal weight to all individuals which makes it more comprehensive.

3.4 Sample Size

The sample size for the study will consist of around 100 individuals. These 100 individuals will be directly related to the project management industry and mostly within the construction sector.

3.5 Instrumentation

The main instrumentation which will be used is that of a questionnaire survey. A questionnaire survey is a tool used to gather primary data from individuals that have been chosen as part of the respondent profile. The questionnaire survey will usually consist of an initial section in which demographic information is collected, while other sections focus exclusively on the variables which are being looked at. Given that this research consists of five different variables, before independent variable and one dependent variable, it is easy to see why there would be six different sections in the instrumentation. There are many different advantages of using a questionnaire survey (Bego & Bodinaku, 2006). One of the biggest advantages is that it allows collection of data and a quantitative fashion and a much more efficient way as opposed to using face-to-face interaction. However, it does suffer from information gaps which may not be available to the respondent, as they are expected to finish it within their own time.

In terms of how the instrumentation will be carried out there will be a focus on using electronic means of getting that data. The survey will be sent out using email to specific lists which have been identified which will be main method of how the instrumentation will be sent to the respondent profile through which their responses will be collected.

3.6 Operationalizing and measurement

To operationalise the factors which have been chosen, there will be a combination of existing literature as well is direct questions which have been derived from existing literature. One of the limitations is that the current study is looking at the topic which has had very little investigation at this point (Carr, et al., 2011). Most of the journals have not even discussed the full impact of the coronavirus on economies around the world, and because of that there has to be creativity employed in developing questions to understand the practical implications of the coronavirus pandemic. To this extent, there will be literature used to find specific questions relating to the overall themes which are part of the independent variables while at the same

time specific questions will be developed or created based on other literature which has asked similar questions. The context will then be put within the idea of the coronavirus situation and the sample which is being chosen.

Table 3-1: Operationalizing and Measurement of Managing Project

Methods Used	Author/Date	Questions
Delaying of payments	(Klum, 2006)	1. Companies are relying more on delaying of payments to deal with the situation
Status Quo practices	(Atherton, et al., 2007)	2. There has been no change in the current methodology of executing the project
Cash flow management	(Atherton, et al., 2007)	3. Tighter cash flow is causing companies to focus more on cost cutting
Agile project management	(Klum, 2006)	4. Lean project methodologies are becoming more common in execution

Table 3-2: Key Success Factors in Managing Projects during Pandemic

Key Success Factor	Author/Date	Questions
Flexibility	(Chawana & Bogaert, 2011)	5. My company is making its supply chain more flexible due to the delays 6. Being flexible in this environment is a key success factor
IT Systems and their usage	(Garrett, et al., 2009)	7. Using new and existing IT systems helps streamline the business processes 8. Technology is being used to cut down cost of carrying out projects from all aspects
Subcontractors and their impact	(Carr, et al., 2011)	9. Subcontractors are important for project execution
Project managers	(Garrett, et al., 2009)	10. Adept project managers are becoming more important

Table 3-3: Type of Impacts Expected during the Pandemic whilst Managing Projects

Type of Impacts	Author/Date	Questions
Upskilling HR	(Buzzetto-More, 2013)	11. Significant changes in skill base has taken place due to the pandemic 12. Companies are focusing on giving new skills to employees during this time 13. Higher productivity is a requirement of the upskilling which is being done 14. My company is not making any such investments 15. I believe upgrading human skills are only part of the answer, with a combination of factors required
Delay in projects	(Atherton, et al., 2007)	16. The current pandemic situation has delayed the projects that were being worked on 17. Too many delays are causing cancellation of the existing projects

Project cancellation and financial impact	(Klum, 2006)	18. Financial impact is an important dimension of delays 19. In my opinion delays will continue to increase the cost of existing projects

Table 3-4: Type of Impacts Post Covid-19 Pandemic

Type of Impacts After Pandemic is over	Author/Date	Questions
Focus on safety	(Atherton, et al., 2007)	20. Lean project management methodologies are expected to become the norm
External factors impacting the project	(Carr, et al., 2011)	21. Project execution has changed forever after the coronavirus situation 22. Living without implementation of IT would not be possible in the new normal
Delays	(DeBruin, et al., 2012)	23. Key success factors have an impact on execution of projects during and after the coronavirus situation

3.7 Data Collection Procedure

The data collection procedure will focus on using electronic methods of sending the survey. The electronic methods will be useful in helping respondents fill out within their own time, and at the same time allows all the information to be collected in a centralised fashion. This centralisation is helpful because data can then be used for statistical analysis and can be sent to various software for further understanding and statistical analysis, which makes it easier on the researcher to conduct their analysis.

3.8 Data Analysis

For data analysis purposes, the only software which will be used is that of SPSS Version 23. SPSS is considered a primary software when it comes statistical analysis and is also a leader when it comes to functionality (Rojon, 2015). The data analysis will focus on trying to synthesise and collect the demographic data while at the same time also look at different statistical sense such as reliability of the variables and even the validity of the variables.

The first type of tests will be statistical tests which focus on the descriptive data. The descriptive tests will try to conduct basic testing for statistics for the sample which has been chosen. These tests include tests such as frequency tables and other basic data to determine the type of respondent profile which has taken part in the study.

The second type of tests which will be carried out are known as reliability tests. Reliability tests are represented by calculation is around the Cronbach Alpha, which determines the internal reliability of the independent variables when it comes to explaining the dependent variable. This will help understand the significance of the variables and the strength of relationship they possess with the dependent variable. In general, higher number represents a higher likelihood that the behaviour of the dependent variable is being explained by the independent variable.

The third type of test is that of a multiple regression test. The multiple regression test will help quantify the relationship between the variables and also create an equation which helps define the relationship. This will complete the analysis, as it will also highlight whether the strength of relationship a significant enough, and if the relationship between the variables is either negative or positive depending on the interaction of those variables with the independent and dependent variables.

3.9 Conclusion

The methodology section and chapter focused extensively on explaining all of the details associated with how the study will be operationalise. The study will be operationalise using first party data which will be collected directly from the sample segment and then analysed using statistical software. This will then give the research a better understanding about how the variables interact with each other and what is the nature of this relationship.

Chapter 4

Results, Data analysis and Discussion

4.1 Introduction

The data analysis chapter will go into some detail when it comes to analysing the primary data which has been collected and then to analyse the strength and direction of the relationship. The goal of this chapter is to statistically analyse the relationship come up with a finding about the independent and dependent variables.

4.2 Descriptive Statistics

Descriptive statistics are important because they give a basic overview of the individuals and respondents involved in the study. Below results indicate that all of the dimensions of the demographic information were filled out successfully by all individuals, and with the split of male-female based on gender as below. The goal is not to show the entire demographic information which can be extremely large but to show a snapshot of that information. The gender balance is important because it has to represent the balance seen an overall society, which then gives better findings as well. If there is an imbalance or there is incorrect positioning, it can lead to the results being slightly skewed in favour of something which is not only representative.

Table 4.1: Gender Breakup

Sex	**Freq**	**%**
Male	65	65
Female	35	35

Table 4.2: Age Breakup

Age	Freq	%
25-34 years old	20	20
35-44 years old	27	27
45-54 years old	23	23
55 years old and above	30	30

Table 4.3: Race Breakup

Race	**Freq**	**%**
Chinese	40	40
Indian	28	28
Malay	22	22
Others	10	10

Table 4.4: Income Breakup

Income	**Freq**	**%**
RM 2000-RM 3000	22	22
RM 3001-RM 4000	23	23
RM 4001-RM 5000	26	26
RM 5001 above	29	29

Table 4.5: Academic Qualification Breakup

Academic Qualification	Freq	%
STPM	34	34
Diploma	16	16
Degree	26	26
Master/PHD	24	24

The following are the overall results which were developed from a descriptive point of view around the responses of the questionnaire. Different section represents the different points and the items which were discussed, as well as the average mean score which is applied to each of these items. This gives a good indication of the weight of each item within the questionnaire as well as its likely impact as well.

Table 4.6: Impact of delays (ID)

Impact of Delays	Mean
The current pandemic situation has delayed the projects that were being worked on	3.404
Financial impact is an important dimension of delays	3.768
My company is making its supply chain more flexible due to the delays	3.566
In my opinion delays will continue to increase the cost of existing projects	3.444
Too many delays are causing cancellation of the existing projects	3.505
Average	3.537

In impact of delays, the highest value was seen for the instrument which covered the financial impact of the delays. This is well regarded in the literature as well as the economic cost of delays are the most concerning for project managers.

Table 4.7: Key Success Factors (KSF)

Key Success Factors	**Mean**
Being flexible in this environment is a key success factor	3.556
Using new and existing IT systems helps streamline the business processes	3.545
Subcontractors are important for project execution	3.354
Adept project managers are becoming more important	3.292
Companies have to leverage new techniques to stay successful in project execution and delivery	3.253
Average	3.400

In the Key Success Factors aspect, the highest value was seen for being flexible in the new environment. This would also be corroborated by ideas of lean management and flexible project management techniques which are expected to become more important moving forward.

Table 4.8: HR Upskilling (HR)

HR Upskilling	**Mean**
Significant changes in skill base has taken place due to the pandemic	3.636
Companies are focusing on giving new skills to employees during this time	3.434
Higher productivity is a requirement of the upskilling which is being done	3.515
My company is not making any such investments	3.474

I believe upgrading human skills are only part of the answer, with a combination of factors required	3.374
Average	3.487

In the HR category, the most important aspect was seen to be that of the skill base changes. Project managers would be required to become more varied in their approaches and develop new skillsets associated with crisis situations.

Table 4.9: Methods Used (MU)

Methods Used	**Mean**
There has been no change in the current methodology of executing the project	3.404
Companies are relying more on delaying of payments to deal with the situation	3.576
Tighter cash flow is causing companies to focus more on cost cutting	3.616
Lean project methodologies are becoming more common in execution	3.556
Technology is being used to cut down cost of carrying out projects from all aspects	3.475
Average	3.525

Tighter cash flow was seen as the main issue. This is expected and corroborates with the first findings of the concerns about financial impact of the delays being caused by the coronavirus situation.

Table 4.10: Impact on Project Execution (PE)

Impact on project execution	**Mean**
Project execution has changed forever after the coronavirus situation	3.515
Living without implementation of IT would not be possible in the new normal	3.455
Lean project management methodologies are expected to become the norm	3.566
Key success factors have an impact on execution of projects during and after the coronavirus situation	3.455
Average	3.497

Overall, lean project management techniques are expected to be adopted during this time. Flexible changes in the schedule have to be accommodated to accede to this request.

4.3 Normality Analysis

Normality Analysis – Impact of Delays (ID)

Normality analysis is done essentially to find out whether the variable, which in this case is the independent variable is normally distributed. A normal distribution is important because normality has to be achieved and there has to be very little to no skewness in the data which can impact the overall result. The normality analysis below clearly indicates that the significance level is well below the 0.05 benchmark. This essentially indicates that for the variable chosen there is normality and it can be used for further statistical analysis.

Table 4.11: Normality Test for ID

	Kolmogorov-Smirnov[a]			**Shapiro-Wilk**		
	Statistic	df	Sig.	Statistic	df	Sig.
Effectiveness	.164	100	.000	.934	100	.001

Normality Analysis – Key Success Factors (KSF)

A normal distribution is important because normality has to be achieved and there has to be very little to no skewness in the data which can impact the overall result. The normality analysis below clearly indicates that the significance level is well below the 0.05 benchmark. This essentially indicates that for the variable chosen there is normality and it can be used for further statistical analysis.

Table 4.12: Normality Test for KSF

	Kolmogorov-Smirnov[a]			**Shapiro-Wilk**		
	Statistic	df	Sig.	Statistic	df	Sig.
Effectiveness	.175	100	.001	.934	100	.0012

Normality Analysis – Methods Used (MU)

A normal distribution is important because normality has to be achieved and there has to be very little to no skewness in the data which can impact the overall result. The normality analysis below clearly indicates that the significance level is well below the 0.05 benchmark. This essentially indicates that for the variable chosen there is normality and it can be used for further statistical analysis.

Table 4.13: Normality test for MU

	Kolmogorov-Smirnov[a]			**Shapiro-Wilk**		
	Statistic	df	Sig.	Statistic	df	Sig.
Effectiveness	.256	100	.002	.963	100	.001

Normality Analysis – Upskilling Human Recourse (HR)

A normal distribution is important because normality has to be achieved and there has to be very little to no skewness in the data which can impact the overall result. The normality analysis below clearly indicates that the significance level is well below the 0.05 benchmark. This essentially indicates that for the variable chosen there is normality and it can be used for further statistical analysis.

Table 4.14: Normality Test HR

	Kolmogorov-Smirnov[a]			**Shapiro-Wilk**		
	Statistic	df	Sig.	Statistic	df	Sig.
Effectiveness	.143	100	.000	.963	100	.002

4.4 Reliability Analysis

Reliability analysis is to understand how well the independent variable is able to describe the changes in the dependent variable. A higher reliability answer would indicate that the variable is largely responsible for changes in the dependent variable and the higher level will indicate a higher correlation as well. In other words, reliability increases as the value of the correlation increases as well.

Reliability – Impact of Delays (ID)

The reliability that has been assessed for this independent variable is that of 55.5%. This shows that this percentage is reflected within the dependent variable through the independent variable which shows that there is enough significant relationship.

Table 4.15: Reliability of ID

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.555	.555	5

Reliability – Key Success Factors (KSF)

The reliability that has been assessed for this independent variable is that of 52.2%. This shows that this percentage is reflected within the dependent variable through the independent variable which shows that there is enough significant relationship.

Table 4.16: Reliability of KSF

		N	%
Cases	Valid	100	100.0
	Excluded[a]	0	.0
	Total	100	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.522	.522	5

Reliability – Methods Used (MU)

The reliability that has been assessed for this independent variable is that of 68.8%. This shows that this percentage is reflected within the dependent variable through the independent variable which shows that there is enough significant relationship.

Table 4.17: Reliability of MU

		N	%
Cases	Valid	100	100.0
	Excluded[a]	0	.0
	Total	100	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.688	.688	5

Reliability – Upskilling Human Resource (HR)

The reliability that has been assessed for this independent variable is that of 66.5%. This shows that this percentage is reflected within the dependent variable through the independent variable which shows that there is enough significant relationship.

Table 4.18: Reliability of HR

		N	%
Cases	Valid	100	100.0
	Excluded[a]	0	.0
	Total	100	100.0

Reliability Statistics		
Cronbach's Alpha[a]	Cronbach's Alpha Based on Standardized Items[a]	N of Items
.665	.665	5

4.5 Regression Analysis

A regression analysis is carried out to understand the direction and the sense of the overall relationship between the variables. A regression analysis is a tool used to understand whether there is a significant relationship and how can the relationship be expressed within a specific type of equation. It is also the best estimate of whether the overall fit is significantly related, with the goal of having a high relationship which is able to be below the significance level of 0.05.

As the results clearly indicate, the overall significance level is below 0.05. This indicates that the overall model it is able to explain the relationship in the independent variables significantly which can then be used as a way of inclusion for other types of independent variables as well.

The R Square which was calculated for the study was 0.094. This indicates, that there is around a significant amount of correlation between the variables, which is further signified by the fact that there is a significant relationship which exist due to the idea that there is a value below 0.05. Through this, it can be concluded that the R Square represents a significant relationship between the variables indicating the strength of the relationship as well.

Table 4.19: Regression Analysis

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.094[a]	.009	-.012	.68343	.009	.428	100	100	.033

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.599	3	.200	.428	.023[b]
	Residual	67.259	144	.467		

	Total	67.858	147			

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.598	.450		5.772	.000
	ID	.034	.083	.037	.448	.015
	KSF	.083	.089	.075	.897	.011
	MU	.042	.076	.048	.582	.012
	HR	.031	.083	.037	.448	.015

a. Dependent Variable: PE

Given that the relationship is significant in terms of having an impact, when relating back to the original objectives which were set out, it can be said that based on the research questions posed; Most evidently it is techniques associated with lean management which are expected to have the most impact. The biggest critical success factor has to do with being flexible in the current environment. Flexibility affords success. With increasing importance of flexible methods, it is expected that traditional methodology will change to adapt to the new environment focused on lean management and flexible mind-set.

In a nut shell, all three objectives are achieved. Objective 1 is to identify ways for project execution. Based on the findings of the study companies would need to invest in HR, change their methods to a flexible approach and also incorporate external factors quantitatively within project timelines. Objective 2 is to establish the critical factors that indicates the success of managing projects post Covid-19. As can be seen, based on the correlation levels, critical factors have an important and significant relationship. Objective 3 is to investigate the significant impact of the critical success rates of managing projects post Covid-19. The model is statistically significant indicating a quantitative relationship and measurement of the impact on project execution from Key Success Factor followed by Methods Used, Impact of Delays and Upskilling Human Resource. All variables contribute to explaining the impact on project execution during the coronavirus pandemic. The results also

indicate that companies would need to start formalizing procedures around these methods to enhance their understanding of project execution during this time.

Chapter 5
Conclusion

5.1 Introduction

The last chapter synthesises the information from all the previous chapter is to understand whether the findings reflect that which is known in the literature. The goal of this chapter is also to conclude the findings and to understand whether the findings are able to connect the variables and give a better understanding of the impact on the dependent variable.

5.2 Major findings

5.2.1 Impact of Impact of Delays

The impact of delays was the first independent variable which was analysed in the study. Impact of delays was defined as the impact of the delays taking place within project execution during the coronavirus situation (Chawana & Bogaert, 2011). Most projects of any size were delayed, because there was not enough workforce to be able to work on the sites, and governments around the world were banning construction activities as these were high-risk zones where the coronavirus can spread. The literature or general analysis of the literature indicated that the impact of delays on project execution were primary concern is delays generally increases the cost of the project. It also delays the implementation of the project all of which is negatively impact the time line.

The results indicated that there was a 55.5% co-relation between this variable and the dependent variable along with the overall significance attached to the multiple regression clearly indicated that the significance of the relationship is impacting the dependent variable.

The results indicated that the delays were positively related to project execution during this period. One of the main reasons being that delays were being put forward by the management on a regular basis, which then require employees to work effectively around these delays (Crane, et al., 2018). Delays had various impact on the project including reducing the number of resources available, as well as increasing the opportunities for raw materials to not reach on time. The entire supply chain was impacted which meant that delays could not always be prevented, indicating that project execution required its focus consistently.

5.2.2 Impact of Key Success Factors

Success factors are defined as those factors which have to be present for the project execution to be executed successfully. Key success factors would vary depending on the type of project, indicating that key success factors are dependent on the type of project execution (DeBruin, et al., 2012). However, research indicates that when it comes to key success factors and their similarities with construction projects, there are several key success factors. For example, adaptability and flexibility within project execution is considered a key success factor because it can have a wide-ranging impact on the success of the project. In essence, the impact of key success factors is generally variable depending on the type of project and the business environment in which the project is being executed.

The results indicated that there was a 52.2% co-relation between this variable and the dependent variable along with the overall significance attached to the multiple regression clearly indicated that the significance of the relationship is impacting the dependent variable.

The results of the study clearly indicated that key success factors were being considered by project managers and there was a changing of some of these key success factors. Key success factors will focus more on adaptability and flexibility within project execution indicating that the nature of some of these key success factors are changing as well is its importance (Täuscher, 2018). Flexibility and adaptability have always been important, however the current general environment is creating a greater need due to the general delays in the environment and the mismatch of the value chain which is taking place. Key success factors have changed in nature, with flexibility and adaptability being the most important factors which have to be addressed by project managers.

5.2.3 Impact of Methods Used

The impact of methods used is an independent variable to understand how methods that were being deployed for project execution change during the coronavirus situation. The usual methods which were being employed were either the waterfall method or other similar methods of planning the project cycle so that it remain successful in any normal business environment (Rojon, 2015). However, the researchers also shown that when it comes to changing external environment factors, the methods which are used to execute the project can change dramatically. For example, if there are changes in the supply of raw materials, it can cause significant changes in the project execution to the point where the architect would need to make

changes to accommodate some of these new issues. As such, the impact on methods is highly dependent on the situation as well is the context of the changes taking place.

The results indicated that there was a 68.8% co-relation between this variable and the dependent variable along with the overall significance attached to the multiple regression clearly indicated that the significance of the relationship is impacting the dependent variable.

This study also ratified that there was an effect on impact of methods indicating that the type of methods which are chosen have slightly changed during the coronavirus situation. For example, methods related to adaptability and preventing any further delays were seen to be more important as compared to normal project executing paradigms. This would indicate that the type of methods which are chosen might change significantly going forward as companies start valuing the importance of the external environment and start internalising that successfully. This is a future area of research which can be looked at as well.

5.2.4 Impact of HR Upskilling

This variable measured how human resource investments and making them more flexible during this environment was having an impact on project execution methods. Overall it was seen, there when it comes to project execution the human resources were involved in understanding how they can improve the skill levels of their workforce and through that improve the output and productivity (Wyk, et al., 2004). This was in context with the overall changes taking place in the wider environment in which individuals are losing their jobs and there is less propensity for job creation. This was one reason why there was a focus on upscaling individuals so that they are able to meet the new environment successfully is more individuals would need to carry out in different types of roles.

The results indicated that there was a 62.5% co-relation between this variable and the dependent variable along with the overall significance attached to the multiple regression clearly indicated that the significance of the relationship is impacting the dependent variable.

The results indicate that the type of upskilling which is expected during this time has changed to some degree as opposed to that before it. The focus now of upskilling is that of creating individuals that are in some essence more flexible than before (Balakrishnan, et al., 2014). Flexibility is given in the sense of these individuals executing different types of skill sets which required them to take on different roles as well. Human resources as a consequence is now

looking at how they can improve productivity of existing individuals so that they can cover the shortfall in productivity which is expected when individuals are laid off as a consequence of the current coronavirus situation.

In conclusion, all three objectives are achieved. Objective 1 is to identify ways for project execution. Based on the findings of the study companies would need to invest in HR, change their methods to a flexible approach and also incorporate external factors quantitatively within project timelines. Objective 2 is to establish the critical factors that indicates the success of managing projects post Covid-19. As can be seen, based on the correlation levels, critical factors have an important and significant relationship. Objective 3 is to investigate the significant impact of the critical success rates of managing projects post Covid-19. The model is statistically significant indicating a quantitative relationship and measurement of the impact on project execution

5.3 Suggestions from your research

The first suggestion from the research is that project managers would need to be more flexible when it comes to execution of the projects. Project managers cannot rely on static modes of executing projects, and cannot just look at internal information to make decisions about the feasibility of the project. They would need to start looking at external environment information and incorporate that effectively to achieve the result of correct project execution in a change business environment.

The second suggestion is that the methods which are used during normal times during project execution would need to change as well. The current environment is focusing companies to be more flexible when it comes to their supply chain and project execution cycle, and do more with less. This indicates, that companies will start to look at information technology as a way of plugging the gap of productivity and use that to streamline their decision-making as well.

5.4 Contribution to research

From a theoretical point of view, the current contribution of the research is more towards understanding the impact of the coronavirus situation on the general construction environment and project execution in Malaysia. Malaysia like other countries has suffered from the coronavirus situation, and the current contribution of the researchers to extend findings on how this impact is having power on project team members to change the way they approach project execution. In many ways it contributes towards how project managers execute projects within diverse environments.

From a practical perspective, it gives project managers that are involved with companies a better understanding of some of the factors which are impacting the delays in their projects. By summarising the information and getting primary research, they can then have a better understanding of how they can positively impact the cycle so that there is consistent improvement in the project execution.

5.5 Recommendations for future research

The only suggestion which can be given for future research is that of including more variables within the study. This suggestion focuses on including up to two different variables, including the impact of regulatory frameworks during the coronavirus situation. One unique aspect of the coronavirus situation is that governments around the world are now spending large amounts of money consistently towards businesses, which should be included as a variable to understand the impact of external environment on the situation.

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Appendix

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Questionnaire

Dear Sir/ Madam,

This survey will only be used for a research purpose only. This project is being undertaken as part of a Masters course in Project Management.

The purpose of this project is

1. To identify ways projects were executed post Covid-19.
2. To establish the critical factors that dictates the success of managing projects post Covid -19.
3. To investigate the significant impact of the critical success rates of managing projects post Covid -19.

The research team requests your assistance as your input will be vital in providing us with an understanding of the industry practice and key strategies for future development in project management.

This questionnaire should take about 10 minutes of your time to complete. The information collected will be kept confidential and will be stored on a password-protected computer with limited access to only this researcher. Your participation in this survey is completely voluntary.

Should you have any questions, please contact Hema at hemadoshini@gmail.com

Thank for your time.

Section A: Demographic Profile

Please tick (√) your answer

1. Gender:	[ ] Male	[ ] Female
2. Age:	[ ] Below 25 years old	[ ] 25-34 years old
	[ ] 35-44 years old	[ ] 45-54 years old
	[ ] 55 years old and above	
3. Race:	[ ] Malay	[ ] Chinese
	[ ] India	[ ] Others
4. Academic qualification:	[ ] SPM	[ ] STPM
	[ ] Diploma	[ ] Degree
	[ ] Master/PHD	
5. Monthly income:	[ ] Below RM 2000	[ ] RM 2000-RM 3000
	[ ] RM 3001-RM 4000	[ ] RM 4001-RM 5000
	[ ] RM 5001 above	

Section B

This section will set to explore questions around how project delays have changed due to the current coronavirus situation.

Please read the following statements, tick appropriately in the box that best explains your opinion.

1	2	3	4	5
Strongly Disagree	Disagree	Uncertain	Agree	Strongly Agree

Impact of Delays

24. The current pandemic situation has delayed the projects that were being worked on

1 2 3 4 5

25. Financial impact is an important dimension of delays

1 2 3 4 5

26. My company is making its supply chain more flexible due to the delays

1 2 3 4 5

27. In my opinion delays will continue to increase the cost of existing projects

1 2 3 4 5

28. Too many delays are causing cancellation of the existing projects

1 2 3 4 5

Section C

This section will set to explore questions around which key success factors have been impacted due to the current coronavirus situation.

Please read the following statements, tick appropriately in the box that best explains your opinion.

1	2	3	4	5
Strongly Disagree	Disagree	Uncertain	Agree	Strongly Agree

Key Success Factors

29. Being flexible in this environment is a key success factor

1 2 3 4 5

30. Using new and existing IT systems helps streamline the business processes

1 2 3 4 5

31. Subcontractors are important for project execution

1 2 3 4 5

32. Adept project managers are becoming more important

1 2 3 4 5

33. Companies have to leverage new techniques to stay successful in project execution and delivery

1 2 3 4 5

Section D

This section will set to explore questions around how project execution methods have changed due to the current coronavirus situation.

Please read the following statements, tick appropriately in the box that best explains your opinion.

1	2	3	4	5
Strongly Disagree	Disagree	Uncertain	Agree	Strongly Agree

Methods Used

34. There has been no change in the current methodology of executing the project

1 2 3 4 5

35. Companies are relying more on delaying of payments to deal with the situation

1 2 3 4 5

36. Tighter cash flow is causing companies to focus more on cost cutting

1 2 3 4 5

37. Lean project methodologies are becoming more common in execution

1 2 3 4 5

38. Technology is being used to cut down cost of carrying out projects from all aspects

1 2 3 4 5

Section E

This section will set to explore questions around how HR expectations have changed due to the current coronavirus situation.

Please read the following statements, tick appropriately in the box that best explains your opinion.

1	2	3	4	5
Strongly Disagree	Disagree	Uncertain	Agree	Strongly Agree

Upskilling Human Resources

39. Significant changes in skill base has taken place due to the pandemic

1 2 3 4 5

40. Companies are focusing on giving new skills to employees during this time

1 2 3 4 5

41. Higher productivity is a requirement of the upskilling which is being done

1 2 3 4 5

42. My company is not making any such investments

1 2 3 4 5

43. I believe upgrading human skills are only part of the answer, with a combination of factors required

1 2 3 4 5

Section F

This section will set to explore questions around how project execution methods have changed after the current coronavirus situation.

Please read the following statements, tick appropriately in the box that best explains your opinion.

1	2	3	4	5
Strongly Disagree	Disagree	Uncertain	Agree	Strongly Agree

Project Execution After Covid

44. Project execution has changed forever after the coronavirus situation

1 2 3 4 5

45. Living without implementation of IT would not be possible in the new normal

1 2 3 4 5

46. Lean project management methodologies are expected to become the norm

1 2 3 4 5

47. Key success factors have an impact on execution of projects during and after the coronavirus situation

1 2 3 4 5

THANK YOU FOR YOUR CO-OPERATION

SPSS Tables

Item Statistics

	Mean	Std. Deviation	N
ID1	3.0946	1.37191	100
ID2	3.0000	1.42857	100
ID3	2.9122	1.46119	100
ID4	3.2770	1.33412	100
ID5	2.9324	1.39319	100

Inter-Item Correlation Matrix

	TA1	TA1	TA1	TA1	TA1
ID1	1.000	.056	.058	-.074	.110
ID2	.056	1.000	.013	-.029	.167
ID3	.058	.013	1.000	-.158	.004
ID4	-.074	-.029	-.158	1.000	-.074
ID5	.110	.167	.004	-.074	1.000

Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	3.043	2.912	3.277	.365	1.125	.022	5
Item Variances	1.956	1.780	2.135	.355	1.200	.019	5

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
ID1	12.1216	7.631	.080	.020	-.046[a]
ID2	12.2162	7.245	.108	.030	-.091[a]
ID3	12.3041	8.295	-.037	.028	.105
ID4	11.9392	9.609	-.154	.034	.223
ID5	12.2838	7.347	.110	.042	-.089[a]

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
15.2162	10.116	3.18060	5

Item Statistics

	Mean	Std. Deviation	N
KSF1	3.0405	1.42322	100
KSF2	3.1419	1.38018	100
KSF3	3.1081	1.44813	100
KSF4	3.1486	1.40633	100
KSF5	3.1351	1.32813	100

Inter-Item Correlation Matrix

	T1	T2	T3	T4	T5
KSF1	1.000	.084	-.012	.065	.123
KSF2	.084	1.000	.077	.140	-.044
KSF3	-.012	.077	1.000	-.071	.049
KSF4	.065	.140	-.071	1.000	.062
KSF5	.123	-.044	.049	.062	1.000

Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	3.115	3.041	3.149	.108	1.036	.002	5
Item Variances	1.954	1.764	2.097	.333	1.189	.016	5

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
KSF1	12.5338	8.563	.121	.026	.128
KSF2	12.4324	8.669	.125	.037	.124
KSF3	12.4662	9.339	.018	.017	.238
KSF4	12.4257	8.872	.089	.033	.162
KSF5	12.4392	9.105	.090	.026	.161

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
15.5743	11.593	3.40486	5

Item Statistics

	Mean	Std. Deviation	N
MU1	2.8716	1.42991	100
MU2	3.0676	1.46924	100
MU3	3.0135	1.38989	100
MU4	3.0135	1.28299	100
MU5	2.9324	1.43646	100

Inter-Item Correlation Matrix

	TM1	TM2	TM3	TM4	TM5
MU1	1.000	.069	.086	.068	.019
MU2	.069	1.000	.089	.043	-.020
MU3	.086	.089	1.000	-.008	-.044
MU4	.068	.043	-.008	1.000	-.062
MU5	.019	-.020	-.044	-.062	1.000

Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	2.980	2.872	3.068	.196	1.068	.006	5
Item Variances	1.969	1.646	2.159	.513	1.311	.039	5

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
MU1	12.0270	7.809	.120	.016	.002
MU2	11.8311	7.924	.088	.014	.040
MU3	11.8851	8.374	.063	.017	.074
MU4	11.8851	9.014	.020	.010	.121
MU5	11.9662	9.162	-.047	.007	.201

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
14.8986	10.813	3.28828	5

Item Statistics

	Mean	Std. Deviation	N
HR1	2.9865	1.38006	148
HR2	2.9595	1.44692	148
HR3	2.9662	1.39199	148
HR4	3.0946	1.50436	148
HR5	2.9865	1.47996	148

Inter-Item Correlation Matrix

	OP1	OP2	OP3	OP4	OP5
HR1	1.000	.153	-.053	-.009	-.010
HR2	.153	1.000	-.149	-.142	-.051
HR3	-.053	-.149	1.000	-.054	-.132
HR4	-.009	-.142	-.054	1.000	.120
HR5	-.010	-.051	-.132	.120	1.000

Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	2.999	2.959	3.095	.135	1.046	.003	5
Item Variances	2.078	1.905	2.263	.359	1.188	.024	5

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
HR1	12.0068	6.809	.045	.025	-.328[a]
HR2	12.0338	7.774	-.103	.068	-.089[a]
HR3	12.0270	8.680	-.192	.046	.035
HR4	11.8986	7.126	-.043	.037	-.187[a]
HR5	12.0068	7.122	-.034	.033	-.202[a]

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
14.9932	9.041	3.00679	5