

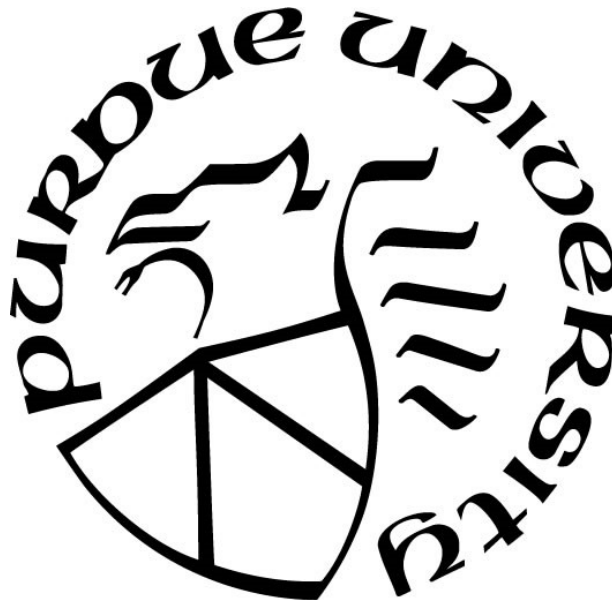
**EXPLORING THE EFFECTIVENESS OF THE PMBOK RISK  
MANAGEMENT PROCESS ON IT PROJECTS IMPACTED BY CRISIS  
EVENTS LIKE THE COVID 19 PANDEMIC**

by  
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*To my family, friends, mentors, and all who have believed in my abilities and have helped me to  
succeed*

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## **ABSTRACT**

The recent covid -19 events have brought about significant changes to the structure of the working environment. The sudden transition from in-person to teleworking created new and unfamiliar project risks that organizations needed to address daily. Risks associated with schedules, communication, culture (Bao, Li, Xia, Zhu, Li, & Yang, 2021), the well-being of employees (Ralph et al., 2020), cost, and procurement, among others, arose due to the transition.

This research aimed to explore whether the PMBOK risk management process is sufficient to address the issues and problems that arise when a project is affected by disruptive events like crises such as the covid-19.

This research was conducted using a qualitative approach. A structured literature review was employed, and the results of the structured literature review showed no specific information addressing the need for a change in the PMBOK risk management process. Still, the findings from the structured literature review showed three themes that provided insights as to how projects and organizations could guard against the impacts of future crisis events.

## **CHAPTER 1. INTRODUCTION**

This chapter provides a concise summary of the research and what it's all about. It briefly states the background of the study, provides information about the study and its significance, outlines the research questions, provides information about the intended methods for use in reaching the research goals, and outlines the limitations and delimitations of the research.

### **1.1 Background**

In 2019, a deadly disease named covid -19 emerged in Asia, specifically in Wuhan, China. The world health organization monitored the developing situation, and the increase in cases and deaths led to the declaration of a pandemic early in March in the year 2020 (WHO). In their briefings, the WHO emphasized the need for preventing close physical contact between people, to avoid the spread of this fatal disease (WHO). Various health organizations declared a state of emergency and emphasized the need to prevent the spread by instructing people to stay home and avoid physical contact as much as possible. (Kaplan, et al; Ralph et al). Exactly 100 years before the worldwide shutdown due to covid-19, there occurred a pandemic, "the Spanish flu," and similar to the happenings in the covid 19 pandemic, businesses and organizations closed up and found alternative ways to operate to reduce the spread of the disease. (Belling, 2021).

Since then, significant changes in the world have occurred, and technology has contributed mainly to these changes. The nature of the coping mechanisms adopted by organizations is very much different from that adopted in the 1980s. In this present era, organizations began transitioning to contactless ways of operating (Duffy, 2020; Ralph et al.) as a means of maintaining resilience in the face of uncertainties. Teleworking was the go-to method for contactless working in many organizations. Although teleworking began around the 1970s, organizations didn't adopt it due to the difficulties and costs accompanying such changes. (Pérez, Sánchez, de Luis Carnicer, & Jiménez, 2004)

### **1.2 Research question**

Due to the impact of the current COVID-19 crisis on projects, does the PMBOK risk management process need to be updated to facilitate successful project execution moving forward?

### **1.3 Scope**

This research, through a structured literature review, explored the effectiveness of the PMBOK risk management process on projects during crisis events, with emphasis on the recent covid 19 crises. The search for resources was limited to google search engines, and articles addressing the management of disruptive events were prioritized and focused on. The initial search yielded 50 resources, and after skimming and exclusion, ten papers were reviewed.

### **1.4 Significance**

The recent pandemic created new uncertainties that affected project management in organizations across the globe. The unexpected crisis posed new threats to projects, and because of the unique situation and issues that arose, project managers around the world, faced challenges in managing project risks. This research is significant because it evaluated the PMBOK risk management process to determine whether there would be a need for a change in the process to facilitate successful project execution moving forward now that the pandemic has affected the world. This research has provided valuable information to project managers about risk management during a crisis, and the importance of expanding risk identification in times of crisis, to support successful project management.

### **1.5 Definitions**

**Project risks:** Project risks can be defined as the likelihood of an event occurring in the course of carrying out a project, and this event is bound to harm the project (Baccarini, Salm, & Love, 2004).

**PMBOK (Project management body of knowledge):** This is an accepted standard that provides best practices and methodologies for project management.

**Risk management:** This includes the measurement of the likelihood of the project risk to occur and the extent to which the risk will negatively impact the overall project if it occurs.

Teleworking: Teleworking is the use of information and communication technologies to organize and perform roles in companies and support the management of employees from different and distant locations. (Perez et al., 2004).

Organizational resilience: When a crisis occurs, the ability of an organization to continue to maintain services and successfully adjust to, and restore the adverse effects posed by the situation, is termed organizational resilience (Rahi, 2019)

Project resilience: As defined in (Rahi, 2019), project resilience is the ability of a project to remain functional despite an expected and unusual risk.

Structured literature review (SLR): This literature review process rigorously and systematically analyzes literature related to a specific research topic. (Armitage & Keeble-Allen, 2008). This method of reviewing the literature is usually done as stand-alone research.

## **1.6 Assumptions**

The following are the assumptions of this research,

1. The structured literature review was sufficient for conducting this research
2. Analysis of the content of the literature was done to the best of the researcher's ability
3. Contents of online sources and literature were valid and reliable enough for use in this study

## **1.7 Limitations**

The following are the limitations of this research,

1. This research area is new, and not much literature was available online
2. Although conscious effort has been made to utilize only peer-reviewed and frequently cited works, the researcher cannot guarantee the validity and reliability of the literature.
3. This research was conducted using a structured literature review, and at least two researchers should typically carry out a structured literature review.

## **1.8 Delimitations**

- Although a survey study of project managers may have been an appropriate method, this research did not apply the survey method because of time constraints associated with getting approvals from the IRB.
- The methodology of this research, a structured literature review (SLR), was conducted by a single researcher. At least two researchers carry out a typical SLR.

## **1.9 Chapter summary**

This chapter began by providing a section that contained a brief description of the study background and ended with a paragraph describing the delimitations of the research.

## **CHAPTER 2. REVIEW OF LITERATURE**

The literature review section will explore the body of work in risk management, resilience in organizations, teleworking, and coping mechanisms project managers employed on IT projects during the pandemic. This literature review will provide more understanding of the events surrounding the pandemic-affected world and, at the same time, indicate the importance of this research. Through this understanding, project managers can realize how the impacts of crisis events could be mitigated and managed effectively to maintain successful projects.

### **2.1 Project risk management**

Project risks can be defined as the likelihood of an event occurring in carrying out a project, and this event is bound to harm the project (Bacarrini et al., 2004). This definition has two important words: "occurring" and "effect". Project risk management includes the measurement of the likelihood of the project risk to occur and the extent to which the risk will negatively impact the overall project if it occurs. (Biskupek, 2018), perceives the risk in projects as "a measure of the probability and effect of failure to achieve the project's goal". (Biskupek, 2018; Zwikael, 2011). According to Biskupek, project risks might not always have the nature of causing failure in projects but identifying them earlier on a project might result in creating ideas that would enable the project to produce better quality results than initially anticipated (Biskupek, 2018; Zwikael, 2011). The PMBOK 6<sup>th</sup> edition has outlined several processes that need to be performed to manage project risks. These processes begin from the first step, the planning stage, to the final step, the monitoring stage. (PMI). PMI also acknowledged that conducting risk management on projects produces results that reflect the overall project's success. According to (Cagliano, Grimaldi, & Rafele, 2015), projects might have individual characteristics that result in instabilities, leading to complications. For these reasons, project managers should endeavor to conduct comprehensive risk management on projects.

THE next section will describe the PMBOK risk management process in detail. Occasionally, other relevant works will be cited within the text.

### 2.1.1 PMBOK risk management

This model consists of six steps: planning risk management, identifying risk, performing qualitative risk analysis, performing quantitative risk analysis, planning risk responses, and monitoring and controlling risk.

### 2.1.2 Planning risk management

This process explains how the risk management activities for the project would be organized and managed. It can be carried out both at the beginning of the project and at various planned stages in the course of the project. The risk management plan contains the methods the project manager decides to use to conduct the risk management process, the design of this plan, and the responsible parties involved in running the process (Brewer & Dittman, 2018). In planning a project, some tools and techniques could be used. They are;

*Expert judgment*, which involves seeking advice from experienced individuals in the specific project field on approaching risks. *Data analysis*, which involves looking into the project information to predetermine possible ways to approach risks e.g., stakeholder analysis, and *conducting project meetings*, which involves meeting with stakeholders and project team members to agree on a project risk management approach.

The contents of the risk management plan should include.

- A method and strategy: They would describe the agreed-upon approach to risk management on the specific project.
- Roles and responsibility: This content would provide detailed information about activities and their corresponding responsible parties
- Budget and schedule plans: Provides details about plans for funding timelines regarding the risk management process
- Risk categories, their probabilities, and impact: This should provide a plan that would be used to sort risks according to different types, and this can be done using a risk breakdown structure (RBS). Also, probability and impact levels that would be used to indicate the likelihood of occurrence and the level of impact of the individual project risks should be pre-determined. The next step after planning is the identification of risks.

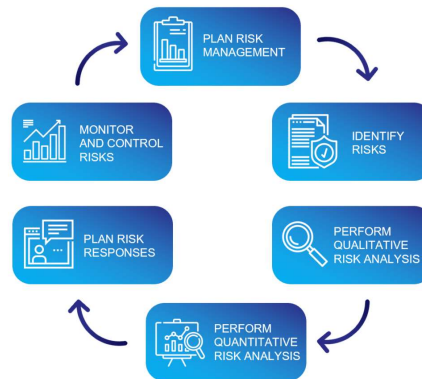


Figure 2.1. PMBOK risk management process (source: google)

### 2.1.3 Identifying risks

This process aims to identify risks relating to the specific project, its sources, and the various features of these risks. Tools that can be used in determining project risk are *expert judgment, meetings, gathering of data* which can be done by brainstorming, checklists, and interviews. *Data analysis* which can be done by root cause analysis, swot analysis, assumption, constraint analysis, and document analysis.

### 2.1.4 Data gathering

- **Brainstorming:** This is an exercise that involves a team of experts from various disciplines who come together to produce suggestions about different types of risks encountered on a project. According to (Demarco & Lister, 2003), the idea of brainstorming is to "use group dynamics to find ways around conventional thinking and to let fresh new thoughts emerge" (Demarco & Lister, 2003). This activity can be beneficial in identifying project risks.
- **Checklists:** A checklist might include lists of details about past projects. This list can consist of documentation of risks that have been observed on previous projects and can be used to identify possible risks on current projects.
- **Interviews:** Interviewing stakeholders and experienced team members can effectively identify project risks.

### **2.1.5 Data analysis**

- Root cause analysis: Involves identifying the potential hidden sources of a problem. Here, potential project threats could be identified and analyzed to find possible causes of those threats. For example, a threat could be "project delays ", and the source of this delay might be analyzed to be "delays caused by outsourcing companies".
  - SWOT analysis: the strength, weakness, opportunities, and threats (SWOT) analysis helps to identify areas of the project or organization as a whole that have the above qualities (strengths, weakness, opportunities, and threats), and it allows for risks to be identified from the area of threats. This analysis is generally suitable for managing organizations by identifying examining these areas.
  - Assumption and constraint analysis: Common elements of projects, especially IT projects, are the assumptions and constraints, and risks can be identified by analyzing these assumptions and constraints to discover threats resulting from inaccuracies and validity issues present in them.
  - Document analysis: project documents like contract statements, various planning documents, might contain information that could lead to the identification of risks, and so document analysis is a helpful tool for risk identification.
- The overall process of identifying risks should provide the following outcomes.
- Risk register: provides a list of the identified risks and their descriptions, the identified risks owners, and the identified responses to these risks.
  - Risk report: This would provide an overall summary of the identified risks, the general project risks and may contain the remaining process deliverables in the overall risk management process. This report will be updated throughout the process.

### **2.1.6 Performing risk analysis**

This process consists of qualitative and quantitative risk analysis process.

### **2.1.7 Qualitative risk analysis**

PMBOK described qualitative risk analysis as further examining the individually identified risks to discover their level of impact and the extent to which they are likely to occur. Qualitative

risk analysis, as the name implies, is qualitative, meaning that it is involved with a non-numeric way of analysis. This type of analysis is based on the opinions of project teams and stakeholders who have information about the project. The already identified risks can be further analyzed by gathering data from interviews and meetings and by seeking stakeholders' opinions about the level of impact of the risks. Some practical tools useful for the process are *data analysis* and *data representation*.

#### **2.1.8 Data analysis**

- Risk data quality assessment: To assess the collected data for accuracy. Surveys can be used to get stakeholders' opinions about the completeness, correctness, and general accuracy of the data.
- Risk probability and impact assessment: The individual risks on the project would be assessed by different stakeholders to determine their opinions about the level of impact and the extent to which the risk is likely to occur on the project. Differences in opinion will provide grounds for exploring the available options.
- Assessment of other risk parameters: risks can be assessed to check for the level to which they can be controlled by knowing their urgency, proximity, detectability, dormancy (if they will be dormant at any time on the project), and in any other way specific to the project.

#### **2.1.9 Data representation**

One significant way to represent data is to utilize a probability and impact matrix: it is a grid that shows the impact and probability of a risk on a project.

A qualitative risk analysis should provide information that would be updated on the risk register and risk report, as the analysis continues in the project.

#### **2.1.10 Quantitative risks analysis**

This analysis represents the impact and probability of occurrence of identified project risks using numbers. Methods of gathering data are through meetings and expert judgment, which are similar to those in the qualitative data analysis. Simulations, sensitivity analysis, decision tree

analysis, and influence diagrams are created. Results obtained from this analysis will be updated in the risk register and risk report.

## **2.2 Risk response**

This stage involves planning and implementing risk response

### **2.1.11 Planning risk response**

The planning risk response specifies the appropriate approaches and methods of responding to risks. Project teams create options and possible strategies that would aid the control, mitigation, and avoidance of risks if possible. Expert judgment, meetings, and various stakeholders' opinions can be used to produce a plan for risk responses. PMBOK listed five strategies to manage project threats, and they are:

- Accept: Low impact threats might be accepted at the project manager's discretion.
- Avoid: Depending on the impact and probability of a threat, a project manager might decide to avoid it.
- Escalate: Threats are escalated when the project manager discovers that the risk needs a higher level of control and cannot be handled on a project level. Threats like this will be escalated to appropriate departments in the organization.
- Mitigate: Some threats need to be addressed and mitigated where possible.
- Transfer: Here risk is transferred to a third party to handle. This strategy might involve a cost.

The outputs of the stage will involve updating most of the overall project planning documents and the risk report.

### **2.1.12 Implementing risk response**

Here the planned risk responses are implemented. Documents should be updated to ensure that these risks are handled as planned during the planning response stage.

### **2.1.13 Monitor and control risks**

In this process, the risk response being implemented is monitored to ensure that the implementation strategies are applied to the individually identified risks. This stage would assess the risks to examine whether the plans are working, whether new threats are being experienced, and the rate of progression of the risk response strategies. Updates of findings should be made to risk reports and registers as well as project documents.

Formal risk management has proven to be very effective in project management. According to (Biskupek, 2018), one of the determinants of a highly successful project is using a structured risk management approach in controlling and mitigating the effects of project risks. (Biskupek, 2018). Despite the availability of these formal risk management practices, there is a need to provide new best practices for risk management in a pandemic-affected world.

The following section will describe pandemic experiences in IT project management based on existing literature.

### **2.1.14 Formal risk management before the pandemic**

According to (Alisson, 2014), because of the nature of software development projects in which new risks occur during the project implementation, a project manager should use a formal risk management method to control the effects of risks. Alisson explained that the following risk management practices, coined from existing literature, could be applied to projects to reduce the risks identified in a software development project. (Alisson, 2014).

- Create and follow a software development plan
- Combine internal evaluation with external reviews
- Involve management and users in the project management lifecycle
- Set up a steering committee to ensure adherence to plans and processes
- Delegate responsibilities to project team members
- Develop a contingency plan to cope with staffing problems
- Include a formal and periodic risk assessment
- Divide the project into controllable portions
- Educate users on the impact of changes during the project

- Document all costs and schedule changes resulting from changes in requirement specifications
- Stabilize requirements and specifications as early as possible
- Avoid having too many new functions on software projects
- Review progress to date and set goals for the following phase

In the empirical research conducted by (Allisson, 2014) on experienced project managers in the IT industry, it was discovered that applying formal risk management to software development projects helped mitigate the effects of risks on the projects. (Allisson, 2014).

## **2.3 Project management during the covid-19 pandemic**

The recent Covid-19 pandemic brought a variety of risks that affected organizations and projects in an unprecedented manner. According to (Seals, Pareek, Taylor, & Sumner, 2020) Covid 19 has presented new challenges and threats to project management resulting from remote working. Some examples are the risks resulting from using "un-trusted home networks", difficulties with communication, and the costs that result from providing all the needed tools for project employees to work effectively from home. The pandemic also created risks for organizations, resulting from the need to accept less productivity due to the circumstances posed by the pandemic. (Ralph et al., 2020).

### **2.1.15 Teleworking experiences and challenges during the pandemic**

Using information and communication technologies to organize and perform roles in companies and to support the management of employees from different and distant locations is termed teleworking. (Perez et al., 2004). As the definition implies, teleworking enables organizations to reach their goals even when employees cannot be in the same building together. Creative meetings, conferences, and various duties could be performed using teleworking/remote working. Before the pandemic, there seemed to be hesitancy in organizations' path to employ remote working in their services. According to (Abarca et al, 2020; Picolli et al, 2004) in 2004, there were speculations about the difficulties associated with virtual working, and sources confirmed that working in-person was more productive than remote working (Abarca et al,2020; Brett et al). According to (Abarca et al,2020), a 2009 study suggests that a virtual project team can

perform better than an in-person project team if appropriately managed. If the necessary practices including risk management are appropriately applied to virtual projects, they have a high chance of success.

Presently, teleworking is in total demand. As a result of the Covid 19 pandemic lockdown order in many countries, organizations transitioned to remote working, and employees worked from home. In some cases, compulsory work was done by a hybrid approach.

Dispersed project team members worldwide who were also affected by the covid 19 stay-at-home order conducted meetings at weird hours due to differences in time zones. Information and communication technology was the central instrument for communication, and it enabled the building of relationships among project team members and collaborators. (Verburg, Bosch-Sijtsema, & Vartiainen, 2013).

One challenge mentioned by (Thorstensson, 2021) about teleworking during the pandemic was comfortable working space. Employees acknowledged that their homes were challenging to work in, especially with family around. Another challenge was employee burnout resulting from the inability to differentiate between work times and home times due to working from home. (Thorstensson, 2021; Kniffin et al, 2020). Thorstensson surveyed IT project managers/coordinators to view their stance on the effects of working from home on productivity. The survey results indicated that productivity wasn't as good when working remotely but that the hybrid approach of working was more productive. The reasons were that limitations of the in-person work environment could be avoided by working remotely and vice versa. Although this survey suggests that project managers lean towards a hybrid approach, a recent study conducted by Gartner, Inc states that CFOs in organizations have plans to transition at least 5% of their in-person employees to permanently remote workers positions. (Lavelle ,2020).

Verburg et al., 2012, researched to determine the critical factors for success in remote projects. Interviews were conducted, and one key to success, as mentioned by project managers, was to have top-notch technical support, provide new communication tools and training. The features of these tools must encourage accessible communication by providing user-friendly interfaces, and well-organized structures to ensure the easy transfer and dissemination of project information. Trust and openness were essential to promote teamwork and productivity which were accomplished by provision of good tools by an excellent technical support team. (Verburg et al, 2012).

One primary risk identified by (Bashatrat et al, 2013) in research conducted in Pakistan on virtual projects in the software industry during the covid-19 pandemic was the risk associated with scheduling. Results from the study, suggest that remote teams faced significant problems with adhering to project schedules. (Bashatrat et al, 2013).

(Bao et al, 2021), researched the effects of working from home on software developers' productivity. One result of the study suggested that the adverse effects of working from home depended on the size of the software project. Large projects suffer because of the difficulties encountered in adjusting to remote work and because teamwork and communication between developers might be more challenging to manage. (Bao et al, 2021), further suggests that the age of the software project was also a factor that contributed to the developers' productivity. Newer projects were not as productive as older ones because of the lack of completeness in planning resulting from the need to transition to remote work. The uncompleted structuring of the newer projects would have been disrupted, and this would have posed a problem to developers that had to continue virtually. In contrast, older projects had matured and would have transitioned to remote working more efficiently than newer ones.

Whether projects are run via teleworking or in-person, now that the pandemic has impacted and caused organizational changes, is it necessary for the PMBOK's risk management process to be updated to address the new risks created as a result of the novel pandemic?

There is indeed a need to move further than the traditional risk management processes and better prepare for risks posed by the unknown. (Kutsch & Turner, 2015). The following section will review the existing literature on organizational and project resilience.

## **2.4 Resilience**

When a crisis occurs, the ability of an organization to continue to maintain services and successfully adjust to, and restore the adverse effects posed by the situation, is termed organizational resilience (Rahi et al., 2019). Project resilience, as defined in (Rahi et al., 2019; Geambasu, 2011), is the ability of a project to remain functional despite the occurrence of an unexpected and unusual risk. Rahi et al. in his article, emphasized the vital role that proactivity plays in resilience and situates that there is a need to first be aware of possible occurrences on a project before the damaging effects become overwhelming. Once this awareness has been established, activities to curb the effects of the risks could be applied to projects in organizations.

Rahi emphasized that the project team is resilient when the team members can successfully go through all the hurdles and problems on the project and remain a strong team. One key element of resilience is the ability to adapt. (Rahi, 2019)

While traditional risk management practices help manage risks on projects, a project manager can incorporate resilience into managing risks that result from crisis events like the covid-19 pandemic because of the uncertainties that come with such events. The pandemic posed such uncertainties that the constant adjustment of policies and organizational structures was paramount to ensuring continuous operations.

In their article (Michalak & Raysavy, 2020) described how one organization remained resilient in managing projects during the covid-19 pandemic lockdown by using various tools to manage and monitor remote working. Tools like Slack, Email, flip grid, or zoom calls were used to facilitate communication among employees in the organization. The authors explained that many problems were detected throughout the usage and dependence on these new tools. The detection of these problems led to continuous research for more efficient means for managing projects. (Michalak & Raysavy, 2020)

According to (Rahi et al., 2019), project managers would have to make necessary decisions to adjust to the crisis events that affect projects, which is a crucial part of project resilience. The continuous efforts put in place by the project team to find ways to mitigate the effects of the pandemic is an actual display of what it means to be resilient.

## **CHAPTER 3. METHODOLOGY**

This study aimed to explore whether the PMBOK risk management process is sufficient to manage project risks affected by significant disruptions like the covid-19 pandemic. Now that the covid -19 pandemic has affected the world, this study is essential and timely.

The methodology used in this research was a structured literature review (SLR). The structured literature review used here is known as the rapid structured literature review (RSLR) process developed by (Armitage & Keeble-Allen, 2008), which is a modified version of the systematic literature review (SLR) process by Transfield et al., 2003. The SLR consisted of 3 stages (a) The planning stage (b) The review process (c) Analysis of the review. See (Armitage & Keeble-Allen, 2008) RSLR process in the appendix. The research design process is explained in detail below.

### **3.1 The review planning process**

The systematic literature review was conducted to the best of the researcher's ability by an organized search of google search engines. The RSLR process was adapted for this systematic review due to the conciseness of the process, which according to (Armitage & Keeble-Allen, 2008) is more appropriate for a master's thesis, considering the short time window available to conduct research at the master's level. The systematic literature review search was conducted over 10 days, From January 15<sup>th</sup>, 2022, through January 25<sup>th</sup>, 2022.

#### **3.1.1 Purpose statement**

The purpose of this review was to explore the literature, to discover whether there would be the need for a change in the PMBOK risk management process to address the crisis and disruptive situations in the future, now that the covid -19 pandemic crisis has affected the project management profession and the world.

### **3.1.2 Database used**

The google search engines were used for the literature search. The database contained a variety of resources including journals, conference materials, books, and blogs related to this research topic, and relevant to address the research question.

### **3.1.3 Search limit/scope**

The literature search was initially limited to resources related to project management and risk management, and a priority search was made for literature that addressed project management and risk management topics relating to crisis and disruptive events. The review process considered a mixture of articles in the form of case studies, organizations' experiences, surveys, and reports from professional journals and institutes.

### **3.1.4 Inclusion and exclusion criteria**

The structured review included online resources that had information regarding risk management in project management related to a crisis. The articles were included if they contained information that addressed risks and project management in organizations during crises. The contents in the resources were analyzed for themes that could address the research question of this study. Excluded resources did not address crises that resembled the severity the covid -19 has brought upon the world, they also did not have sufficient information regarding the area of topic for analysis.

### **3.1.5 Search terms**

The selected search terms used were mainly risk management, crisis, project management, and resilience. The words were combined with various needed conjunctions during the search process.

## 3.2 The review process

### 3.1.6 Documenting the search results

The resources found were selected in four screening stages. The initial search stage, the abstract screening stage, the scanning stage, and the full reading stage. The google database was searched using the terms risk management, project management, crisis, and resilience, and the initial search yielded 50 resources, but after reading the abstracts and opening statements to have an overview of the contents of the paper, these resources were reduced to 24, the 24 resources were scanned through, and 14 were excluded, which left the researcher with 10 resources which were included in the structured literature review. The unavailability of resources on the research topic, contributed to the low number (10) of resources found during the literature search.

The 10 resources were fully read and analyzed. See figure for a map of resource identification and selection.

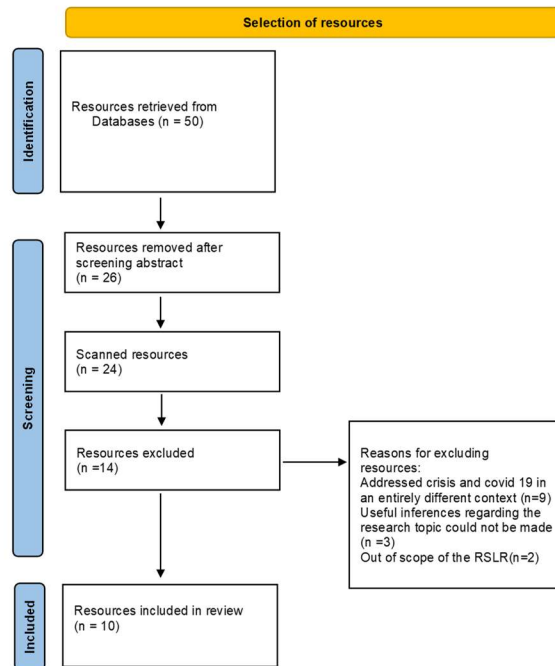


Figure 3.1. Resource identification and selection map adapted from PRISMA, (2020).

### **3.1.7 Quality assessment of literature**

The quality of the literature to the best of the researcher's ability was determined using the framework in Appendix A. The resources were assessed based on 1) The aims and objectives of the studies as it relates to the research question of the present study 2) The resource type, methodology and how appropriate it was for the use in the RSLR of this research 3) The clarity of the findings and information in the resource 4) The overall clarity of the conclusions of the article regarding their research goals.

### **3.1.8 Data extraction and findings**

The extraction of data from the 10 included resources was carefully outlined, to allow for comparison of the selected resources which is the overall aim of the structured literature review. Data was extracted under five criteria, and a review matrix table was established during the process of data extraction. See appendix A.

### **3.1.9 Summary**

This section described the methodology used for this research and explained how the structured literature review was conducted.

## CHAPTER 4. ANALYSIS AND SYNTHESIS OF SLR

### 4.1 Discussion

This research aimed to explore whether the PMBOK risk management process needs to change to facilitate successful project execution in the future, due to the impacts of the recent covid 19 crises. The researcher conducted the SLR and found no specific result addressing the need to change the PMBOK risk management process. Nevertheless, this research showed that the project manager would need to be more flexible during the planning stage of the risk management process and expand the risk identification process to plan for significant disruptive risks like the covid 19.

The findings also suggest that project managers need to adapt to challenging situations in such a crisis. One vital theme was the need to provide psychological safety for employees. During disruptions, project managers would need to pay close attention to the effects of the crisis on individuals' psychology to ensure they work effectively. These themes are explained in detail below.

Findings from the SLR showed the following three themes

#### 1) Resilience

Articles	Analysis
Kanjanasomkid, N., & Lara Cartagena, J. E. (2021), Westby, J. R., & Lamb, L. (2020), Wang, Z., Liu, Z., & Liu, J. (2020), Project Management Institute & Project Business Foundation (2020).	A common theme found in these resources was resilience, and the need for organizations and project managers to not only perform risk management but also provide contingency plans and various measures that would sustain the projects and organizations through periods of crisis and disruptions in the likes of covid-19.

According to (Kanjanasomkid & Cartagena, 2021), Emergent risks like the covid -19 pandemic are challenging to foresee, because they rarely happen. Organizations should manage these risks by creating an adaptable atmosphere, in which the project activities can continue being executed to attain success with minimal losses. (Kanjanasomkid & Cartagena, 2021) described six determinants of project resilience (contingency planning, risk monitoring, learning, flexibility,

empowerment, and communication clarity). Providing an extra store of funds to manage unknown risks during a crisis, intensifying risk monitoring efforts, documenting and learning from project experiences, readiness to change paths and adapt when situations arise due to uncertainties, providing employees and team members with the needed mental and professional authority to provide the necessary services, and communicating clearly about developing activities to all project stakeholders, are practices that could facilitate successful project execution in organizations during a crisis. Together these determinants create a resilient organization.

During the recent 2020-2022 covid 19 pandemic, we have witnessed flexibility and adaptation in organizations that have managed working from home (WFH) by providing the necessary tools for employees to communicate and perform the needed services on their jobs.

Overall, risk management, contingency plans, proactive measures, the mindset of adaptability are all needed during the crisis to navigate the complex and uncertain times brought about by a crisis such as the covid 19.

## 2) The psychological safety of employees

Berger, J. G., & Johnston, K. (2020), Edmondson, A.C., & Mortensen, M. (2021), Ryan, B.J., Coppola, D., Canyon, D.V., Brickhouse, M., & Swienton, R. (2020).	A common theme found in these resources was the mental and psychological safety of team members and organizational employees. These articles focused on the need for psychological safety and the provision of social needs that would increase employees' motivation during crises and disruptions.
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The above theme focused on the safety of employees in organizations, and the importance of attending to the psychological needs of employees during a crisis event such as the covid -19. During such uncertain times like in the covid -19 crisis, leaders should be careful in making decisions and consider that everyone on the job is making sense of the uncertainties and difficulties that the crisis pose. (Berger & Johnston, 2020). With this in mind, approaching the working environment differently in thoughts, engagement, and actions, during tough times such as the covid 19 crisis, and providing the necessary motivation for employees should be paramount. Project managers should ensure a safe and comfortable working atmosphere throughout the crisis.

According to (Ryan et al, 2020), to release restrictions put in place as a result of the pandemic, leaders (organizational and governmental) should adopt Maslow's hierarchy of needs

as a guide to ensure that employees are in the right frame of mind during a time of crisis. Maslow's hierarchy of needs pyramid shows the needs of an individual that would have been met before they could attain self-actualization. (Ryan et al, 2020), see appendix A.

The hierarchy of needs from the lowest level upwards, consists of psychological, safety, love and belonging, esteem, and self-actualization needs. By adopting the idea by (Ryan et al, 2020), project managers could use Maslow's hierarchy as a guide, by ensuring that employees on projects are satisfied in the lower needs, before climbing up the hierarchy. The table below adapted from (Ryan et al, 2020), shows the possible impact that the covid 19 crisis could have on the Maslow's hierarchy of needs, and the information contained in this table could help managers develop a plan on how to address such impacts, or the effects of disruptions on projects moving forward.

Figure 4.1 Possible impacts of the covid 19 crisis on Maslow's hierarchy of needs adapted from (Ryan et al, 2020)

Needs	Elements of needs	Possible impacts of covid-19 on employees
Psychological	Breathing, food, water, sex, sleep, homeostasis	Food access problems, living space/shelter problems, limited mobility due to lockdown, lack of sleep due to anxiety brought about by the crisis, and burnout from WFH.
Safety needs	Employment, resource, property, health, stability, security	Unemployment increase, physical and mental health issues due to uncertainties posed by crisis, individuals' household safety issues, and stability issues resulting from the uncertain future.
Social needs	Love, affection, family, friends, relationships, belongings	Inability to socialize due to isolation, family crisis.
Esteem needs	Respect, recognition, self-confidence, achievement, and self-worth	Goals and achievements reduce on individual and corporate levels, self-confidence is affected due to anxiety and job uncertainties.
Self-actualization	Acceptance of facts, morality, creativity, problem-solving	Depending on the nature of the crisis, and the level of satisfaction attained in the other needs on the lower level of the hierarchy, self-actualization needs may or may not be impacted.

Helping, and ensuring that the needs of individuals and employees are met on the various levels of the Maslow's hierarchy, would positively affect the psychological wellbeing and safety of project team members and stakeholders. Together with risk management and resilient practices, this would go a long way in facilitating a successful project.

### 3) Expansion of risk identification process

Hillson, D. (2014), Ivanova, M. (2020), Trentim, M. (2020).	These resources focus on the need for rigorous risk identification processes in organizations. They emphasize the need for thorough risk identification during risk management that includes all possible risks on projects. Moving forward, project managers should pay more attention to disruptive risks like the covid-19, and preparations should be made to mitigate the effects of these risks.
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According to (Hillson, 2014), there are some risks called the "Black Swans", and these risks are unknown or unimaginable to us because of our lack of experience with them. A crisis like the covid -19 pandemic would fit into these categories of risks because the nature of this crisis is unprecedented. Risk management should go beyond identifying risks that affect cost, schedule, and time. It should consider risks that could affect employee health, psychology, physical safety, and other specific project objectives. (Hillson, 2014)

The RIBS (risk impact breakdown structure) by (Hillson, 2007), is a helpful tool that project managers can adapt to outline in detail, a project's entire list of deliverables and their potential risks on different levels. See example of RIBS in figure below. The RIBS can be tailored to fit the specifics of the unique project.

RIBS level 0	RIBS level 1	RIBS level 2
0. Project impact	1. Schedule impact	1.1 Entire project duration
		1.2 Activity sequencing
		1.3 Float
		1.4 Delivery schedule
	2. Cost impact	2.1 NPV
		2.2 IRR
		2.3 ROI
		2.4 Payback
	3. Quality impact	3.1 Performance
		3.2 Reliability
		3.3 Maintainability
		3.4 Usability
	4. Other impacts	4.1 Government mandates
		4.2 Health & safety
		4.3 Job security
		4.4 Customer's acceptance

Figure 4.2. RIBS (risk impact breakdown structure) adapted from (Hillson, 2007)

Conducting risks assessments and taking into consideration the economy and entire country/regions exposure, would be necessary during the crisis, and going above and beyond by conducting research on the governmental potentials and resources available to curb the effect and spread of the disease, would support project managers and organizations in deciding on the effective ways to manage risks on projects during disruptions like the Covid-19 pandemic. (Trentim, 2020).

According to (Ivanova, 2020), there is some evidence that organizations with risk management policies in place for infectious diseases were prompt at attending to the covid 19 pandemic issues and could reduce some of the negative impacts of the pandemic on their businesses. In other words, if most organizations identified infectious diseases in their lists or expected risks, and were prepared for the recent pandemic, they would have attended to the situation quickly and reduced losses. (Ivanova, 2020)

These resources suggest expanding the risk identification processes during risk management and including all risks that affect project deliverables from every angle.

## **CHAPTER 5. FUTURE RESEARCH AND CONCLUSION**

### **5.1 Future research**

This study, through a SLR was able to determine three themes, which could facilitate successful project executions during crisis.

One suggestion for future research would be to conduct another study, investigating the impact that each of these three themes (resilience, risk monitoring, and psychological safety ) would have on the success of a project during a crisis. The study could provide details about the level to which each theme if practiced during a crisis, could positively affect the project outcome.

Future research could also approach the research question of this study using a different methodology, which would involve utilizing questionnaires or interviewing project managers who experienced the covid 19 pandemic. Interesting findings could result from first-hand accounts of project managers. They could provide insight into how they managed the risks posed by the pandemic and their opinions about whether the PMBOK risk management process needs an update to address crisis events moving forward.

### **5.2 Conclusion**

Although the above results do not significantly suggest the need for an update or change in the PMBOK risk management process, they indicate the need for the following practices moving forward to execute projects during a crisis successfully:

- a) Expansion of the risk identification phase of the risk management process
- b) The practice of resilience
- c) Providing psychological safety

Project managers should expand the risk identification phase of the PMBOK risk management process and include crises like disease outbreaks and other significant disruptions. Once these risks are identified, project managers should complete the PMBOK risk management process to ensure an overall successful project.

A resilient project environment is essential for successfully executing projects during a crisis. The following resilient practices should be conducted during a crisis:

- a) Contingency planning: This should involve the provision of schedule and budget contingency in case of an emergent risk and creating a unique budget set aside to manage the impacts of a disruption/crisis.
- b) Risk monitoring involves consistent and continuous identification of risks throughout the project. During risk monitoring, project managers should anticipate and analyze the project environment to detect early signs as soon as possible.
- c) Flexibility: Project managers should endeavor to make changes from lessons learned during a crisis. For example, change working tools that seem unfit to handle the effects of the problem and provide suitable alternatives that keep the project objectives.
- d) Empowerment: Giving team members the needed authority to make necessary decisions during a crisis and creating an environment filled with trust and encouragement would empower project teams to be more effective at such a time.
- e) Communication clarity: Updating project stakeholders and team members about the project's status, management decisions, and changes during the crisis is vital to provide clarity during uncertain times.
- f) Learning: Providing feedback and documenting lessons learned is an essential element of project resilience. Conducting individual and team meetings about lessons learned during a crisis, is one way to ensure project resilience.

When conducted on projects during a crisis, the above elements of resilience should reduce the effects of the crisis and ultimately contribute to the project's overall success.

The psychological safety of team members during a crisis is paramount to the project's success and can be attained by adapting Maslow's hierarchy of needs and ensuring that the human needs on the different levels are met during the crisis. For example, psychological, safety, social, and esteem needs were the most deficient during the covid-19 crisis and are essential for the motivation of employees. With this framework, project managers can motivate team members by providing resources that would assist in satisfying the lower hierarchical needs, which would offer a healthy and more conducive psychological environment on an individual and team level for employees to work.

Ultimately the results of this research show that proactivity, continuous risk monitoring, and the health and safety of team members are the primary drivers of successful projects during a crisis like the covid -19 pandemic.

## **APPENDIX A: QUALITY ASSESSMENT, DATA EXTRACTION & MASLOW'S HIERARCHY OF NEEDS.**

Table A. 1. Quality assessment of literature adapted from Armitage & Keeble – Allen, (2008).

Conceptual framework	<ul style="list-style-type: none"> <li>▪ What are the aims, objectives, questions /hypothesis identified?</li> <li>▪ How is the body of knowledge linked to research questions?</li> <li>▪</li> </ul>
Research Design and methodology	<ul style="list-style-type: none"> <li>▪ Are the following appropriate for the study?</li> <li>▪ Paradigm</li> <li>▪ Approach/strategy/Methodology</li> <li>▪ Research methods and instruments</li> <li>▪ Findings</li> <li>▪ Reliability</li> <li>▪ Internal and external validity</li> <li>▪ Ethical concerns</li> <li>▪</li> </ul>
Findings and analysis	<ul style="list-style-type: none"> <li>▪ Are the results presented in a clear fashion?</li> <li>▪ How is the literature use to interpret the findings?</li> <li>▪</li> </ul>
Conclusions	<ul style="list-style-type: none"> <li>▪ Does the study re-visit the research questions?</li> <li>▪ Does the study critique the approach taken?</li> <li>▪ What implications are there for practice?</li> <li>▪ What further research is required?</li> </ul>

Table A. 2. Data extraction and quality assessment

no	Resources	Aims and objectives	Focus	Methodology/resource name	Findings & conclusions
1	Kanjanasomkid, N., & Lara Cartagena, J. E. (2021).	Project management resilience during crisis	Explains the project management resilience practices that were developed during the 2020-2021 covid 19 period	survey	risk management, contingency plans, clear communication, etc. were elements of project management resilience during the crisis in the Swedish community.
2	Westby, J. R., & Lamb, L. (2020)	Analyze and inform about the importance of high-level risk management, now that the pandemic has been experienced and the rigorous methods needed to manage risks in organizations	The need for more resilient organizations, and the upgrade of the duties of risk managers in an organization.		Risk managers should be engaging with organizational executives, and resilient plans should be put in place moving forward.
3	Wang, Z., Liu, Z., & Liu, J. (2020)	To explore the impact of covid 19 on the tunnel construction industry and the strategies used by the project management team to curb the effect or manage the risks brought about by the pandemic	Employees had to be on-site to perform their jobs, which was risky during the pandemic. The study investigates how these risks were identified and controlled during the construction stage of the projects.	Case study	Risks concerned with the non-availability of workers and construction materials were identified, and this was due to the travel restrictions during the pandemic. Strategies used were the use of available workers for the jobs that needed to be done and the provision of private transportation for employees who needed to travel to the construction sites.
4	Berger, J. G., & Johnston, K. (2020)	To provide leaders with the knowledge of how to lead in a complex, uncertain, and changing world.	Focuses on how leaders can communicate change and provide a safe transition for employees during uncertainty and change.	Book	The ultimate goal as a leader should be to have the proper orientation about leading during complex and uncertain times adapt to these times and still lead and provide the necessary motivation for team members and employees and prepare them for the difficult times ahead.

Table A.2 continued

5	Edmondson, A.C., & Mortensen, M. (2021).	Explains how managers are challenged with ensuring psychological safety in the hybrid working environment and how this can be achieved in a team.	Focuses on ways to enable a manager to maintain psychological safety in a hybrid working environment, to encourage creativity and innovation	Havard review	Managers can bring about this psychological safety by being open about their working from home (WFH) personal challenges. Encourage team conversations, letting employees know that the team together is responsible for creating psychological safety in the hybrid workspace.
6	Hillson, D. (2014).	Explores risks that are commonly omitted when performing risk management on projects.	Identifies all types of risks that can affect a project in areas other than the usual cost, schedule, and time. This paper provides ways to manage these risks.	PMI institute	Project risk management should be done to encompass all types of risks including event risk, variability risk, emergent risk, ambiguity risk. Uncertainties that affect the project's employees and team members psychologically should also be considered.
7	Ivanova, M. (2020).	Explores whether organizations that had previous experience with infectious diseases and risk management practices in place, better managed the novel covid -19 pandemic crisis, even though the covid-19 pandemic was unique and unprecedented.	Focuses on the benefits of organizations being transparent about future identified risks and providing a dedicated committee to manage risks and preparedness for resilient practices when the troubles arise.	Stockholm school of economics	Organizations that had previous experience with infectious diseases, were better equipped for the covid 19 pandemic and mitigated the negative impact on their businesses. High-level diligence in risk management and resilient practices should be encouraged in organizations moving forward.
8	Project Management Institute & Project Business Foundation (2020)	To provide accurate information about the challenges faced by the project management profession and business during the covid -19 crisis.	The focus of this survey was to provide information that would bring an understanding of the challenges faced by contracted project managers during the covid 19 pandemic and provide helpful help that is needed.	Survey	The covid 19 had impacts on the project business, on remote working, and the overall performance of the projects and respondents of the survey were impacted on different levels. Loss of contracts and profits were some impacts. Provision for the needs of the project business and project management profession will help better prepare the industry for times like these.

Table A.2 continued

9	Ryan, B.J., Coppola, D., Canyon, D.V., Brickhouse, M., & Swienton, R. (2020).	The objective here was to provide leaders with a framework, using the idea of Maslow's hierarchy of needs, to ensure that societal needs are met, while making decisions about easing lockdowns and restrictions in the different works of life and the community, during the covid 19 pandemic.	Focuses on disaster risk management and provides a framework for the ease of lockdowns and restrictions in different communities, including organizations and the general public.		Collaborations between the government and leaders of organizations in different professions and communities would be a great way to provide sufficient measures to accommodate the needs of the various systems and communities that make up the whole country/nation.
10	Trentim, M. (2020).	A risk assessment on the impacts of covid 19.	Focuses on an effective way for PMOs to assess the threats and opportunities in organizations, during the covid 19 crisis.		Proactivity is important. During risk assessment, PMOs should begin by assessing external factors, internal factors, and the specific projects for risks, during this covid 19 crisis.

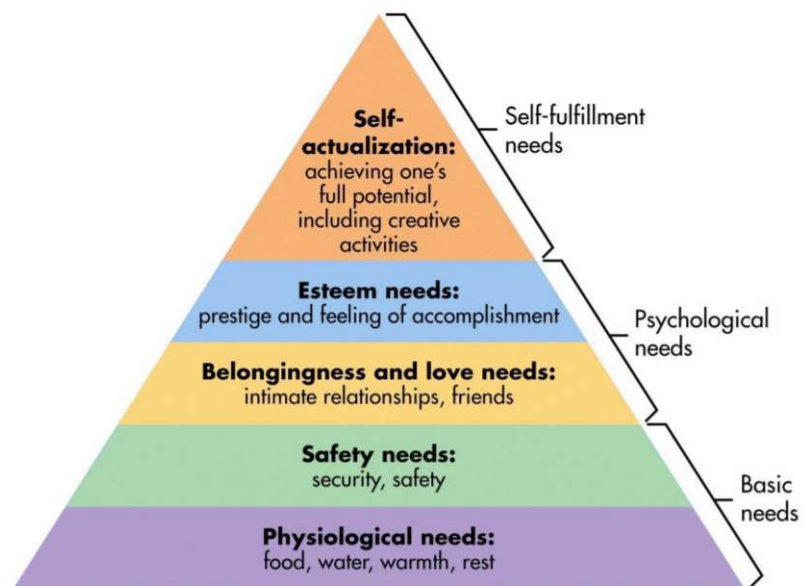


Figure A. 1Maslow's heirarchy of needs

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