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Assessment of Factors Affecting the Project Schedule and Resources in Construction Industry in the City of San Fernando Pampanga During Pandemic (2020 – 2021)

A Thesis Presented to
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ABSTRACT

In the year 2019, COVID-19 entered the whole world and challenged every aspect of society, especially construction firms. Pandemic protocols and suspension of work were unavoidable as the government ordered it to prevent the spread of the virus. However, knowing construction projects, following their schedule, and having enough resources were crucial to finish their ongoing projects on time.

In this research, a mixture of quantitative and qualitative types of study was used to collect the necessary data by conducting survey questionnaires and a Likert scale to 145 respondent companies in the City of San Fernando, Pampanga. And during the pandemic, it was found that more than half of the respondent companies were handling private projects. Most of them experienced a negative slippage because of the lack of materials, lack of manpower, and lockdown restrictions.

The overall effect of the pandemic in terms of resources was moderate but it greatly affected the construction firms financially because of the sudden inflation of construction materials. As well as the effect of lockdown restrictions, health protocols, and requirements brought a huge impact on the deliveries and supply of materials causing the project managers to have difficulties in finishing their projects on time. That is why giving attention to following the schedule is substantial.

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CHAPTER ONE

THE PROBLEM AND A REVIEW OF RELATED LITERATURES AND STUDIES

➤ *Introduction*

Construction plays an important role in society, it creates buildings and spaces that bring connection to the community, gives people jobs, and continuously improves the society. These create business platforms known as Construction Firms that design and build the project that the client desires. It is common for all businesses including construction firms to let a given project rest for a while due to holidays, natural calamities, accidents and such phenomena. However, by the year of 2020 to 2022 many construction firms closed or either had no project received or no available workers. This once in a blue moon situation created numerous mismanagements yet produced new ways to handle the problems.

SARS-CoV-2 virus is the cause of an infectious illness called COVID-19 or Corona-virus Disease 2019. The so-called pandemic that has shaken every aspect of the world. The effect of the pandemic made every business, school, factories, and other services shut down. This brief moment in our history made a great impact in our economy. This type of uncertain events really shows the need for preparation and management (Kang, 2021).

Many national and regional roads were closed during this pandemic. This is a direct order from the authorities to contain the increasing number of Covid-19 patients. Some roads were not closed, yet limited to an amount of time where traveling is allowed. This made many deliveries and services to operate limited to the given time and also to what it carries. Primary resources for many businesses became really hard, as the goods were expected to be delivered late.

Employees were asked to stay within the building and will be sent home after several days. This type of management strategy was made to continuously operate their business. However, many employees ran from their company. Explaining that home-sickness, exhaustion and being burnout made them decide to home (Chen, 2021).

The decision of closing business platforms during this time is a self-made decision that ensures the safety of the owners and its employees. The threat of pandemic made the economy's status declined to an unimaginable rate. The Philippines' economy is progressing at 12% of rate before the year of 2020. However, in the year of the pandemic it declined to a 28% down fall. This is due to the numbers of businesses that chose not to operate. Given the situation, many Filipinos became unemployed (Fauzi, 2021). The decision of closing business platforms during this time is a self-made decision that ensures the safety of the owners and its employees. The threat of pandemic made the economy's status declined to an unimaginable rate. Philippines' economy is progressing at 12% of rate before the year of 2020. However, at the year of pandemic it declined to a 28% down fall. This is due to the numbers of businesses that chose not to operate. Given the situation, many Filipinos became unemployed (Fauzi, 2021).

• *Background of the Study*

The construction sector is one of the most crucial businesses in many underdeveloped countries and largest industries that supply the framework for economic development (Ebekozien, 2020a). The industry is also referred to as the "physical infrastructure sector" and the "organizational center of an economy" (Jallow, Suresh, Renukappa, & 2020). Construction is a crucial component of our lives, because it generates and sustains economic wealth, the health of society and the administrative foundation of an economy (Weber & Alfen, 2016).

Since the construction industry is distinctive, the direct and indirect negative impacts of Covid-19 on the sector are immeasurable making it affects both developed and developing countries. Underdeveloped countries include decrease in employment, building projects, and cost overruns are a few examples. The World Bank (2020) and The World Health Organization (2020) recommended practices like alternating shifts within trades, 6-foot physical isolation for two or more workers when working remotely engage a Covid-19 supervisor on-site to ensure compliance and give full personal protection equipment, a station for handwashing and sanitizers, and other entrances to the site.

The construction sector is regarded as one of the most significant facets of the economy. This industry is afflicted by many issues and one of these is time overrun. A large number of construction projects experience this difficulty globally. This time overrun may have a major effect on the project's overall performance. Due to the construction concluding late, this may affect not only the project's timeline but also its budget. On the other hand, if a project is delayed the company is the one responsible for covering the workers' wages (Bekr, 2018).

In the construction industry, the main focus is to finish a project on time. It is important to know the schedule of the contract in order to estimate those budgets to prevent losses. If those projects were delayed, the schedule would also be affected. According to E. Reeder (2022), time management is significant in construction due to employees often paid by hour, that's why time management can control salary cost. Furthermore, another reason why projects should not be delayed is because it can derail company efforts to secure bids on other projects. Mostly, when they have a reputation for not being reliable and timely.

Due to the rapid spread of COVID-19, several countries have implemented lockdowns to curb its transmission. There are two types of lockdowns - the nationwide traffic ban and the stay-at-home movement. In an effort to prevent COVID-19 transmission at the workplace, which could then spread to migrant worker dormitories, most construction activities were halted during the "circuit breaker" period. Workers were not allowed to leave their accommodations, except for medical appointments, and were required to check their temperature twice a day. All meals were provided and delivered to the dormitories to minimize contact with others (Gan & Koh, 2021; Esa et al., 2020).

Amidst the pandemic, the construction industry was hit hard and had to shut down completely, resulting in a significant impact on the workforce and labor worldwide. The outbreak also changed the working conditions, causing workers to become increasingly concerned about their physical and mental health. As construction plays a crucial role in economic development, having an adequate number of workers is essential to complete projects on time. Even before the pandemic, a shortage of construction workers was a common issue, but COVID-19 made it worse. The virus spread easily among workers, and many companies reduced their workforce due to project suspensions. Labor shortage and job loss were identified as the most significant impact of the pandemic, and fluctuating material prices were also a contributing factor. The labor shortage caused disruptions in the construction industry and had the potential to delay projects. (Dr. Gamil et. Al, 2020; Osuizugbo, 2020).

➤ *Review of Related Literature*

• *Movement Restriction During Pandemic*

The road is important for the construction sector, because transporting the resources needed in every project cannot be delayed or stopped. It could affect the project's cost and schedule which the contractors do not want to happen. Unfortunately, due to the rapid spreading of the virus, roads were closed to prevent more cases. Rosik, P. (2022) stated that due to the pandemic, numerous roads and their extensions have been closed or had their usage restricted. Transportation can only be allowed provided that they have a permit to pass through checkpoints and they have a complete vaccination card with them.

• *Directive to Stop Construction Activities During Pandemic*

The COVID-19 pandemic has disrupted numerous construction projects, leading to many of them being stopped altogether. One reason for this is to protect the health and safety of workers who may be at risk of contracting the virus on the job. As a result, the government has issued directives to halt or pause construction activities in order to mitigate the spread of the virus. These directives are known as government-ordered suspensions, and they are typically issued by the contracting officer who has the authority to mandate the stoppage of work (Beezly and Osborne 2019). It is also highlighted in the study the importance of adhering to these directives in order to ensure the safety of workers and the public at large.

• *Continue Operation of Hardware Stores*

Not all sources of materials and aggregates have been shut down as a result of the pandemic, however some have. Some suppliers continue to operate and do business as usual. The Mineral Products Association (MPA) is a trade association for companies that produce a wide range of materials, such as silica sand, dimension stone, asphalt, cement, and concrete. Even in times of pandemics, it is still recognized as a significant producer. The MPA's chief executive officer, Nigel Jackson, claims that members are "working hard to keep their operations going, supporting their employees, customers, and wider society as we all face this challenge" (Moore, C. 2020).

• *Schedule and Resources of Construction Projects*

The field of construction relies heavily on data and is rapidly changing due to the increased production and collection of data (Soibelman & Kim, 2002). With technological advancements, the construction industry has entered a new era in which the digital age has led to an unprecedented growth in data (You, Wu, & A., 2019). This data is gathered from various sources, such as sensors, meters, tests, and web pages, and can be in the form of numerical, visual, textual, and multimedia data, among others (Bilal et al., 2016). Effective analysis and use of this diverse data allows for the discovery of knowledge in the construction industry, which can help construction stakeholders make better decisions and improve the performance of their projects or businesses. In other words, improving the performance of construction projects or businesses requires a significant investment in analyzing and transforming large amounts of data into useful information.

There are several causes of productivity loss in the construction industry, with delays being a common factor. Delays refer to situations where a project's completion date is postponed due to various reasons, including issues related to the client, consultant, or contractor (Aibinu & Jagboro, 2002). Delays can also occur when events take longer than expected or when timely action is not taken, or when the contractually agreed-upon date is not met (Lo et al., 2006; Trauner, 2009). Completion delays are a significant factor in construction projects and can affect project evaluation (Aziz, 2013; Olawale & Sun, 2004; Williams, 2004, 2015). These delays are typically addressed in contract clauses for typical building projects (Chang, 2002; Frimpong et al., 2003; Cooke). As a result, completing construction projects without delays is crucial for their success.

- *Effects of Pandemic in Construction Projects*

The COVID-19 pandemic has had a devastating impact on the world, affecting both small rural communities and large urban centers. The SARS-CoV-2 coronavirus, which was first detected in Wuhan, China, in December 2019, has significantly impacted both employees and workplaces on a global scale. The pandemic has led to changes in the office environment, with workers facing concerns about job security, isolation, and the challenges of working remotely or returning to work safely. COVID-19 has also had an impact on workplace diversity and dynamics, as employment issues have been compounded by the pandemic (Pamidimukkala et al., 2021).

The construction industry has been hit hard by the pandemic, causing numerous challenges that have impeded project completion, such as delays, revenue interruptions, postponed permits, agreements, and inspections, travel restrictions, safety and health concerns, and shortages of materials and machinery (Rehman et al., 2022). Building projects are complex, with many different organizations involved in their management, implementation, and planning, including owners, developers, consultants, managers, distributors, and manufacturers, all of whom are important stakeholders in each project (Alfadil et al., 2022). These factors have contributed to the uncertainty and difficulties faced by the construction industry during the pandemic.

The construction industry plays a significant role in the nation's economic development and growth, and any delays in construction projects can have adverse effects on the economy. The COVID-19 pandemic has impacted the construction industry, and building projects have been particularly affected. Many building sites have been shut down due to concerns about the spread of the virus, leading to delays in project delivery and completion. Developers are also worried about cost inflation due to COVID-19. The construction industry is at a high risk of COVID-19 exposure due to workers' close proximity to each other, and employers are responsible for ensuring their employees' health and safety at work. As per the Work Health and Safety (WHS) laws, employers and contractors must take appropriate control measures during the pandemic to prevent the spread of COVID-19 and provide workers with a safe workplace. (S H Zamani et al. 2021; S Majumder et al. 2020).

- *Mitigation of Pandemic in Construction Projects*

The number of workers on construction projects has been significantly affected due to the need to consider safety measures at the site to minimize the risk of spreading the virus. As a result, the shortage of workers has led to delays in construction projects. Recent literature on construction and COVID-19 reveals that the pandemic has various effects on the construction industry. The impacts of the pandemic on the industry and its effects outside the industry can be distinguished based on different levels of analysis (Araya, 2021c).

According to a study by M. Raoufi et al. (2020), researchers examined and created evidence-based operational strategies to reduce the impact of pandemics on construction sites. The goal was to identify new practices that construction organizations can use during future pandemics. The study identified 177 mitigation controls for pandemics and divided them into 16 groups, such as Health and Public Health Directives, Safety, and Workforce. The study also examined the mitigation controls that construction organizations currently implement or suggest to address the pandemic. The researchers concluded that the top strategies for reducing the impact of pandemics on construction sites are Regular Health Monitoring, preventing symptomatic workers from coming to work, and providing support systems. These strategies should be implemented to slow the spread of COVID-19 within the construction industry.

➤ *Statement of the Problem*

This research study aims to identify and evaluate the impacts of pandemic in schedule and resources of construction projects in City of San Fernando in terms of the following aspects:

- *How does the pandemic affected the project based on their timeline?*
 - ✓ Start of the construction project: Communication or collaboration, Importation of resources; human and material resources, Project Approval Sheets
 - ✓ During a construction project
 - Hiatus: Health related issues, difficulties accessing worksites, Project shutdowns
 - ✓ End of the construction project: Price Hikes, Exportation of resources; Human and material resources, Final inspection/ approval
- *How does the pandemic affect the resources used in construction projects?*
 - ✓ Manpower Resources: Lack of human labor, Workers were afraid to risk their health in an exposed area, Manpower reduction, Unavailability of workers due to sudden growth of COVID-19
 - ✓ Machine Resources: Inadequate of equipment
 - ✓ Material Resources: Delayed deliveries, Lack of supplier, Unavailability of materials

✓ Money Resources: Shortage of budget due to price increase of materials, financial support for trapped workers during lockdowns, Insufficient funds, Economic crisis that affects financial stability, Salary reduction

➤ *Objectives of the Study*

To assess the impacts of pandemic in the schedule and resources of projects of construction industries in the City of San Fernando Pampanga:

- To list and identify the different factors relating to the schedule and resources of construction projects that are affected by the pandemic.
- To evaluate quantitatively how COVID – 19 affected the schedule and resources of construction projects in the City of San Fernando Pampanga.
- To evaluate qualitatively how COVID – 19 affected the schedule and resources of construction projects in the City of San Fernando Pampanga.

➤ *Significance of the Study*

In this study, the impacts of pandemic in schedule and resources of projects of construction industries in City of San Fernando according to the following beneficiaries:

For **Companies**, it will provide them deeper knowledge of the effects of covid-19 on their ongoing structures during pandemic and give them knowledge on how the contractors will face the problem.

For **Contractors**, it will help them to analyze and estimate the work load and duration of a project.

For **Future Researchers**, it will help them to have more sources and references about the impact of pandemic in schedule and resources of construction projects. They can also use this study as a basis on their future study about pandemic.

➤ *Scope and Limitations*

- The study primarily focuses on the schedule and resources in construction projects during the pandemic in the City of San Fernando, Pampanga. The respondents of the study will be composed of the Contractors or Project Managers and Presidents of Companies. The findings of this study will help the beneficiaries to be adaptive and prepared in case of another pandemic.
- The researchers conducted this study in order to identify the factors contributing to the negative impact of pandemics on the schedule of work and resources.
- The researchers mainly focused on the factors that affected the schedule and resources of the construction projects during pandemic only.
- The study only used 4M's of operation which are; manpower, money, materials, and machine.

➤ *Conceptual Framework*

Labor productivity is the most important factor for any construction company in any country. The pandemic's effects on schedule and resources of construction projects in San Fernando, Pampanga caused changes in project and contractor performance. The conceptual framework of the study will outline the overall method for assessing the impacts of pandemics on construction projects.

The researchers will explore recommendations to lessen the effects of the pandemic. Researchers will review the findings and decide whether the recommendations would be useful in reducing the difficulties related to the effects of the pandemic on construction projects.

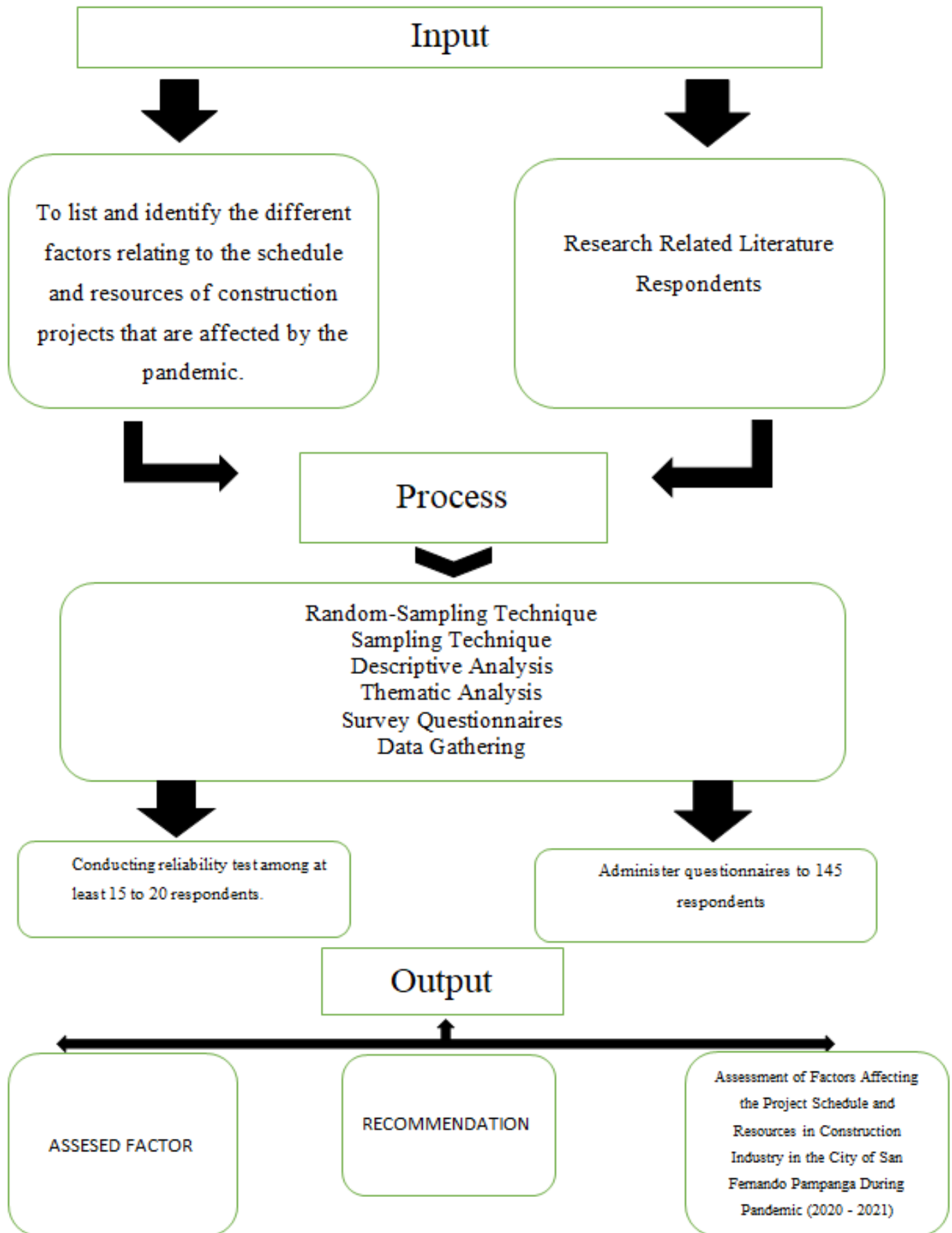


Fig 1 Conceptual framework

➤ *Definition of Terms*

- **Construction industry**- The branch of manufacture and trade based on the building, maintaining, and repairing structures.
- **Duration** - An event's or state's duration is the amount of time that is last or persists.
- **Gradual retirement** - An all-encompassing term that clarifies that an individual doesn't stop working "overnight," but instead gradually reduces their hours or takes on less difficult jobs throughout their final years of employment.
- **Hiatus** - a brief interval during which nothing occurs, nothing is stated, or there is a gap where something is missing.
- **Labor shortage** - In order to fill open positions, employers are finding it challenging to find qualified candidates.
- **Labor**- To use one's physical or mental abilities, especially with a painful or demanding effort.
- **Labor-intensive**- a method or sector that uses a lot of labor to create its products or services.
- **Machinery**- Construction machinery entails all machinery used for activities in construction, ranging from soil excavation to the transportation, loading, and unloading of materials and waste management.
- **Manpower** - in construction industry is the working force that committed to building constructions, such as planning, erecting and modelling the buildings
- **Materials**- means an article, material, or supply brought to the construction site by the Contractor or a subcontractor for incorporation into the building or work.
- **Money**- provides the capital to fund new projects in the construction sector, mostly, but not always, used by construction companies to plug the gap between the completion of work and receiving payment for said work.
- **Negative slippage**- indicates that work is behind schedule.
- **Positive slippage**- work is ahead of schedule.
- **Project schedule**- A construction schedule is a timeline for a building project that construction managers use to determine the order and duration of construction activities.
- **Resources**- A resource is a source or supply of assets that can be drawn on by a person or organisation and from which a benefit is derived.
- **Skilled labor**- refers to parts of the workforce that have had extensive training, education, or experience and are capable of handling more difficult physical or mental activities while at work.
- **Supply chain**- is a network of people and businesses involved in the production and delivery of a product to the consumer.
- **Worker rights or labor rights**- are related to labor relations between employees and employers in terms of both legal rights and human rights.
- **Workforce** - the employees worked in a particular business or activity.
- **Workforce planning** - the procedure of analyzing, projecting, and planning workforce supply and demand, identifying gaps, and choosing appropriate talent management interventions to make sure an organization has the appropriate people, with the appropriate skills, in the appropriate locations, at the appropriate times, to carry out its mission and achieve its strategic goals.

CHAPTER TWO METHODOLOGY

This chapter covers the research methodology of the study entitled "Assessment of Factors Affecting the Project Schedule and Resources in Construction Industry in City of San Fernando Pampanga during Pandemic" that contains research design, sampling method, research instruments, data collection procedure, and data analysis procedure.

➤ *Research Design*

Researchers employed a mixed-method which is a quantitative and qualitative type of study. The researchers used a descriptive type of research involving sequential explanatory design to determine the impacts of pandemic in schedule and resources of construction projects in the City of San Fernando Pampanga. According to Nataliya et. al., 2017, mixed-methods sequential explanatory design analyzes both quantitative and qualitative in two consecutive phases within one study. The results using this method are integrated as both quantitative and qualitative are interconnected to each other.

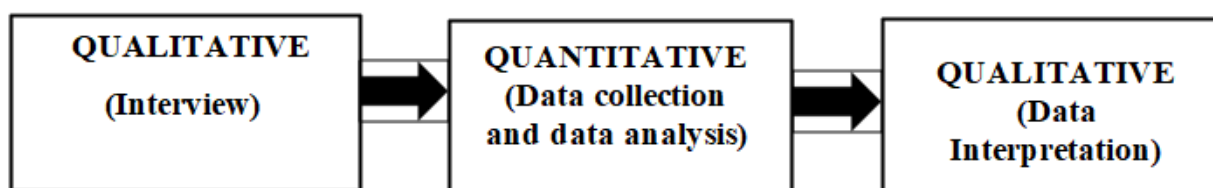


Fig 2 Sequential Explanatory

➤ *Sampling Method*

According to the Department of Trade and Industry (DTI) obtained by the researchers, the City of San Fernando, Pampanga has a total of two hundred thirty (230) composed of the same private and government registered construction firms. In solving probability tests with the help of raosoft calculator, the sample size was calculated where in the researchers got an actual sample of (145) construction firms to achieve the 95% confidence level with 5% margin of error out of the total of (230) private and government construction firms were determined using random sampling technique procedure.

➤ *Research Instrument*

The researchers used the Likert scale as the research instrument of the study to collect data. The survey consists of statements with options provided. The survey questionnaire is used to measure the particular statement of the response of participants according to their views. In this research, project managers were the respondents. The researchers obtained permission from the said participants in order to answer survey questionnaires. Using a 5-point Likert scale, participants can immediately respond to questions and express their standard of agreement in which (5) is rated as the highest and (1) as the lowest. The following responses to the Likert scale are: (5) Highly Affected; (4) Affected; (3) Moderately Affected; (2) Slightly Affected; and (1) Not Affected. The respondents can freely rate their neutral responses based on the questionnaires that were provided.

Table 1 Likert Scale

Scale	Interpretation
5	Highly Affected
4	Affected
3	Moderately Affected
2	Slightly Affected
1	Not Affected

In qualitative, interviews were used as the research instrument of the study that was conducted in the City of San Fernando, Pampanga. Also, the thematic analysis was applied to support the tabular and graphical representation of the data. This thematic analysis analyzed the given information.

The questionnaire has undergone validation and pretesting to ensure that the questions could answer the problems of the study. The Likert Scale questionnaire was pretested among 15 construction industries in the Municipality of Mexico and Municipality of Bacolor. Cronbach's Alpha analysis revealed an alpha value of .842 which indicated that the questionnaire is reliable.

➤ *Data Collection Procedure*

- *Formulation of Instrument*

To collect data from the respondents, the researchers prepared survey questions as the instrument of the study. A 5-point Likert-scale questionnaire was used to calculate the rate of responses of every participant. This served as the basis of what kind of tests that were used in the study.

- *Validation of Instrument*

For the instrument used in the study, researchers ask for advice and approval from experts or professionals if the study is ready to be conducted.

- *Distribution of Instrument*

Together with consent and a questionnaire prior to gathering data, researchers wrote a letter requesting permission to conduct their study in the City of San Fernando, Pampanga with a sample size of (145) out of (230) construction firms distributed to the selected respondents. This random sampling approach is to be used in a smaller group based on the sample size of the population unit and this kind of technique has an equal probability of being chosen.

- *Analysis and Interpretation of Gathered Data*

Nevertheless, the collection of quantitative data was assess/interpret with the guide of a statistician using Microsoft excel. The quantitative data results were analyzed qualitatively to satisfy the research design which is the sequential explanatory design.

➤ *Data Analysis Procedure*

After the data has been gathered, various tests and evaluations were performed in the study. This descriptive research with sequential explanatory method shows how the features of the summarized data was evaluated by statisticians.

- *For Qualitative Data*

In this procedure, the thematic analysis was included as the statistical test to help in evaluating the result of qualitative data in the study that was conducted in the City of San Fernando, Pampanga.

- *For Quantitative Data*

In this part, the quantitative test used in data was the descriptive analysis. The purpose of descriptive analysis is to describe, show clearly, or helpfully a brief data points so those format may improve that suit all conditions of the data (Villegas, F., 2023).

The researchers also used quantitative analysis, data gathered was analyzed using the frequency count and percentages and mean and standard deviation. Frequency count and percentages was used to determine the ratio and proportion of the participants when they are classified according to details about the company such as number of manpower, number of projects undertaken and nature of projects undertaken.

The mean was used to ascertain how the COVID 19 pandemic has affected the resources in construction. While the standard deviation assessed the dispersion of the scores around the mean. To describe the impact of COVID 19 pandemic to resources, the following mean scale was used:

Table 2 Mean Scale

Mean Scale	Description
1 - 1.80	Not Affected
1.81 - 2.60	Slightly Affected
2.61 - 3.40	Moderately Affected
3.41 - 4.20	Affected
4.21 - 5.00	Highly Affected

- *For the Interpretation of Qualitative Data*

For the qualitative data, thematic analysis was utilized. This involved grouping the answers of the participants into themes or sub themes. In this study, the themes identified were called factors while the sub themes were called sub factors.

CHAPTER THREE RESULTS AND DISCUSSIONS

This chapter contains the results and discussions, it specifically presented results based on the statement of the problem of the study.

➤ *Detail of Respondents*

Table 3 Distribution of Respondents According to Categories

Categories	Frequency	Percent
Entire Group	145	100
Number of Projects Undertaken		
1-10	50	34.5
11-20	46	31.7
21-30	24	16.6
more than 30	25	17.2
Nature of Project		
Government Project	64	44.2
Private and Government	5	3.4
Private Project	76	52.4
Number of Manpower		
1-10	23	15.9
11-20	35	24.1
21-30	31	21.4
more than 30	56	38.6

Table 3 shows the distribution of the respondents when they are grouped according to categories such as number of projects undertaken, nature of project, and amount of manpower. A total of one hundred forty construction companies participated in the survey. When classified according to the number of projects undertaken, the survey revealed that one third (34.5%) of the construction companies asked have 1-10 number of projects undertaken and also about a third (31.7%) have 11-20 number of projects undertaken.

In terms of the nature of the project, more than one half (52.4%) of the projects undertaken by the companies were private projects, and followed by government projects (44.2%). Meanwhile, few ventured on both private and government projects.

More than one third of the respondent companies (38.6%) have more than 30 manpower, indicating that workforces are in demand in the construction sector since few (15.9%) have a manpower of 1-10.

➤ *Effect of COVID 19 Pandemic to Schedule of Project Construction Activities and Resources*

Table 4 Start and Completion of Project based on Schedule

Categories	Frequency	Percent
Number of Projects Started as Scheduled		
1-10	77	53.1
11-20	29	20.0
21-30	25	17.2
more than 30	14	9.7
Number of Projects Completed as Scheduled	Frequency	Percent
1-10	86	59.3
11-20	28	19.3
21-30	18	12.4
more than 30	13	9.0
Total	145	100.0

Table 4 revealed that more than one half (53.1%) of the projects started by construction industries as scheduled were only few, estimated to only about 1 to 10 projects. Only a fraction of 1/10 companies could start more than 30 of its projects as scheduled.

As for completion, results showed that most companies have completed 1 to 10 of its projects as scheduled (59.3%), while few of them have completed more than 30 projects on time.

Table 5 Negative and Positive Slippage Incurred

Category	Total
Negative Slippage	
No Negative Slippage	24
1-10 Negative Slippage	92
11-20 Negative Slippage	15
21-30 Negative Slippage	10
more than 30 Negative Slippage	4
Total	145
Positive Slippage	
No Positive Slippage	40
1-10 Positive Slippage	70
11-20 Positive Slippage	23
21-30 Positive Slippage	5
more than 30 Positive Slippage	7
Total	145

When further asked about their experience on incurring negative and positive slippages, data in Table 3 showed that out of 145 companies asked, only 24 said they did not incur any negative slippages. Follow up questions revealed that a company has experienced negative slippage with its 1 to 10 projects. During the pandemic majority of construction firms experienced negative slippage due to “force majeure” which may cause delays and stopped of operations in construction (Stover, M., Rodgers-Waire, C. Moran T. Wright, Constable & Skeen, 2023)

In terms of positive slippage, forty companies answered that they have not experienced a positive slippage during the pandemic. Fewer construction firms experienced positive slippage during the pandemic. Prior to the data, the rest of the respondents quoted “Doing double time is key to positive slippages during the pandemic”. JD Summa (2020), shares why their company survived during the pandemic “We never stopped working,” he said, “If you’re going to be successful,” he said, “you have to find positives, and you have to be self-motivated,” he said. However other construction firms mostly can’t attain positive slippage due to some issues, other respondents said “there are delays of materials” and another said that “lack of laborers due to their health concerns”. Unavailability of materials, health concerns and etc. are significant problems in construction industries during the pandemic that may have decreased positive slippage (Palcis, R., Jr. 2023). The rest, which totals 105 fortunately, said they did have positive slippage or an advance progress compared to the schedule of activities and timeframe.

Construction projects were greatly affected due to the effects of the pandemic on the workers and also the materials needed for the continuation of work. Construction firms have a hard time hiring workers because of the fear of not being safe at the site. Also travel restrictions greatly affect the delivery of materials that caused the delay of projects. Having a negative slippage is abundant because of these reasons. As one of the respondents shared: ‘Some of the projects temporarily stopped, other workers were afraid to work on site because of Covid.’ Another answer provided by one of the participants: ‘Pandemic has increased the expenses, work to be done and work hours of a project. Also lack of supply of materials to be used.’ As stated from a study, The scarcity of labor has been a continuous concern for the construction sector, but the pandemic has worsened it, as a substantial proportion of construction workers have allegedly tested positive for the coronavirus (Karimi et al., 2018). Moreover, Delays were notably conspicuous when the supply chain involved sourcing materials or raw materials from foreign countries (Fernandes, 2020).

➤ *Reasons of Negative and Positive Slippage*

Table 6 Reasons of Negative and Positive Slippage

Reasons of Negative and Positive Slippage	Frequency	Percentage
Reasons of Negative Slippage		
Unavailability of Materials/Delivery of Materials	42	29.0
Lack of Manpower	22	15.2
Lockdown restrictions	21	14.5
Financial Resources	16	11.0
Revision of Plans	5	3.4
Weather Condition	2	1.4
Slow Progress	2	1.4
Reasons of Positive Slippage		
Close Monitoring	28	19.3

Follow Timeline	20	13.8
Ensure Delivery of Materials	18	12.4
Additional Workforce	9	6.2
Both availability of manpower and supply	8	5.5
No COVID 19 testing procedure	2	1.4

The top reason of the negative slippage was Unavailability of Materials or the Difficulty in the Delivery of Materials with 42 out of 145 respondents (29%) provided such reason, it was followed by reasons such as Lack of Manpower (15.2%), Lockdown Restrictions (14.5%) and Financial Resources (11%). Other reasons provided were revision of plans, weather conditions and slow progress.

On the other hand, many respondents said that close monitoring of work progress (19.3%), following the timeline (13.8) and ensuring delivery of materials contributed to positive slippage. Also mentioned were Additional Workforce, Both availability of manpower and supply and No COVID 19 testing procedure.

Table 7 Extend of Impact of COVID 19 Pandemic to Resources

Variables	Mean	Description	Std. Deviation
Entire Group	3.14	Moderately Affected	1.009
Resources			
Manpower			
Laborer/Skilled Workers	3.46	Affected	1.323
Materials			
Hardware Materials	3.25	Moderately Affected	1.228
Aggregates	3.34	Moderately Affected	1.340
Machine/Equipment			
Hand Tools	2.30	Slightly Affected	1.151
Heavy Equipment	2.63	Slightly Affected	1.257
Financial			
Miscellaneous Costs	3.49	Affected	1.208
Project Costs	3.50	Affected	1.308

Legend:

Mean Scale	Description
1 - 1.80	Not Affected
1.81 - 2.60	Slightly Affected
2.61 - 3.40	Moderately Affected
3.41 - 4.20	Affected
4.21 - 5.00	Highly Affected

Data in table 5 shows the impact of COVID 19 pandemic to the resources as provided. From among the resources, the most affected based on the mean score is the project cost (M=3.50), followed by Miscellaneous Costs (M=3.49), and Laborer/Skilled Workers (M=3.46). On the other hand, Heavy Equipment (M=2.63) and Hand Tools (M=2.30) were the least affected. Overall, COVID 19 pandemic has moderately affected the resources in construction industries (M=3.14).

Cost inflation is one of the problems encountered during the time of pandemic. In line with this, are the resources that are being used during the construction of a project. Delays due to Covid restrictions are also contributing to the increasing project cost. That is why project cost is the most affected having the highest mean scale among all the said resources based on our study. According to Mansoor et al. (2021), the cost of construction projects and labor expenses have significantly increased after the pandemic compared to the pre-pandemic period. An answer by the participant said: 'When we are in the time of pandemic, the resources are limited and the prices of materials increase because some sources of materials in our community doesn't have all the materials that we want or need.'

On the other hand, under the materials, hand tools are considered as the least affected resources based on our study. Mainly because materials like hand tools are more likely to be present on construction sites. According to a study, various contractors store their tools in different locations for use in diverse construction machinery. However, due to the lockdown, this equipment has remained unused for an extended period of time. (Biswas et al., 2021)

Overall, the entire resources that were mentioned in the study were labeled as moderately affected. This is because some construction firms were able to handle the pandemic wisely. Construction firms did their best to cope up with all the adjustments

that they needed to. Knowing what to prioritize and proper management is what was most answered by the respondents on how they were able to manage to survive during pandemic. Nations with moderate risk and inadequate readiness to detect incoming cases and contain further spread should prioritize the immediate allocation of resources, increased monitoring, and capacity building (Gilbert et al., 2020). As one of the respondents shared: ‘Yes, when it's pandemic we encounter difficulty when it comes to the process of doing the project, we adjust the schedule and make the project longer than what we expected to do.’ Also, another respondent said: ‘Proper management with work schedule.’

➤ *Factors Affecting the Project Schedule and Resources in Construction Industry*

To gather information about the factors that affect the project schedule and resources, respondents were asked open-ended questions. Thematic Analysis was utilized to analyze the responses of the respondents. All answers were grouped into themes called the factors.

From among the 145 respondents, 138 (95.2%) of them have construction activities at the onset or during the pandemic. Then, they were asked about how the pandemic has affected the start, on-going construction and completion of their projects and their issues about the resources used in the construction activities.

• *Factor 1: Scarcity and Delay in the Delivery of Materials*

During lock down, the government issued guidelines on the operation of business establishments. One of the establishments considered as necessary thus remained to be opened are the hardware and construction material stores. However, respondents shared that lockdown restrictions have caused some hardware to close their stores and limited the mobility of some suppliers also caused the delay of delivery, as one of the respondents shared: ‘Yes, we have readily available construction materials on our warehouse, but somehow some of our needed construction materials are not available because hardware are closed’. Another answer by one of the participants: ‘The difficulties that have been encountered during pandemic is the delivering of construction supplies. They must have complete documents for transporting goods, a vaccination card is one.’

Lock down restriction perhaps was one of the hardest blows to the construction companies and suppliers as one of the respondents shared: ‘There are a lot of areas that really restricts people from entering and exiting the place. That affects the supply of my materials and progress of the project’.

Delays in the delivery of construction materials and intermediate goods can have a ripple effect on the processing and completion of a construction project, ultimately impeding the smooth functioning of the supply chain for the project. (Raj et al., 2022)

• *Factor 2: Scarcity of Manpower Due to Lockdown Restrictions.*

One of the reasons behind the scarcity of manpower is the anxiety of workers to continue their job, afraid that they will be infected by the COVID 19 virus. Skilled workers became a scarcity, as many opted to stay at home for their safety. One respondent said that ‘People are concerned about being assigned to distant projects and government requirements such as vaccination cards also was one of the reasons that workers were not able to work. A respondent shared: ‘Most of my workers didn’t have a vaccination card right away. So, shortage of workers is the reason for negative slippage’.

The scarcity of materials and manpower, compounded by the government and project site's rigorous Standard Operating Procedures (SOP), has led to a decline in productivity and a slowdown in the pace of work at the project site. (Gare et al., 2022)

• *Factor 3: Financial Crisis*

Financial crises experienced by the construction companies can be divided into two sub factors: Increases in material costs and Additional miscellaneous expenses. All transportation networks were closed due to this lockdown, which has also caused supply chains to break down and prevented workers from getting from their homes to the building site. Therefore, construction work has halted, and the workers in this industry have extreme uncertainty. That leads to a financial downturn for the construction industry. To solve the financial crisis, companies need to start working again (Biswas, A. et al., 2021).

• *Sub factor 1: Increases in Material Costs*

Increase in material costs was very common during the pandemic. A respondent shared ‘Losses profit in terms of cost on materials. Additional medical expenses, for facemask, covid tests, etc.’. Looking back at the demand and supply law, once the supply is low, and the demand is high the tendency for the clients to compete for the resources thus the prices becomes higher. This happened during the pandemic, with many hardware companies opting to close their stores, construction materials became scarce. Not to mention, hardware also incurs additional miscellaneous fees to comply with the requirement of the government. One respondent even shared that ‘Some of the suppliers issued bankruptcy due to pandemic. Their capital is slowly decreasing because of the lockdown.’ This answer was further supported by a response from a respondent: ‘When we are in the time of pandemic, the resources are limited and the prices of materials increase because some sources of materials in our community don't have all the materials that we want or need’.

It has also found that the cash flow issues contractors and subcontractors face affects productivity. Given that, cash flow issues have been a particular problem with increased material prices and difficulties encountered by the owners in meeting their deadlines and payments to the contractors (Alsharif, A. et al., 2021).

• *Sub factor 2: Additional Miscellaneous Expenses*

At the height of the pandemic, the government required establishments and companies to follow health protocols, such as wearing of face masks, use of disinfectants and some companies required their employees to be vaccinated. This caused the companies to incur additional expenses as shared by one participant: ‘Medical documents are being required by the government to ensure safety.’ Due to the pandemic, the unexpected inflation of construction materials brought a great challenge in every ongoing construction project during the pandemic especially on their financial stability. Some fixed-price contractors forcefully cut their own profit to cover monetary shortage. Pandemic restrictions and requirements need an extra budget for swab tests, vaccination, etc. that adds up in the miscellaneous costs to continue the construction process and avoid delays. (Choi, 2021)

➤ *Analysis of the Responses Lead to the Following Thematic Diagram:*

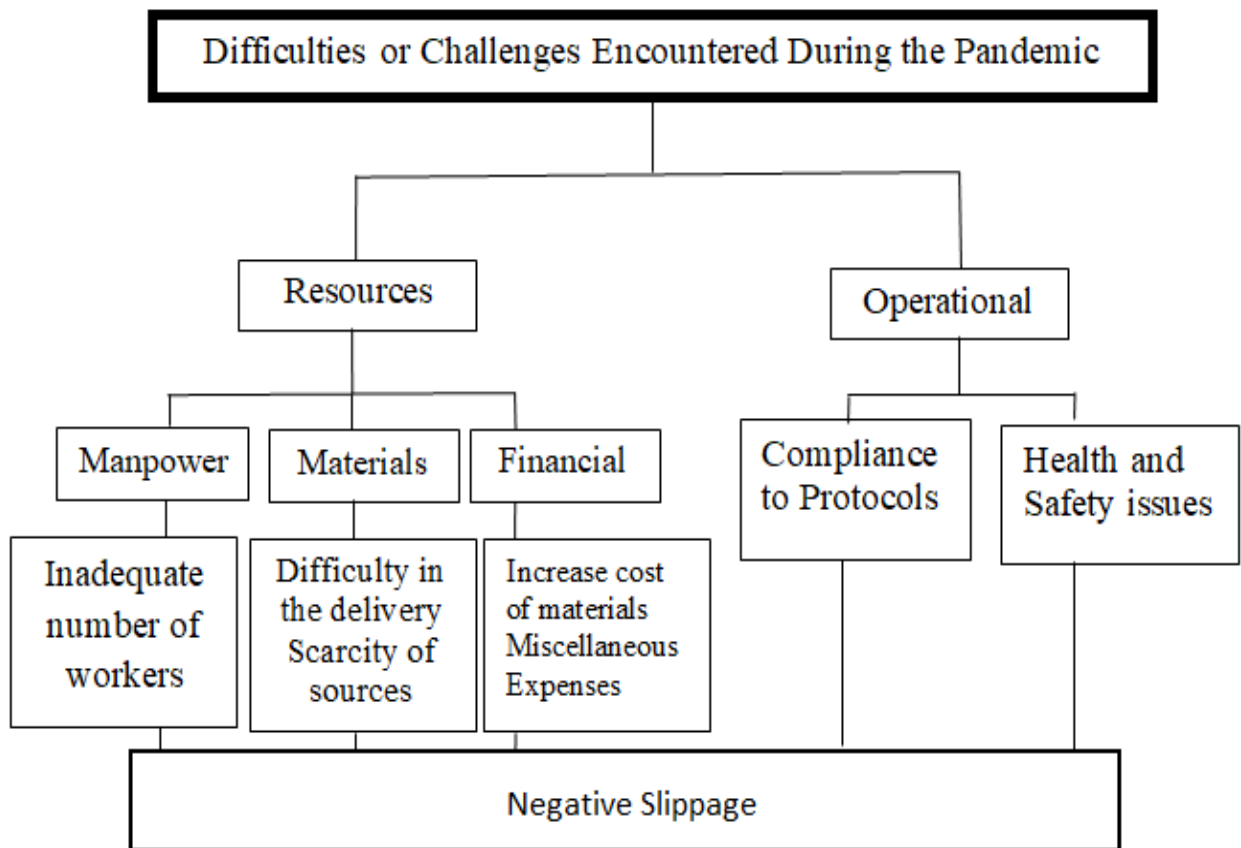


Fig 3 Analysis for thematic diagram

CHAPTER FOUR

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

This chapter presents the summary of major findings, the conclusions derived from the findings and recommendation drawn from the conclusions.

➤ *Summary of the Findings*

- When classified according to Number of Projects undertaken, about one third of the construction companies have 1-10 number of projects undertaken this is being followed by 11-20 projects undertaken.
- More than one half (52.4%) of the projects undertaken by the companies were private projects.
- Bigger number of respondent companies (38.6%) have more than 30 manpower.
- Most companies have 1 to 10 projects that were started and completed as scheduled. Few could start and complete more than 30 projects.
- 121 out of 145 companies incurred negative slippages. When asked about the reasons, difficulty in the delivery of materials and inadequate manpower due to lockdown restrictions were commonly provided.
- 105 out of 145 said that they also incurred positive slippages, and reasons for this include advance ordering of materials and additional manpower.
- Overall, COVID 19 pandemic has moderately affected the resources, with financial to include miscellaneous and project costs as the most affected.
- Factors that affect the project schedule and resources in construction industry were Scarcity and Delay in the Delivery of Materials, Scarcity of manpower due to lockdown restrictions, and Financial Crisis.
- Based on the findings, the following thematic diagram was derived:

➤ *Conclusions*

Based on the findings of the study, the following conclusions are drawn:

- Lock down restrictions, health protocols and requirements from the government has affected mobility and delivery of materials.
- Anxiety of workers on COVID 19, health requirements and protocols has caused the workers to stop reporting to work, thus creating difficulty to the construction industry to complete their projects on time.
- COVID 19 scare has caused some supplier stores to close down, difficulty accessing imported materials due to protocols affected the construction supplies.
- There are companies who decided to order materials in advance, thus were able to complete the projects.
- Negative slippages are very common, it is being caused by factors such as manpower, and materials.
- Attention to timeline is observed by companies thus were able to complete their projects and incur positive slippages.

➤ *Recommendations*

From the conclusions, the following recommendations are advanced:

- The government, organizations and associations that are concerned should design management strategies that could not greatly hamper our construction industries once another incident like COVID 19 pandemic happened.
- Future researchers could conduct a study related to this, they may use a more detailed questionnaire and consider other stakeholders as respondents to come up with a more comprehensive results about the impact of COVID 19 pandemic to construction industries. Also knowing what are the ways on how to solve the factors that are affecting the construction company and how to deal with the negative factors caused by the pandemic.
- Consider if the companies have a vertical or horizontal projects, it might have different effects.
- Use percentage instead of range in the survey questionnaire to have a more accurate or specific results.
- Based on the overall findings, most of the companies experienced negative slippage on their ongoing projects during the pandemic because of the difficulties in the delivery of materials and lack of manpower. The Pandemic has greatly affected the funds of every project because of the unprecedented inflation of materials and additional expenses in miscellaneous costs to provide health and safety needs. The researchers recommend making policies or provisions on the cost and schedule management of the company especially in times of natural calamities like pandemic.

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APPENDICES

APPENDIX A CERTIFICATIONS

CERTIFICATION OF GRAMMARIAN



Republic of the Philippines
DON HONORIO VENTURA STATE UNIVERSITY
Bacolor, Pampanga

GRAMMARIAN'S CERTIFICATE

This is to certify that the undersigned has reviewed and went through all the pages of the research titled **ASSESSMENT OF FACTORS AFFECTING THE PROJECT SCHEDULE AND RESOURCES IN CONSTRUCTION INDUSTRY IN THE CITY OF SAN FERNANDO PAMPANGA DURING PANDEMIC (2020-2021)** by **ARBY M. BANAG, YVONNE CLAIRE D. BAUTISTA, KYLE GABRIELE C. LIM, JOMAR B. MORENO, LEI AEROLJOE S. NICOLAS, EDEL GRACE L. SALCEDO.**

It is assured that the manuscript was checked in the areas of grammar and mechanics of research writing.

Signed and issued this 10th day of June, 2023.

JOHN REINJOE F. NAMIT, LPT, MAED

Grammarians/Editor

PLAGIARISM REPORT



DON HONORIO VENTURA STATE UNIVERSITY

VILLA DE BACOLOR, PAMPANGA, PHILIPPINES 2001

GRADUATE SCHOOL RESEARCH LABORATORY

Certificate of Plagiarism Scan

This certifies that the thesis entitled

“Assessment of Factors Affecting the Project Schedule and Resources in Construction Industry in the City of San Fernando Pampanga during Pandemic (2020-2021)”

By Banag, Arby M.
Bautista, Yvonne Claire D.
Lim, Kyle Gabriele C.
Moreno, Jomar B.
Nicolas Lei Aeroljoe S.
Salcedo, Edel Grace L.

BACHELOR OF SCIENCE IN CIVIL ENGINEERING MAJOR IN STRUCTURAL ENGINEERING

Scanned and reviewed by the
Graduate School Research Laboratory
on June 9, 2023.

Apodilla
CHARLIE K. PADILLA, MIT
Plagiarism and Grammar Review Coordinator

PGR-00419-2023
ORN- 1722273

APPROVAL SHEET

VALIDATED QUESTIONNAIRE



Republic of the Philippines
Commission on Higher Education
DON HONORIO VENTURA STATE UNIVERSITY
Villa de Bacolor, Pampanga



April 13, 2023

Dear Ma'am/ Sir,

Greetings!

We are Fourth Year students of **Don Honorio Ventura State University** taking up Bachelor of Science in Civil Engineering. We are currently conducting an undergraduate thesis entitled **“Assessment of Factors Affecting the Project Schedule and Resources in Construction Industry in the City of San Fernando Pampanga During Pandemic (2020-2021)”**.

It is for this reason that we are requesting your good office to allow us to use your facilities for data gathering purposes. We will be distributing questionnaires to selected project managers which will serve as primary source for our study.

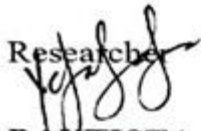
Attached is the Survey Questionnaire for your perusal.

Please feel confident that any data gathered shall be treated for academic objectives only. We are looking forward for a positive response on this matter and you can reach us through our group's leader, Jomar B. Moreno at 2019988538@dhvsu.edu.ph or 0926-973-5684.

Thank you very much!

Very respectfully yours,


BANAG, ARBY M.

Researcher


BAUTISTA, YVONNE CLAIRE D.

Researcher



LIM, KYLE GABRIELE C.

Researcher



MORENO, JOMAR B.

Researcher



NICOLAS, LEI AEROLJOE S.

Researcher



SALCEDO, EDEL GRACE L.

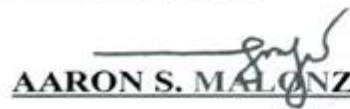
Researcher

Noted by:



JOCELYN MALIG, RCE

Research Adviser



AARON S. MALONZO, RCE

Research Coordinator

Approved by:



IRENE R. ROQUE, RCE, MESE

Chairperson, Civil Engineering Department

Part I. Personal Profile

Instructions: We are the students of Don Honorio Ventura State University currently studying Bachelor of Science in Civil Engineering. We are conducting research entitled **ASSESSMENT OF FACTORS AFFECTING THE PROJECT SCHEDULE AND RESOURCES IN CONSTRUCTION INDUSTRY IN THE CITY OF SAN FERNANDO PAMPANGA DURING PANDEMIC. (2020 – 2021)**. There are 20 questions to be rated and will only take 5 minutes to answer. All of your responses will be kept anonymous and no one will be identified in research. Your information will be treated as highly confidential and shall be used for research purposes only.

Please tick the box provided to show your consent to be part of the research

General Instruction: Please accomplish this questionnaire very carefully and honestly. Rest assured that any information you supply will be treated with utmost confidentiality.

Respondents Detail:
Construction Company Name: _____

Number of projects undertaken:
1-10 11-20 21-30 more than 30

Nature of the Project:
 Private Project Government Project

Number of Manpower:
1-10 11-20 21-30 more than 30

Part II. Data on the Schedule of Project Construction Activities and Resources

A. Schedule

From the projects undertaken above, how many started as per schedule?
1-10 11-20 21-30 more than 30

How many were completed as per schedule?
1-10 11-20 21-30 more than 30

Did you incur negative slippage? Yes No

How many projects have a negative slippage?
1-10 11-20 21-30 more than 30

Reason/s: _____

Did you incur positive slippage? Yes No

How many projects have a positive slippage?
1-10 11-20 21-30 more than 30

Reason/s: _____

B. Resources

Instructions: Rate the following according to the Extent of impact of the overall management of the project identified. Answer the following by putting a check mark on the space provided. Please fill up all the items.

The ratings with their corresponding description are as follows:

- 5 - **Highly Affected** 4 – **Affected** 3 – **Moderately Affected**
- 2 – **Slightly Affected** 1 – **Not Affected**

RESOURCES	Not Affected	Slightly Affected	Moderately Affected	Affected	Highly Affected
Manpower					
Laborer/Skilled Workers					
Materials					
Hardware Materials					
Aggregates					
Machine/Equipment					
Hand Tools					
Heavy Equipment					
Financial					
Miscellaneous Costs					
Project Costs					

Part III. Factors affecting the project schedule and resources in construction industry.

Instruction: Please write down your answer on the space provided.

- Do you have construction activities at the onset or during the pandemic? Yes No
 Can you share to us how the pandemic has affected the start, on-going construction and completion of the projects?

- Did you have any issues about the resources used in the construction activities? Yes No
 How the pandemic has affected the supply of resources? Can you share to us some of the difficulties if there are any?

3. What are your recommendations and suggestions to the project implementers (could be Provincial Engineer's Office or the national government) how to address issues and concerns on project constructions activity schedules and resources during pandemic?

VALIDATED LETTERS



Republic of the Philippines
DON HONORIO VENTURA STATE UNIVERSITY
Villa de Bacolor, Pampanga
College of Engineering and Architecture



March 14, 2023

Engr. Bryan Q. Alvarado
Engr. III / Acting Maintenance Division Head
PEO, San Fernando Pampanga

Sir:

Greetings!

In partial fulfillment of the requirements of Bachelor of Science in Civil Engineering (BSCE) Students A.Y. 2022 – 2023 in CE Project 2 at Don Honorio Ventura State University (DHVSU), we are currently conducting research entitled, **“Assessment of Factors Affecting the Project Schedule and Resources in Construction Industry in the City of San Fernando Pampanga During Pandemic (2020 – 2021)”**. We are humbly asking for your assistance for the validation of the survey instrument of our thesis.

The purpose of this study is to evaluate the impacts of pandemic in the schedule and resources of projects of construction industries in the City of San Fernando Pampanga.

1. To list and identify the different factors relating to the schedule and resources of construction projects that are affected by the pandemic.
2. To evaluate quantitatively how COVID – 19 affected the schedule and resources of construction projects in the City of San Fernando Pampanga.
3. To develop a framework of recommendation that will mitigate the impacts of pandemic to the schedule and resources of construction projects.

Attached herewith is the sample instrument to be used in the study. If you require any additional information, please contact Jomar B. Moreno, the group's leader, at 2019988538@dhvsu.edu.ph or 09269735684. Your participation in our research is greatly appreciated. Thank you in advance for your thoughtful accommodations and assistance in meeting our academic requirements. God bless you and have a wonderful day!

Respectfully yours,

BANAG, ARBY M.
Researcher

BAUTISTA, YVONNE CLAIRE D.

Researcher

LIM, KYLE GABRIELE C.

Researcher

MORENO, JOMAR B.

Researcher


NICOLAS, LEI AEROLJOE S.

Researcher

SALCEDO, EDEL GRACE L.

Researcher

Noted by:


JOCELYN MALIG, RCE

Research Adviser


AARON S. MALONZO, RCE

Research Coordinator

IRENE R. ROQUE, RCE, MESE

Chairperson, Civil Engineering Department

Approved by:


BRYAN Q. ALVARADO, RCE

Engr.III/Acting Maintenance Division Head



Republic of the Philippines
DON HONORIO VENTURA STATE UNIVERSITY
Villa de Bacolor, Pampanga
College of Engineering and Architecture



March 20, 2023

EnP. Mary Rose A. Matucan
Statistician
La Paz, Iloilo City

Ma'am:

Greetings!

In partial fulfillment of the requirements of Bachelor of Science in Civil Engineering (BSCE) Students A.Y. 2022 – 2023 in CE Project 2 at Don Honorio Ventura State University (DHVSU), we are currently conducting research entitled, “**Assessment of Factors Affecting the Project Schedule and Resources in Construction Industry in the City of San Fernando Pampanga During Pandemic (2020 – 2021)**”. We are humbly asking for your assistance for the validation of the survey instrument of our thesis.

The purpose of this study is to evaluate the impacts of pandemic in the schedule and resources of projects of construction industries in the City of San Fernando Pampanga.

1. To list and identify the different factors relating to the schedule and resources of construction projects that are affected by the pandemic.
2. To evaluate quantitatively how COVID – 19 affected the schedule and resources of construction projects in the City of San Fernando Pampanga.
3. To develop a framework of recommendation that will mitigate the impacts of pandemic to the schedule and resources of construction projects.

Attached herewith is the sample instrument to be used in the study. If you require any additional information, please contact Jomar B. Moreno, the group's leader, at 2019988538@dhvsu.edu.ph or 09269735684. Your participation in our research is greatly appreciated. Thank you in advance for your thoughtful accommodations and assistance in meeting our academic requirements. God bless you and have a wonderful day!

Respectfully yours,

BANAG, ARBY M.
Researcher

BAUTISTA, YVONNE CLAIRE D.
Researcher

LIM, KYLE GABRIELE C.
Researcher

MORENO, JOMAR B.
Researcher

NICOLAS. LEIAEROLJOE.S.

Researcher

SALCEDO. EDEL GRACE L.

Researcher

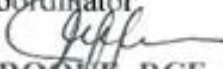
Noted by:


JOCELYN MALIG, RCE

Research Adviser



AARON S. MAIZONZO, RCE

Research Coordinator


IRENE R. RODILLA, RCE, MESE

Chairperson, Civil Engineering Department

Approved by:


EnP. Mary Rose A. Matucan
Statistician



Republic of the Philippines
DON HONORIO VENTURA STATE UNIVERSITY
Villa de Bacolor, Pampanga
College of Engineering and Architecture



March 15, 2023

Engr. Fredel J. De Vera, MA. MsCM, APEC Engr./ ASEAN Engr
Vocational Manager
Lincoln College International, Kingdom of Saudi Arabia

Sir:

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Researcher

SALCEDO. EDEL GRACE L.

Researcher

Noted by:


JOCELYN MALIG, RCE

Research Adviser


AARON S. MAIONZO, RCE

Research Coordinator


IRENE R. ROQUE, RCE, MESE

Chairperson, Civil Engineering Department

Approved by:


FREDEL J. DE VERA, CE, MA, MsCM, APEC Engr./ ASEAN Engr

External Adviser / Validator



Republic of the Philippines
Commission on Higher Education
DON HONORIO VENTURA STATE UNIVERSITY
Villa de Bacolor, Pampanga



College of Engineering and Architecture

LETTER OF REQUEST

April 4, 2023
Department of Trade and Industry
City of San Fernando Pampanga

Greetings of Peace!

We, the bonafide students of Bachelor of Science in Civil Engineering in Don Honorio Ventura State University - Main Campus are conducting a research entitled, “**Assessment of Factors Affecting the Project Schedule and Resources in Construction Industry in the City of San Fernando Pampanga During Pandemic (2020 – 2021).**” as a requirement in CE Project Study.

Our study focuses on assessing factors affecting the project schedule and resources in construction industry in the City of San Fernando Pampanga during pandemic. For this reason, we humbly request information provided by your guidance. We would like to request a list of construction firms in the City of San Fernando Pampanga.

Your help will contribute significantly to the completion of our study. We hope you will consider our request. Thank you very much. Please feel free to contact the researcher through mobile at 09269735684 or you can send an email through: 2019988538@dhvsu.edu.ph.


With sincere appreciation,

BANAG, ARBY M.
Researcher

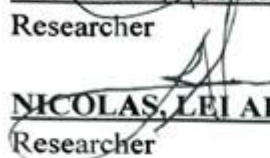

BAUSIS, YVONNE CLAIRE D.
Researcher


LIM, KYLE GABRIEL C.

Received by
JL MAUG
TIDA/NC
DTI Pampanga
4/4/2023

Researcher

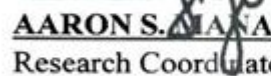
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Noted by:


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