

# Concheck: Development of Construction Project Monitoring Application for Private Construction Firms in the Province of Pampanga

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**Abstract:** - As the world transitions to the digital age, the need for construction companies to adapt to different technological advancements is becoming more and more crucial. The presence and continuous developments of these technologies can help to automate repetitive tasks and streamline processes, which can increase efficiency and reduce the time it takes to complete construction projects. This can lead to cost savings for both builders and customers. This study aimed to evaluate the difficulties being encountered by workers in the construction sector and develop a project monitoring application which can be used by different private construction firms currently based in the Province of Pampanga. The data were gathered through 2-phase survey questionnaires. The findings of the first part of the study showed that the construction sector continuously encounter project monitoring-related problems such as communication, shipment and delivery of tools and equipment, and health and safety standards. These factors led to the development of ConCheck Project Monitoring application that primarily focused on the digitalization of project monitoring among construction projects. Among the features of the application are: Daily Weather Report, Delay Type, Daily Progress Report, and Accomplishment Report. The application was pilot tested to 5 private construction firms and the survey results showed that the application's functionality enabled users to monitor their construction projects in a more efficient way. Moreover, the data gathered strongly suggests that the application would be beneficial for the companies to adopt. The findings of the study will be beneficial to construction companies in their efforts to address the need for technological advancements in the sector. Further, the results may be used by different web-developers in establishing a more user-friendly application that can help the construction sector intervene in the 21st century landscape of the workforce.

**Key Words:** — *Technology, ConCheck Project Monitoring application, Difficulties in the construction sector, Construction Management.*

## I. INTRODUCTION

As the world transitions to different technological advancements, the capacity of businesses in the construction sector to arrange for digitization is becoming more and more crucial as the speed of change quickens.

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As contrast to science's goal of learning how things work in the ordinary world, which includes constructed methods of doing things, technology is related to acting to satisfy a human need.

The effort to gather, analyze, and visualize the vast amount of data related to the field operations of construction resources is rarely taken. The availability of real-time information and subsequent technology that makes data collecting, processing, and visualization simple are some of the primary factors that restrict higher-quality decision-making in project site management, particularly in resource-intensive and complicated operations.

Despite recent developments in remote data sensing and intelligent data processing that support manual data recording and analysis practices, there are still few data visualization tools in development that gather data from dynamic resources and stream it to a field-realistic virtual reality environment in real-time. The most current innovations in real-time data collecting and visualization are discussed.

In accordance with the Construction Industry Authority of the Philippines (CIAP), under Section VI: Labor, Work and Payments, the contractor is typically in charge of carrying out all works and ensuring that they are finished within the time frames specified in the construction contract. The contractor is typically expected to provide all the supplies, goods, and equipment required for the work. Additionally, it is the contractor's duty to fix any flaws or deficiencies that may develop during construction 2 and/or within a specific time afterward. Construction firms are increasingly being asked to revisit and revise their strategy to utilize a competitive industry. The project schedule is the most important factor determining cost, according to parameter estimation. It is essential for the project management to create an accurate forecast of the project duration for determining the speed of work and to periodically update it in front of the project's dynamic environment to maintain the project on schedule.

Given the importance of the construction industry to economic growth, it is critical to identify major issues affecting the sector's efficiency. The primary goals of any project are to improve time, cost, and quality. To effectively implement an infrastructure project, the construction company must adopt a management solution that will serve as a guide to guarantee that projects are performed within the limitations of top quality, on schedule, and at the lowest feasible cost.

Over the past few years, the demand for efficient and cost-effective performance in the construction industry has risen. This is a result of modernization's accelerated pace, which primarily affects market trends. Thus, a large number of studies, mainly from developing nations, suggest that trying to adopt and incorporate Total Quality Management is likely to enhance an organization and even become competitive in the global market. TQM has yet to be fully implemented in the Philippines because its efficacy is still being contested. Given that the Philippines is a developing nation, more investment in the sector of construction is required to promote growth and development (Coronel et al., 2021).

According to Bondoc (2022), Pampanga is one of the competitive housing markets in the Philippines. The region's viability as a preferred outside of Metro Manila investment location is being further enhanced by massive infrastructure development and decentralization initiatives. The project manager's choice regarding project planning is greatly influenced by the project's location. It argued that managerial abilities are extremely important for successfully managing construction projects. The 3 findings showed that obstacles to the use of construction project management include the project manager's passive participation, the lack of client input in decision-making, the provision of subpar materials, design flaws, ineffective communication, and poor treatment of the workforce (Ugunde et al., 2017).

According to Nunag & Villaverde (2021), construction industry cost overruns and delays in the Philippines may be a significant issue for many building contractors. The owner, contractor, and other parties involved in the building design process are beginning to feel uncertain.

Because of construction delays due to poor management, we need to adapt to the latest technology hence the development of the mobile app. Integration is now more important than ever because of recent IT sector developments, the expanding globalization of the construction market, and a resurgence of quality and productivity demands. Design and development organizations are able to integrate multiple construction operations by restructuring several of their organizational processes and functions.

## II. METHODOLOGY

Research Methodology denotes the discourse of the procedures selected and employed in a research study. This analysis also contains the theoretical notions that further provide information about the approaches to planning and application. This chapter covers the procedures and methods that were used to collect and analyze data for the study. This chapter will present the following:

- (1) research design,
- (2) research participants, (3) instruments, (4) research locale,
- (5) validity and reliability of the instrument, (6) data collection,
- (7) data analysis, and (8) research ethics.

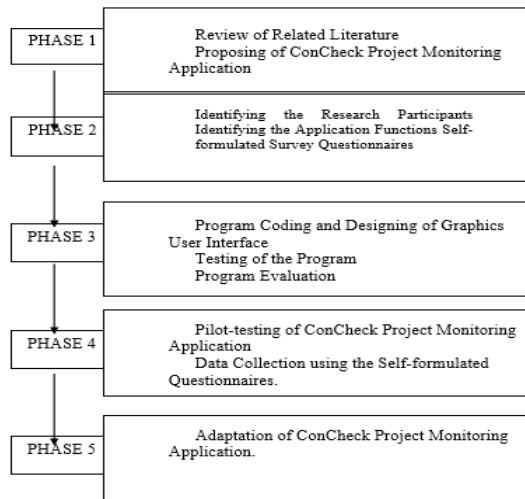


Fig.1. Methodological Framework

The figure above illustrates the phases of work the researchers followed during the conduct of this study.

Phase 1 of the framework presents the sources of information to be acquired. Online sources such as articles, published journals, and relevant related literature will be gathered and compiled to get an overview of the need to digitalize the Project Monitoring workforce in the Construction industry to propose the ConCheck Project Monitoring Application.

Phase 2 illustrates the track of study that was carried out. The researchers identified their Research Participants through a Convenience Sampling approach. This phase will also be the identification of the possible features to be used in the mobile application to be developed.

Phase 3 shows the coding and designing phase of the application. Relevant features necessary in the ConCheck Project Monitoring application were used as primary functions of the application. The development of self-formulated research questionnaires is also included in this phase. Relevant questions shall only be included in the set of survey questions to be used and have also been reviewed and evaluated by different experts in the field.

The aim of Phase 4 is to pilot test the ConCheck Project Monitoring application to the selected research participants. For data collection, self-formulated questionnaires were sent among the target respondents. Descriptive analysis was used to interpret the findings of the data collected for data analysis.

Lastly, in Phase 5 was the identification of whether the ConCheck Project Monitoring Application could help the construction industry to adapt in the growing trends of

digitalization where Project Engineers will have an alternative application to use during work. The level of acceptability and effectiveness will be determined through the data collection process using the self-formulated research questionnaires.

This study utilized cross-sectional investigation with a mixed qualitative and quantitative approach that focuses on improving the current landscape of workforce in the construction industry among Private Construction Firms in the Province of Pampanga. According to Girolamo & Mans (2019), cross-sectional studies are carried out to investigate the presence or absence of an exposure and an outcome at a particular time point.

Furthermore, the approach in this study utilized survey questionnaires which were distributed to the respondents to gather the information needed to complete the study's objectives, which include figuring out whether or not construction firms will accept the ConCheck Project Management Application and whether it can be used in their line of work.

The first phase of survey questionnaires was to determine the difficulties being encountered by Project and Site Engineers in Project Monitoring. The questions included focused on the factors affecting the delays in construction, problems being faced in construction sites, and the effects of delays in project management. The second phase was a descriptive analysis by using a survey questionnaire. The first part contained questions about the application functions, the problems encountered, and the points to improve using a 5-point likert scale. Subsequently, the researchers determined the effectiveness and acceptability of the application after the pilot-testing.

Purposive sampling was used by the researchers to choose the study participants. Purposive sampling, also known as judging, selective, or subjective sampling, is a non-probability sampling approach where researchers choose members of the general population to participate in their surveys based on their own judgment. Using a purposive sampling method, researchers can glean a lot of information from the data they have collected. This makes it possible for academics to talk about the important implications of their findings for the general audience.

The researchers conducted data gathering procedures in identifying the total number of registered Construction Firms in the Province of Pampanga to the Philippine Contractors Accreditation Board (PCAB). The license issued by the PCAB is intended to train its holders in excellence and competence in

contracting activities. Additionally, a PCAB license guarantees that all contractors have the skills necessary to complete infrastructure development projects. In accordance with P.D. No. 1746 amendments to Republic Act 4566, states that to 19 conduct business, a contractor (including a subcontractor and a specialized contractor) must first get a PCAB license. In the Province of Pampanga, 336 PCAB licenses are in operation.

With the use of this sampling approach, the study's sample population closely follows the researcher's intended audience. To identify the target population, the researchers utilized an Raosoft Online Survey Calculator. RaoSoft's online survey software is used by a wide range of industries, including healthcare, market research, education, and government agencies. The company's clients include major corporations, non-profit organizations, and academic institutions.

With that, the researchers conducted the study to 180 Project Engineers, Site Engineers, Project Implementers, and/or Construction Firm Owners in the Province of Pampanga. The focus group were the firms who are currently operating in the said location.

The target population of this study are the Project Engineers, Site Engineers, Project Implementers, and Construction Firm owners currently based and operating in the Province of Pampanga. The location of the study was chosen by the researchers because Pampanga hosts various regional offices of major Philippine government 20 offices, houses the Clark Development Corporation, and it is strategically located at the heart of Central Luzon. It cannot be denied that the construction industry is significant to the province's economic growth.

The researchers employed frequency percentage distribution under Descriptive interpretation to construct and evaluate the original data from the respondents. The findings were determined using the 5-point Likert scale to evaluate the respondent's level of agreement in the question provided.

Table.1. Verbal Interpretation of Mean by Levels of Agreement

Unit Weight	Range of Mean	Level or Reactions
5	4.51 – 5.00	Strongly Agree
4	3.51 – 4.50	Agree
3	2.51 – 3.50	Neutral
2	1.51 – 2.50	Disagree
1	1.00 – 1.50	Strongly Disagree

The pilot testing of the ConCheck Project Monitoring Application was done to a selected Construction Firms currently based and operating in the Province of Pampanga. Pilot testing is a sort of software testing that examines a system's individual parts or the system while it is in use. The goal of the pilot test is to assess a research project's duration, cost, risk, and performance (Hamilton, 2022).

The study used Javascript as the major programming language. Programmers across the globe utilize Javascript to develop dynamic and interactive internet programs and browsers. JavaScript is the most popular programming language in the world, used as a client-side language by 97.0% of all websites. (Meltzer, 2020).

The main System Software platform used in this study is Android Studio. Esmael (2015) stated that Android Studio is the most recognized Integrated Development Environment (IDE) for creating Android apps. This developing platform has been made by Google freely available to Android developers.

*Program Features*

The ConCheck Project Monitoring Application was developed as an application to further improve the present landscape of workforce among Construction Firms in the Province of Pampanga. The researchers aimed to provide an avenue for Civil Engineers to perform their tasks effectively by using the technological advancements presently available.



Figure 2.1. Admin Login for Web Interface

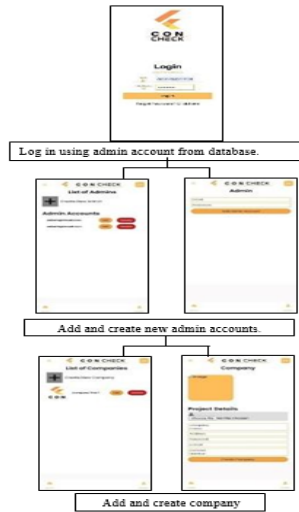


Figure 2.2. Admin Login for Mobile Interface

Figures 2.1 and 2.2 illustrate the login function for the application’s administrator. The application login account starts within the homepage of the application proper. The administrator will be logging in using the Email and Password registered under the application.

The Main Admin of the application has an option to create a new account for a new admin or may start registering an account for the client/company of their choice. The account created for the company shall have the option of creating an account for their engineers and other professionals working under their supervision.

Web and Mobile Device Functionality for the Company/Owner Interface

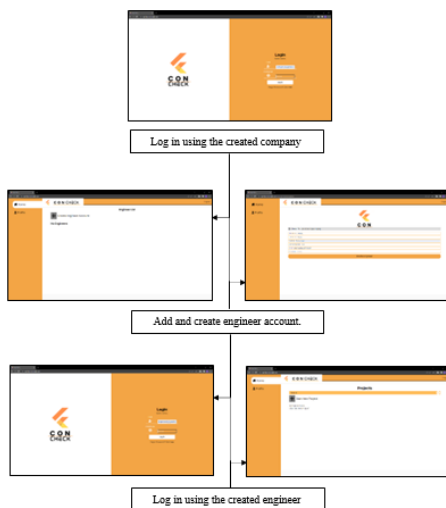


Figure 2.1. Company Login for Web Interface



Figure 2.2. Admin Login for Mobile Interface

Figures 2.3. and 2.4. show the process of how the company or owner can access the ConCheck Project Monitoring application using the Web or Mobile device. The company representative may start by logging into the account created by the administrator. After successfully logging in, the Company Representative may now add and create an account for its Engineers and/or Architects employed under its company.

The company may now allow its engineers to start logging in using the account created by the authorized representative of the company.

Web and Mobile Device Functionality for the Application Dashboard



Figure 2.5. Application Dashboard for Web Interface

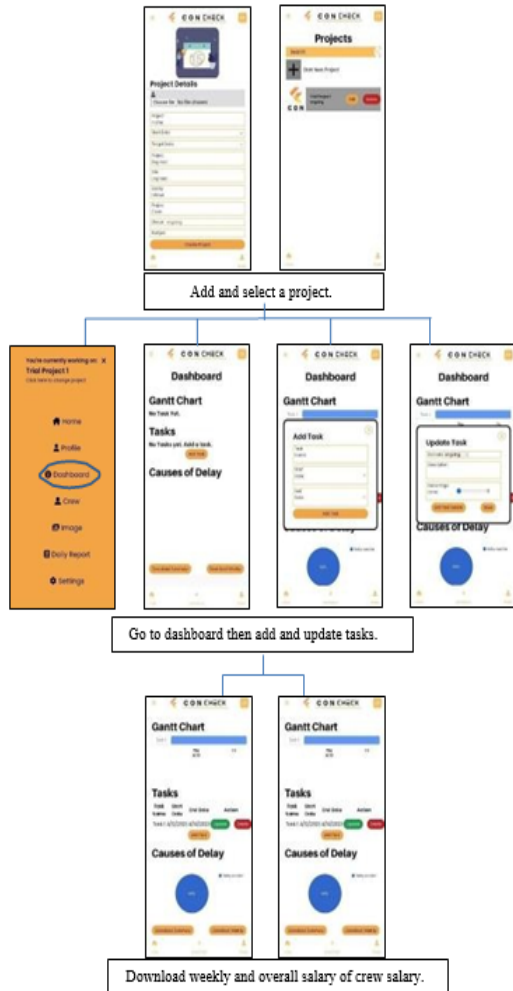


Figure 2.6. Application Dashboard for Mobile Interface

Figures 2.5 and 2.6 explain the process on how to access the Dashboard Interface of ConCheck Project Monitoring Application. This feature mainly focuses on the Project Management part of the application. The user will be able to add and edit the details of every Construction Project they are handling. Among the existing features in the dashboard interface are the following:

**Gantt Chart.** This feature enables the user to add and update a specific task being administered in the project. Task name, start and target end date must be indicated in order for this feature to work. The user can add a remark as the description of every accomplishment being made for the project. The percentage done about a specific task should also be included in the Gantt Chart. A downloadable summary of the accomplishment per day and week can also be utilized in this feature.



Figure 2.7. Daily Report and Image Upload Feature for Web Interface

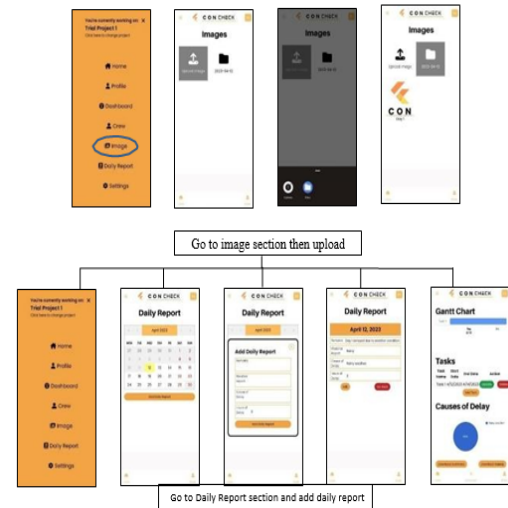


Figure 2.8. Daily Report and Image Upload Feature for Mobile Interface

Figures 2.7 and 2.8 explain the operation of how to upload images and data for daily reports. The user can upload multiple images per day and input data for Daily Report specified within the day. The remarks, weather report, causes of delay, and hours of delay will be reflected on the Gantt chart. 36 Log in using the created crew account and press Time in/out to time in and press again to time out.

**Daily Report.** This feature enables the user to upload images of daily activities on the construction site and input data that can track the different kinds of delays that are being encountered during the entire construction project.



Figure 2.9. Crew Management Feature for Web Interface

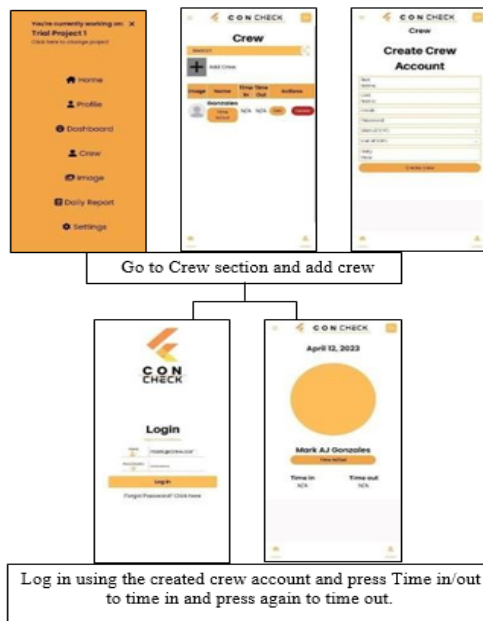


Figure 2.10. Crew Management Feature for Mobile Interface

Figures 2.9 and 2.10 demonstrate the process of how the engineer can create the accounts of the crew. The details of the crew, such as: personal information, duration of work hours and their daily rate are needed for them to register an account. The Crew can access the website using their own account and log in strictly for time in and time out used only.

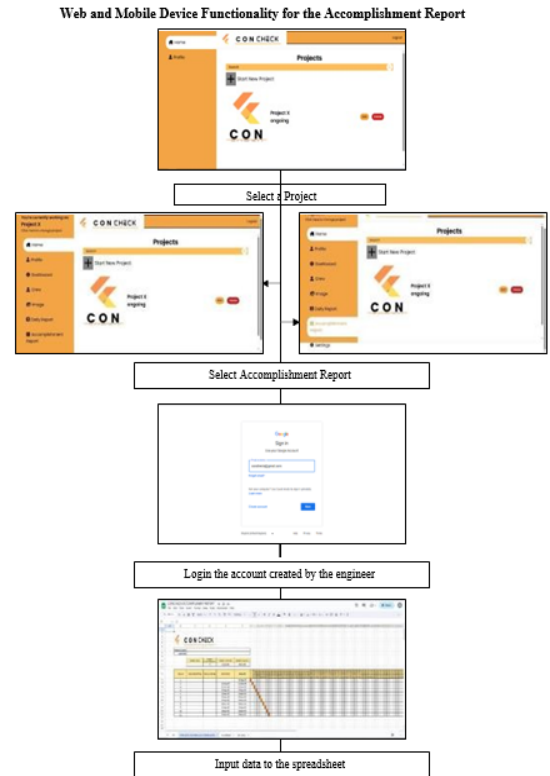


Figure 2.11. Accomplishment Report Feature for Web Interface

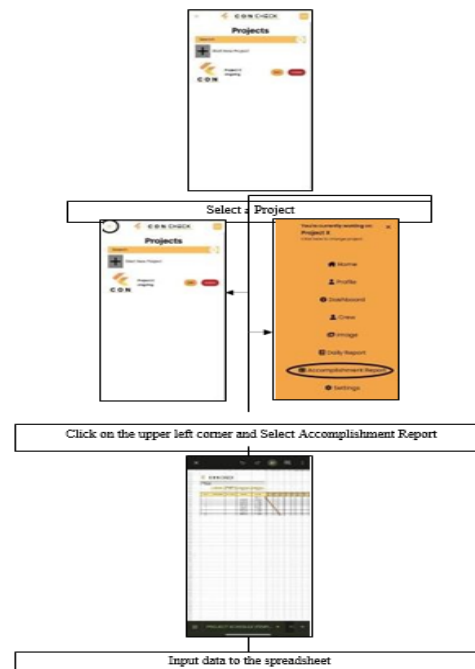


Figure 2.12. Accomplishment Report Feature for Mobile Interface

**Weight Percentage.** A percentage computed by dividing the amount per pay item over the total amount of all pay items and then multiplied by one hundred percent.

The Formula used is:

$$\text{Weight \%} = \frac{\text{Amount per Pay Item (₱)}}{\text{Total Amount of Pay Item (₱)}} \times 100\%$$

**Total Percentage per Week.** It represents the value obtained by multiplying the sum of the Weight percentage by the sum of the Weekly percentage.

The Formula used is:

$$\text{Total Percentage per Week} = \sum \text{Weight \%} \times \sum \text{Week \%}$$

**Weekly Financial Accomplishment.** The amount obtained by multiplying the total amount of pay items by the total percentage per week.

The Formula used is:

$$\text{Weekly Financial Accomplishment (₱)} =$$

$$\text{Total Amount of Pay Items} \times \text{Total Percentage per Week}$$

**Ahead / Delayed.** It indicates the percentage of the project being ahead or delayed.

The Formula used is:

$$\frac{\text{Total Percentage per Week} - \text{Planned Accomplishment Percentage}}{\text{Percentage}}$$

**Days.** Shows the number of days the project is ahead or delayed.

The Formula used is:

$$\text{Days} = \frac{\text{Ahead}}{\text{Delayed}} \div \text{Project Duration (Days)}$$

### III. RESULTS AND DISCUSSION

The findings reported by the respondents comprising the construction stakeholders within the companies in the Province of Pampanga. Table 1.1 shows the respondent's general information or the demographic profile, which includes the age, years of work experience, position/s held and workplace location. The researchers got a total of one hundred ninety-five (195), surpassing the targeted sample size of one hundred eighty-three (183) respondents.

**Table 2.1. Descriptive Statistics for the Demographic Profile of the Respondents (n = 195)**

Category	Item	Frequency	Percentage
Age	18-25 years old	48	24.62
	26-35 years old	113	57.95
	36-45 years old	17	8.72
	46-50 years old	15	7.69
	51 years old above	2	1.03
Years of Work Experience	< 3 years	38	19.49
	3-5 years	61	31.28
	6-10 years	65	33.33
	11-15 years	11	5.64
	>15 years	20	10.26
Stakeholders/ Positions held	Project Engineer	51	26.15
	Architect	19	9.74
	Site Engineer	71	36.41
	Office Engineer	93	47.69
	Safety Officer	12	6.15
Locality of work/s	Angeles City	52	26.67
	Apalit	5	2.56
	Arayat	4	2.05
	Bacolor	16	8.21
	Candaba	4	2.05
	Floridablanca	1	0.51
	Guagua	8	4.10
	Lubao	5	2.56
	Mabalacat City	27	13.85
	Macabebe	2	1.03
	Magalang	6	3.08
	Masantol	2	1.03
	Mexico	13	6.67
	Minalin	4	2.05
	Porac	3	1.54
San Fernando City	100	51.28	
San Luis	3	1.54	
San Simon	3	1.54	
Santa Ana	3	1.54	
Santa Rita	3	1.54	
Santo Tomas	4	2.05	
Sasmuan	1	0.51	

Table 2.1 depicts the descriptive statistics of the demographic profile of the respondents. The researchers primarily asked the age of the respondents where the majority or 57.95% of them are in the age bracket of 26-35 years old. Moreover, 48 out of 195 participants belong to the bracket of 18-25 years old while 8.72% are from the 36-45 years old group and 2 participants aged 51 years old and above.

Meanwhile, the researchers also determined the years of work experience of the respondents. 65 out of 195 participants have 6-10 years of work experience while 61 or 31.28% have worked for 3-5 years. 19.49% among the participants were already working for less than 3 years while 31 participants worked for almost 11 years and above. Of all the positions held, 93 among them have already been working as an Office Engineer with a percentage of 47.69. Of the 195 respondents, 71 among them have also worked as Site Engineer while 51 among them have experienced working as a Project Engineer.

Moreover, the researchers also asked for the locality/s of their work experience in the Province of Pampanga. 100 out of the 195 or 51.28% respondents said that they have already handled construction projects in the City of San Fernando while 26.67% or 52 among them worked in the Angeles City. 27 or 13.85% of the participants also worked in Mabalacat City while 8.21% among them handled projects located in the Municipality of Bacolor.



Item	SD	Frequency					Mean	Verbal Interpretation
		D	NAD	A	SA			
I have encountered construction-related problems On-site	0	3	9	94	89	4.38	Agree	
I have experienced difficulties in Project Management due to poor Project Monitoring	2	14	27	91	61	4.00	Agree	
Communication and information sharing within the problem.	3	23	31	95	43	3.78	Agree	
I am aware of the technological advancements available for use in the construction field	0	2	16	109	68	4.25	Agree	
Managing my site documentations has been one of my problems in project monitoring and management.	8	36	37	68	46	3.55	Agree	
I am confident that the current safety procedure can protect me from any hazards and health risks.	0	19	65	89	22	3.58	Agree	
When it comes to establishing health and safety standards, I believe the company does not have any difficulty enforcing and	1	36	70	69	19	3.35	Neither Agree/Disagree	
adhering to the laws and regulations.								
The use of personal protective equipment is being properly observed at the workplace where I work.	1	40	55	69	30	3.45	Neither Agree/Disagree	
There are no legal difficulties for the company, such as permit delays or interruptions in contractual terms in adhering to the health and safety regulations.	1	40	73	56	25	3.33	Neither Agree/Disagree	
The company does not reduce supply expenses, cut reduction costs, or lower financial expenditures, to reduce costs and boost profitability.	3	22	86	63	21	3.39	Neither Agree/Disagree	
I have encountered construction project delay due to lack of manpower in the company.	3	17	32	84	59	3.92	Agree	
I believe the company has sufficient workforce which does not place workers under pressure to complete tasks on time, hence avoiding health and safety issues.	3	22	81	59	30	3.47	Neither Agree/Disagree	

I have experienced delays due to the delivery/shipment of materials and equipment being used in the construction site.	0	12	35	84	64	4.03	Agree
Malfunction of tools and equipment being used con	1	7					

The data gathered shows that the workers still experience difficulties while performing their duties at their workplace, with an average index of 4.38. Additionally, with an average of 4.00, the respondents experienced difficulties in project management due to poor project monitoring. Moreover, with an average of 3.78, the workers claimed that communication and information sharing is still one of the usual problems being experienced in the jobsite.

Consequently, the participants agree that they are aware of the present development of technological advancements used in the construction sector with an average mean of 4.25. With an average index of 3.55, site documentation has also been one of the difficulties faced by the workers in the field.

With an average mean of 3.81, construction workers continue to face several difficulties while performing their duties and obligations inside the workplace. One of the most significant causes of project delay due to poor project monitoring is a lack of communication and collaboration among project stakeholders. For example, if the project manager is not regularly communicating with the project team, subcontractors, and suppliers, it can lead to delays in materials delivery, equipment availability, or other crucial factors that could impact the project timeline.

Proper project monitoring is critical to ensure that a project progresses as planned and is completed within the specified time frame. If project monitoring is not done correctly, it can result in delays, cost overruns, and other issues that can affect the success of the project. The integration of technology in the construction industry also improves project efficiency, reducing costs, and improving safety.

Table 2.3. shows the data gathered on the respondents' level of agreement to the timeliness of the application. It can be gleaned that out of 5 companies who participated in the pilot-testing, 3 companies or an average mean of 4.6, the application has helped them complete their tasks on time. More so, the application has a fast response time which managed the respondents to work efficiently.

The application also provided access to accurate site information which is vital in achieving a systematic project monitoring among construction sites. Furthermore, 5 or all the research participants who were able to use the application said that the application reminders feature, and its different functionalities enabled them to stay on top of project tasks. With an average mean index of 4.6, the respondents agreed that the ConCheck Project Monitoring Application helped them to save time and reduce errors among construction projects. Overall, the application developed was able to obtain an average of 4.66 which can be transmuted to Strongly Agree when it comes to the relevance of the application to save time and allow the users to work proactively. The application was thoroughly examined to ensure that it works as expected, is bug-free, and meets all project requirements.

**Table 2.4. Descriptive Statistics on the evaluation of ConCheck Project Monitoring Application Functionality in terms of Connectivity (n = 5)**

Item	Frequency					Mean	Verbal Interpretation
	SD	D	NAD	A	SA		
<b>Connectivity</b>							
The application has fast and reliable internet connectivity.	0	0	0	2	3	4.6	Strongly Agree
The website is able to connect to a variety of devices and operating systems.	0	0	0	3	2	4.4	Agree
The application can sync data in real-time across multiple devices.	0	0	1	2	2	4.2	Agree
The application was able to handle multiple projects simultaneously without issues.	0	0	1	2	2	4.2	Agree
The application's connectivity features are highly secure and protect my data from unauthorized access.	0	0	1	2	2	4.2	Agree
The application's features allow for seamless collaboration with team members and stakeholders.	0	0	0	2	3	4.6	Strongly Agree

Table 2.4. depicts the overview of the respondents when it comes to the connectivity of the application. Good connectivity among applications is essential for the smooth functioning of any business or organization that relies on technology to operate. When applications are connected, they can easily share data with each other, eliminating the need for manual data entry or file transfers. This saves time and reduces the risk of errors. In Item no. 1, three (3) among the respondents strongly agree that the application has fast and internet reliability.

Moreover, with a mean of 4.4, the participants agreed that the website was able to connect to a variety of devices and operating systems making their project monitoring easier. In addition, the application was able to sync data in real-time across multiple devices and handled multiple projects simultaneously without the occurrence of any data breach and

technical errors as supported by an average index of 4.2. Meanwhile, workers from the companies who participated in the pilot-testing of the application, 4.6 in average, strongly agreed that the application was able to provide efficient tool for managing and organizing their project's information and documents.

To sum it up, with an average of 4.40, the connectivity of ConCheck Project Monitoring Application was able to pass the respondents' standards which allowed them to seamlessly collaborate with their team members and stakeholders with the application developed.

**Table 2.5. Descriptive Statistics on the evaluation of ConCheck Project Monitoring Application Functionality in terms of Reliability (n = 5)**

Item	SD	D	Frequency			Mean	Verbal Interpretation
			NAD	A	SA		
<b>Reliability</b>							
The construction management application I am using performs reliably and consistently.	0	0	1	2	2	4.2	Agree
The application rarely experiences downtime or system failures.	0	0	1	1	3	4.4	Agree
The application handle large amounts of data without performance issues.	0	0	1	2	2	4.2	Agree
The data and information stored in the application are always accurate and up to date.	0	0	1	2	2	4.2	Agree
The application has never lost or corrupted any of my project data or information.	0	1	0	2	2	4	Agree
The application has a good reputation for delivering accurate and timely project data and information.	0	1	0	2	2	4	Agree
The application is essential to my current construction projects.	0	0	0	2	3	4.6	Strongly Agree
The application is extensively tested for use in the construction industry.	0	0	0	1	4	4.8	Strongly Agree
	0	0	0	1	4	4.8	Strongly Agree

Presented in the Table 2.5 is the descriptive statistics on the evaluation of ConCheck Project Monitoring Application in terms of its reliability during the pilot- testing conducted to selected five (5) construction companies currently holding their projects in the Province of Pampanga. Supported by an average of 4.2, the respondents agreed that the construction

management application they used performed reliably and consistently. This is further backed up by the index of 4.4 where the application rarely experienced downtime and system failures while performing the initial testing. Furthermore, the data and information stored in the application were always accurate and up to date, which was agreed by an average of 4.2 among the companies who utilized the application.

Meanwhile, the majority of the respondents strongly agreed that the application has a good reputation for delivering factual and accurate information, which is vital in construction management. Moreso, 4 or 96% among the respondents said that the application is essential to their current projects and has been extensively tested before the formal launch among construction companies. Finally, with an average mean of 4.42, the application is a strong option for managing their construction projects and is ready for integration in their respective firms.

#### IV. SUMMARY OF FINDINGS

The study was conducted through a standardized survey questionnaire which was divided into two (2) parts. The Part 1 of study was conducted to identify the difficulties being encountered by different workers in the construction sector while the second part was the pilot-testing of the ConCheck Project Monitoring application to selected companies currently handling projects within the Province of Pampanga.

The proponents supervised a survey to 195 construction-field workers where they examined the presence of difficulties being encountered by Project Engineers, Site Engineers, and Project Managers inside their jobsite. The findings revealed that most of the workforce continuously experience construction-related delays due to poor project monitoring. The researchers found out that communication is among the primary contributors among the problems in the construction site. Moreover, proper documentation among construction projects has a direct impact on the overall progress of the project. The researchers also learned that site documentation is necessary to ensure compliance with regulatory requirements, such as permits, zoning, and building codes. In the event of an audit or inspection, accurate site documentation can demonstrate compliance and protect the construction company from potential legal issues. Meanwhile, the data gathered during the conduct of the study said that Construction Health and Safety standards shall be prioritized in order to minimize the possible occurrence of health and safety issues. To protect workers from

any hazards, construction companies should provide their workers with training on safety measures and emergency procedures, including how to use protective equipment and how to respond to accidents or injuries. Meanwhile, manpower and shipment of tools and equipment being used in the workplace also play a significant impact in the duration of projects. Survey results from the participants have shown that there is really a need to incorporate the existing technological advancements in the day-to-day progress among construction projects.

Meanwhile, in the latter part of the study, the pilot-testing of the ConCheck Project Management Application was conducted. The researchers found out that the application's functionality enabled the users to complete their projects on time. Moreso, it can be gleaned that the application has helped the workers to make their tasks easier as they transitioned to using technological advancements in the construction field. Based on the results of the pilot-testing and survey, the respondents mutually agreed that the application is reliable and is essential to incorporate in the construction industry. Further, the participants mentioned that the application is a strong option for managing their construction projects and would be beneficial for the company to adopt. Overall, the results said that the ConCheck Project Monitoring Application allowed them to share site documentation and accomplish their tasks on time.

#### V. CONCLUSION

Construction project monitoring is an essential part of project management that involves tracking and assessing the progress of a project. It helps project managers identify potential problems, assess the effectiveness of the project plan, and take corrective actions to keep the project on track. However, despite its importance, project monitoring is often associated with continuous problems that can impact the success of the project. The presented research offers an understanding that the construction sector should adapt to the fast pacing 21st century world. The construction sector plays a vital role in the development of the global economy's infrastructure, the production of jobs, and economic expansion.

There is enough evidence to support the claim that in order to lessen the difficulties being encountered by Project and Site Engineers in Project Monitoring, construction companies should maximize their resources and establish a common ground for the development of different technological

advancements that could cater the need of the digitalizing industry.

The findings of the research will be helpful in construction businesses as they work to solve the problems and risks that they uncovered. Construction firm owners, leaders and representatives may utilize the findings to identify modernization efforts that are appropriate for their own organizations. This will support the development of new policies to address unforeseen events as well as the strengthening of strategic plans. Researchers may make use of the data to determine further issues, areas and provide suitable solutions to aid the industry's initiatives.

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