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Assessment of Demski's Model in House Construction Planning

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Abstract: ***The construction industry has witnessed significant advancements in recent years, particularly in the area of planning and project management. Efficient and effective planning plays a vital role in the successful completion of construction projects, ensuring timely delivery, cost-effectiveness, and quality. One prominent planning model that has gained attention is Demski's Model, which aims to optimize the house construction planning process by incorporating various factors and variables. This research paper presents an in-depth assessment of Demski's Model in the context of house construction planning. The objective is to evaluate the model's effectiveness, its applicability in real-world scenarios, and the potential benefits it offers to the construction industry. The assessment process involves a comprehensive literature review, analyzing existing studies, scholarly articles, and relevant industry reports. The gathered information provides a foundation for understanding the fundamental principles and components of Demski's Model. The research methodology consists of both quantitative and qualitative analysis. Quantitative analysis involves examining key performance indicators such as project duration, cost, and resource allocation, comparing projects that utilized Demski's Model with those that followed traditional planning approaches. Qualitative analysis focuses on gathering feedback from project stakeholders, including contractors, homebuilders, and house owners, to gauge their experiences and perceptions regarding the model's effectiveness and practicality. The findings of this research contribute to the existing knowledge base on house construction planning methodologies. The assessment of Demski's Model provides insights into its strengths, weaknesses, and potential areas for improvement. It also sheds light on the challenges and limitations that may arise during its implementation. By understanding these factors, construction professionals can make informed decisions when considering the adoption of Demski's Model in their planning processes. Ultimately, this research aims to provide a comprehensive assessment of Demski's Model in house construction planning, offering valuable insights for***

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researchers, practitioners, and decision-makers in the construction industry. By evaluating the model's effectiveness and practicality, this study contributes to advancing planning methodologies and optimizing construction project outcomes in the pursuit of enhanced efficiency, reduced costs, and improved quality.

Keywords: Demski's Model, Construction, Preconstruction, Planning.

1. INTRODUCTION

Background of the Study

As the name would imply, pre-planning for construction occurs before the project starts. This service involves defining the project, identifying potential problems, planning, scheduling, the scope of the project, cost estimates, and analyzing what is needed for a job (Demski, 2022). Pre-construction planning is the most time-intensive step of the entire construction process; however, it is essential for successful project execution. In addition to determining expected project scope, feasibility, and cost, pre-construction planning also addresses a myriad of other project-related concerns, including building permits, site evaluation, subcontractor criteria and selection, building materials, equipment requirements, etc. (What is Pre-construction Planning, and why is it Essential?, 2022). Construction planning identifies all activities necessary in a construction project, splits them into smaller activities, and organizes them logically, thereby determining the required machinery, labor, and materials. The collection of documents created during construction planning is referred to as a construction plan. These are the available tools, tasks, schedules, and financial plan. (Gerardi, 2021). It is a process that involves a number of tasks between the initiation of the project and the development of its detailed design (Minikevicius, 2016). Preconstruction planning is the most crucial phase of the construction process. An effective plan can prevent an overload of change requests and budget expansions. The more detailed the preconstruction process, the greater the chance the project has for timely completion (Gibson, 2021). Good construction starts with a solid foundation. That's true of the work itself (Gerardi, 2021). In this process, important decisions are essential, and measurements are established to maximize project efficiency and minimize potential obstacles while constructing.

When delivering a construction project on time and within budget, desired quality is a common requirement (Cyrus, 2016). Pre-construction planning is gaining popularity as one approach to improving productivity in the construction industry (Menches, Hanna, & Russell, 2005). It is time to thoroughly assess and plan to mitigate risks associated with constructing the project, including evaluation of the construction site, permit and inspection requirements, and others that need to be resolved before or during construction (Gansauer, 2019). It is also essential to track the performance of your construction project team and ensure the parameters you've set are met (Gupta, 2022).

Most of the citizens in Bayugan City are constructing their houses without proper planning, particularly those poor citizens who lack knowledge about preliminary planning. It can be seen in our own locality that the houses constructed are not yet finished, particularly those that are "Bahay Kubo". It appears from some research that "The Bahay Kubo" is a semi-permanent bungalow made with materials found nearby. The materials are lightweight due to

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the tropical location and enable for natural airflow, which successfully cools the interiors. However, during the rainy season, some of the occupants will undoubtedly be blown off or destroyed (Lorenzo, 2015). Preconstruction has various advantages. These include improved accuracy, cost savings, improved scheduling, reduced risk, and increased quality (D'Arcy, 2022). Furthermore, before building a house, ownership of land doesn't mean they can do what they want; it needs lot approval, zoning, ordinances, covenants, building codes, and permits (McCollum, 2022).

Making a home useful, effective, and pleasurable for the occupants is the whole aim of construction. In a house, you are free to be yourself and have fun. Your home needs to be constructed in an affordable, practical, and lovely way for such purposes. To put it another way, it needs to be customized to your needs and wellbeing. The only way to do so is to have a well-designed and efficient home. Both your comfort and your wants must be met. It should also be effective and long-lasting (Davis, 2021). Building your dream house is exciting but making it a reality can be a complicated procedure, particularly when someone is making their first house purchase. thus, developing a realistic idea of how much you can afford to spend and how much it will cost to build (Craven, 2022). Building a house can be a rewarding journey, but it takes a lot of time, money, and patience (Drolet, 2022). Pre-construction helps to prevent miscommunication, delays, and unexpected issues on the construction site (Jacobs, 2022). Construction plays a major role in global economic development (Hosseinian and Jabbarani 2012). Construction defects often result from the absence of an installation methodology or a lack of knowledge of proper installation (Forcada et al., 2014), leading to material or system failure even if the proper material is selected (Tatum 2011). Given that the success of a project depends on experienced workers, the installation of high-quality materials and careful selection are essential (Mills et al., 2009). There's no point in starting anything if you do not have any objectives (Ambegaonkar, 2022). By thoroughly planning the project ahead of time, many time and resource-consuming hurdles can be avoided (Maciel, 2022).

It's essential to realize that because construction projects are evolving, it's normal for the strategic plan to alter as project-related situations evolve. To verify that the project is proceeding properly, the construction manager and other stakeholders can refer back to their original plan by having a high-level overview to look at (Gilliland, 2019). In light of the many houses that are not yet properly constructed, the researchers conducted this study to find out the assessment of Demski's model in house construction planning by the citizens in the city of Bayugan. The researchers came up with the idea of conducting this study due to the desire to survey citizens who had done preliminary planning.

2. Objectives of the Study

The objective of this study is to give the data of citizens preliminary planning in Bayugan City. This study aimed to ascertain the following issues among the primary and specific issues:

1. To identify the typical preliminary planning techniques used by citizens.

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2. To determine the factors affecting the application of preliminary planning and outcome of constructed houses.
3. To be aware of the citizen's understanding about the importance of preliminary planning in constructing a house.
4. To determine the significance between preliminary planning to the structure of the house build by the owners.

Significance of the Study

This study is intended to determine the typical preliminary planning techniques of citizen, to the knowledge of citizens about the importance of preliminary planning in constructing a house, and to identify the factors affecting the outcome of a constructed houses.

HOUSE OWNERS. They can gain from this study by contributing their opinions about preliminary planning. This study will help them to construct their house properly and appropriately.

FUTURE HOUSE OWNERS. They can benefit in this study by being aware of the contribution of preliminary planning. This study will help them to achieve their desired houses.

FUTURE RESEARCHERS. This study will benefit to other researcher who wanted to have further knowledge about the topic, this study will help them widen their knowledge about this research.

HOUSE RENTERS. This study will benefit to the house renters by being aware that the house they rented has a proper planning before constructing. This study will help them secure their living.

Scope and Limitation

This study covers the selected Barangays in Bayugan City, Agusan del Sur. These selected areas are Bucac, Calaitan, Poblacion, Maygatasan, and Gamao. Determining the factors affecting the preliminary planning of citizens and identifying its importance. The information needed will be gathered by surveying the house owners. One hundred twenty house owners will be covered in this study, and all the respondents will answer the questionnaire form that will be given by the researchers.

Conceptual Framework

It involves a systematic and structured approach to evaluate the effectiveness and applicability of Demski's Model in optimizing house construction planning. The research aims to investigate how well Demski's Model aligns with the realities of construction projects and its impact on project efficiency, cost-effectiveness, quality assurance, and stakeholder satisfaction. The diagram depicts the entire process of this study. The instruments used in conducting this study, to the process, and the output of this study.

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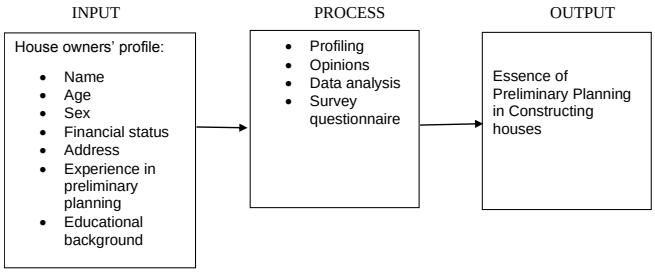
Research Paradigm



Review of Related Literature

This chapter will discuss some relevant studies applicating Demski's model in house construction planning. Furthermore, this review of literature would go over presentation of a method for solving a construction planning problem in a housing development project using a mathematical model which is an integer linear programming for dividing house construction jobs to three contractors in a project case study (Ngowtanasuwan, 2018). The findings demonstrated that this research's application of the integer linear programming mathematical model was effective in producing the lowest-cost building costs for the results. A construction manager or project owner will be able to select the best option based on the construction cost aspect by using this model. Applications of the mathematical model can be made to other, more challenging topics as recommendations for this research. Additional requirements, such as labor restrictions, material restrictions, construction quality requirements, or other factors, might be introduced as additional constraints. The objective function can also be used for multi-criteria optimization, which involves balancing many criteria, such as minimizing project length and maximizing construction quality and cost.

According to the study of Sofberi et al. (2021), in decision-making method employed at construction planning phase of housing development, detailed decision supporting data is needed to provide specific guidance to private housing developers. The success of a housing development project is determined by the decisions that decision-makers make during the planning phase. In this assessment of the literature, a decision-making process that will be used throughout the construction planning stage of a home development project in Malaysia is defined. Their findings show that talks and market/economic reports are the most important aspects Malaysian private housing developers take into account when deciding on house construction projects. Thus, this research is meant to assist governments and private housing developers in Malaysia in making decisions throughout the construction planning stage of housing development projects.

At each level of the planning phase, the private housing developers utilize essentially the same decision-making techniques. Discussion, experience judgment, and financial analysis are the three most important and effective tactics that support private housing developers in their decision-making at the first and second stages of the planning phase. The builders of private housing are aware that having a discussion in a group is the best approach to gain new information. Conversations with more seasoned team members can lead to the best decision

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for the best option and suggestions for shortening the duration of a housing project. The decision-making data is then expertly produced, and workable options to the course of action are understood. Financial analysis is crucial because the primary goal of any construction professional is to complete the project within the estimated time range (Sofberi et al., 2021).

In these findings, the right value for the housing development project can be predicted by decision-makers through debate supported by information from the market/economic report and financial analysis. Projects can be finished within the allocated budget, but doing so necessitates a trustworthy preliminary estimate and familiarity with the factors that can increase the project's cost. By precisely predicting the expenses of each component of a home development project during the building design phase, private housing developers can avoid project failure brought on by insufficient financing (Sofberi et al., 2021).

The respondents (private home developers) concurred that discussion, decision trees, and a pros-and-cons analysis are the best methods for determining the best course of action before moving on to the stage following risk planning. Decision-makers may have better talks using decision trees and pros and cons analyses, which in turn enables them to develop early forecasts of potential threats and solutions to potential issues. The primary methods used in decision-making at the last stage of the construction planning phase are identified as discussion and experience judgment (procurement). The decision-makers must make a precise decision based on their knowledge to identify the most qualified stakeholders. It is necessary to find a solution to any issue involving the interactions of stakeholders, such as clients, contractors, and consultants. The early prognosis would help save time and money. A decision-maker might choose a workable plan in reality to produce a fruitful house construction project. Private home builders can learn more about the activities, discover dangers, their repercussions, and potential solutions by utilizing the provided decision-making approaches. They can also find the best and most crucial input data this way (Sofberi et al., 2021). Finally, a decision-making process has been established for use by Malaysian private housing developers throughout the construction planning phase of a housing development project as a result of this study.
In the study of Imad et al. (2018), they seek to identify the key causes of schedule overruns in Pakistani building projects' pre-construction planning (PCP) phase. Their study got underway with an examination of variables intended to have an impact on the overall project length. In the life cycle of a project, the planning phase comes immediately following the conceptualization phase. Depending on how the project is planned at this point, complications can appear or go away. Evaluation of these time-consuming aspects is essential for the project's success. Very important, very significant, and moderately significant criteria were used for categorization. The identified elements will undoubtedly assist the involved person(s) or organization(s) in preventing and controlling such problems before they seriously affect the project duration. Teams are formed properly, and this requires good communication amongst all parties involved. It denotes healthy relationships and attitudes that withstand requests for changes, reworks, and delays and, as a result, lead to a successful conclusion.

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The construction sector in Pakistan doesn't have a solid track record for finishing projects on budget and on schedule. Contractors and industry management are attempting to address the significant issue of cost and time overruns during the preplanning stage of the building project for analyzing the elements which are influencing the cost and time overruns of the construction projects (Ilyas, Li, and Ullah 2019). The primary goal of the research study on the evaluation of important variables responsible for cost and time overruns in the pre-construction planning phase of construction projects is to examine the factors influencing these overruns in the current construction planning phase of these projects. Many research have been evaluated on this subject, and it is clear from all of them that poor site management, a lack of laborers, project complexity, and a shortage of building materials are the main causes of cost and schedule overruns in construction projects.

The construction projects around the world have a track record of very poor performance when it comes to finishing on time, within budget, and with the desired level of quality, according to various studies that have examined this issue. (Ilyas, Li, and Ullah 2019). In this study, the variables that have an impact on construction projects in the preplanning stage are examined. The variables that affect the duration and cost overruns of construction projects are also examined. Several tests are used to identify the variables that significantly contribute to plans being completed late. By examining the writings of several authors on this particular subject, the study's main components—poor site management, labor shortages, project complexity, and a lack of resources—have been identified.

Cost and time overrun issues are very important for the effective completion of the carried-out project in construction projects, and the linear regression is also utilized to measure the effects of factors. In the research study, coefficient testing examined the relationship between a building project's complexity, labor force, lack of resources, and inadequate management system. Also, the qualitative study concluded that political unrest affected time and cost overruns in Pakistan's largest construction project, the orange line railway project. The research study's conclusions also put light on the necessity of excellent project schedule preparation with the flexibility to account for any delays, reductions in complexity, and proper communication mechanisms to effectively execute a construction project. (Muhammad Ilyas, Jing Li, and Irfan Ullah, 2019)

Capacity planning is instrumental in production planning as the variability witnessed in construction projects complicates the planner’s role in achieving a balance between weekly task load and available resources (Abou-Ibrahim et al., 2019). The objectives of this article is to examine how capacity planning affects a project's time and cost performance and to educate planners about the dangers of inadequate capacity planning. A simulation model is created to compare several project scenarios using various capacity planning strategies. Measures are created to track a project's performance during the course of construction in terms of cost, schedule, and planning quality. According to the findings, a project's cost and duration are influenced by both the capacity planning approach the planner selects and the type of project. Interestingly, the best balance between weekly load and capacity is achieved by knowledgeable planners who are aware of a project's features. Without materially

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reducing the building period, they can cut the amount of money expended for unused resources.

The benefits of informed planning methods can result in a reduced and optimized use of buffers, enabled by pull planning and timely removal of constraints. Accordingly, informed capacity planning fills an important gap in the production planning puzzle (Abou-Ibrahim et al., 2019). However, to reap the full potentials of informed capacity planning, the design of the production process should be enhanced to increase process flexibility. Possible suggestions include a better design of weekly work backlogs (a pool of Plan-B tasks ready for execution in case of extra capacity or stopped work) and employing a multi-skilled workforce. The wise design of work backlogs and their dynamic update throughout the project may help production planners assign extra capacity to workable backlogs and avoid idle resources, while the hiring of multi-skilled workforce increase the flexibility of assigning labors to different available tasks. These suggestions require further research and can be the subject of future studies on capacity planning.

3. MATERIALS AND METHODS

This chapter contains the study's methodology.

3.1 Instrument:

The primary tool for the research will be used to collect data is a self-administered survey questionnaire which consist of 30 items and be given in person. Data that can be used to determine the awareness of house owners in Demski's Model in House Construction Planning. The survey is used to gather data on the opinions of house owners to Demski's model in house construction planning.

3.2 Methods:

3.3 Research Methodology

The study will use a correlation method, as the study's goal is to determine the opinion of citizens in Bayugan City about Demski's model in house construction planning. The objective of widening the citizens' perception and knowledge of the house owners to the model about preliminary planning in constructing houses. It would benefit not only the researchers but also the house owners.

3.4 Research Design

A descriptive research design is carefully constructed to ensure a complete description of the situation, making sure that there is minimum bias in the collecting of the data and to reduce error in interpreting the data obtained.

3.5 Variables of the Study

The main objective of this study is to get opinions from house owners regarding preliminary planning in constructing their houses. Among the main and the specific problems, this study sought to determine the profiles of the respondents and contribution of Demski's model in construction planning to the random house owners in Bayugan City.

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3.6 Data Gathering Procedure

The research will use questionnaires to gather data, to know the knowledge and perspective of house owners in house construction planning based on Demski's model. The survey is composed of 30 items questions, following the initial stages participants are encouraged to take any clarification, concerns and unclear questions due to the technical difficulties.

Following the completion of the research questionnaire's development, we will conduct consultations with at least 10 instructors to verify and assess the research instrument's construct validity, item validity, and content validity as well as its suitability for use in this research activity.

To test the reliability of the results in the questionnaire, we ask a separate question with the same idea. The response must be comparable so that it can be determined whether the survey's questions and answers are still valid over time.

3.7 Data Analysis

Descriptive statistics and frequency distribution analysis are the two analyses that will be performed while analyzing the data description. The house owner's score, frequency, and percentage are realized in the frequency data distribution. Their scores in the control group were used to determine the frequency distribution.

3.8 Locale

This study will be conducted in selected Barangays in Bayugan City, Agusan del Sur. These selected areas are Bucac, Poblacion, Maygatasan, and Gamao since the chosen respondents of the study are the house owners who lived in Bayugan City.

4. RESULTS AND DISCUSSIONS

4.1 Result and Discussion

The study aimed to assess the effectiveness of Demski's Model in optimizing house construction planning and its impact on project efficiency, cost-effectiveness, quality assurance, and stakeholder satisfaction.

4.2 Interpretation of Data

Part 1 of Research Questions showed the majority of participants' understanding and knowledge about preliminary planning. It is shown that most of them made a plan before constructing their house. They have knowledge that in constructing a house, there are things that a house owner (future house owners) must consider.

Research Questions Part 2 have shown that most of the participants have a preliminary technique in constructing their houses. Most of the house owners have hired local homebuilders to construct their houses instead of professional architects and engineers. Most of them also answered 'Budget' as a factor that affects them from having a proper preliminary planning, and 'Planning' as their preliminary technique.

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Research Question part 3 shown that most of participants have experienced and applying preliminary planning in constructing their houses. The majority of the participants have enough knowledge about initial planning. They are considerate in their surroundings before constructing a house.

The Research Question Part 4 have shown that all participants have enough knowledge and understanding of how important, beneficial and convenient the preliminary planning is. They are fully aware of how preliminary can help house owners, especially for the residents.

5. SUMMARY, CONCLUSION AND RECOMMENDATION

This chapter presents the summary of findings, conclusions, and recommendations drawn by the researcher from the results obtained in this study.

5.1 Summary of Findings

The findings of the research suggest that Demski's Model serves as a valuable framework for enhancing construction planning practices. It indicated positive impacts on the effectiveness of the project, quality assurance, and satisfaction among stakeholders. Its impact on cost-effectiveness was more complex, though, and was affected by factors distinct to every project.The research highlights the importance of carefully considering project characteristics when applying Demski's Model. Construction professionals should adapt the model based on project size and complexity to maximize its benefits. Moreover, fostering a culture of collaboration among stakeholders is crucial for successful model implementation. Overall, this research provides valuable insights into Demski's Model in house construction planning and offers recommendations for its effective application in the industry. It emphasizes the significance of striking a balance between model integration and project-specific considerations to achieve better project outcomes and stakeholder satisfaction in construction planning processes.

5.2 Conclusions

Therefore, it is concluded that by exploring Demski's Model, which highlights the significance of defining the project, identifying potential problems, planning, scheduling, scoping, and cost estimation, the study aimed to shed light on the benefits and challenges associated with the pre-planning phase. The findings of this research emphasize that construction pre-planning plays a crucial role in minimizing risks, improving project outcomes, and enhancing overall efficiency. It enables stakeholders to identify and address potential issues early on, resulting in cost savings, schedule adherence, and improved quality.

5.3 Recommendations

1. Emphasize the Importance of Construction Pre-Planning
2. Foster Collaboration and Communication
3. Utilize Building Information Modeling (BIM)
4. Enhance Risk Management Strategies
5. Standardize Pre-Planning Processes

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