CLOUD-BASED PROJECT MANAGEMENT SYSTEM

FINAL YEAR PROJECT UG – 2020

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CERTIFICATION

This is to certify that the

Final Year Project Titled

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has been accepted towards the requirements.

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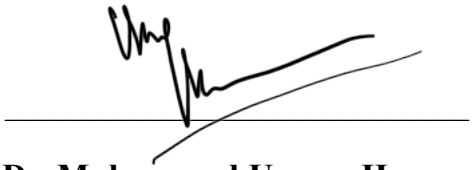

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Our journey for the project has been marked by a collective effort of dedicated individuals. The journey wouldn't have been as remarkable without the contributions of each member of our team. Each challenge we faced was met with the spirit of collaboration and innovation, and for that, we are immensely thankful. In closing, we are humbled and grateful to have been surrounded by such an exceptional network of individuals who have propelled our startup to fruition. May this acknowledgment serve as a testament to the collective effort that has brought us to this point.

ABSTRACT

The complex nature of construction project management creates a need for effective communication. However, the traditional methods of the construction industry create problems throughout the project lifecycle. Because there is no single centralized platform and the present communication tools and methods are sometimes disorganized, there is a lack of real-time collaboration. Our project aims to provide the users with a single platform that provides seamless communication and bidding processes. The process includes a comprehensive assessment of the literature, which directs the creation of a platform that incorporates knowledge from previous research. Important stages include building a trustworthy freelancer database, getting industry feedback, analyzing the data using the technology acceptance model and iteratively developing the product based on testing and user input. Strong security measures and an intuitive user interface are given top priority. Project management in the construction sector can be optimized and a reliable pool of independent contractors can be created with more stakeholder participation. This is the planned contribution of the research. The research helped us in identifying the key variables needed to create this platform which include perceived usefulness, perceived ease of use, attitude towards using, behavioral intention to use and actual system use.

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CHAPTER 1

INTRODUCTION

1.1 Background

Based on the various literature points that have been reviewed in line with this study, it is evident that constructions have a ripple effect on almost any operation in the economy. It is a key factor in the global economy which plays a significant role in jobs creation particularly in the emerging markets where construction is paramount in developmental undertakings and growth of towns and cities (Oladinrin, Ogunsemi & Aje, 2012). The management of several types of construction projects from the conceptual stage, designing to construction and any other intermediate stage that may be involved in project delivery involves the use of project management. Project management in construction process makes it easier to deal with many complex activities that can be involved in a construction project and how each phase of the project is planned.

Effective management recognizes different construction projects in relation to the quality, time, and cost standards to optimize resource utilization. Such discipline is critical especially in the management of risks and other challenges that are recurrent within construction projects and involving multiple stakeholders and limited resources. (Al-Hajj & Zraunig, 2018).

Construction project management is a broad process with an emphasis on detailed organization and coordination from the start of the construction project to the end. For instance, it covers aspects such as project planning to identify and gain consensus on objectives, specifying timelines, assignment of resources, workforce, and materials. The position of a construction project manager is central in overseeing the lifecycle of the specific project with focus on enhancing all facets of the construction project with the overall objectives proposed. (Xie, 2013).

Additionally, to finish a construction project on schedule, construction project management incorporates structuring of project, organizing human resource and scheduling of activities in a proper manner. This involves setting the right time limit, cost, quality, and risk that are desirable in the project to ensure that the project objectives are met to the best extent or quality. These elements all need to be addressed in enhancing the management of these projects since challenges and uncertainties are always experienced in construction activities (Harjanto, Azis & Hidayat, 2019).

Construction project management mainly revolves around the timeline, estimate costs and staff organization with the other significant members being the client, contractor, engineer and the architect (Xie & Zhang, 2013). Therefore, it is prevalent for the project manager to be more involved in the decision-making process with elements such as risk management, resource management, and communication with its stakeholders during the extent of the project (Chen & Kao, 2010).

Construction project management has the aim of delivering a construction project to completion, as laid down by construction specification, legal, and set standards. It is important to maintain compliance with these standards within the framework of the project for its successful completion. (Koolwijk, Vrijhoef, Van Oel, Van der Kuij, & Wamelink, 2014).

Scheduling is one of the most central activities used in effective construction project management. It entails developing a time schedule so that every phase of the project is dealt with within the specified time frame.

Control of funds should be well managed and planned to prevent the use of excess funds during the project to exhaust the set amount of funds for the implementation of the project. Budgeting can be defined as anticipating the costs required for a given project, keeping track of the expenses, and altering the spending plans if required to be on track.

It is thus important that some of the key staff are coordinated in planning and in the working of the project. This includes the coordination and management of activities and total responsibilities that are assigned to the client, the contractor, the engineer, and the architect.

Overlapping of goals with all the stakeholders guarantees that all stakeholders work towards the achievement of the planned goals and objectives of a project or process.

Risk management is not limited to a particular phase of the project, instead, it is a continuous process. This means that the project manager looks at prospective risks and comes up with ways of addressing them. This is because the proactive approach assists in lessening effects of the risks and unforeseeable factors that are likely to be encountered during construction.

Thus, it becomes crucial to ensure adequate provision for communication during the conduct of construction ventures. Leaders of projects provide consistent communication between people involved in the project and the public, so that there is no confusion as to what is being done. Unfortunately, in the present construction industry, breakdowns in communication between important parties can be quite problematic in the field of construction and project management. (Yang, Wakefield, Lyu, Jayasuriya, Han, Yi & Chen, 2020).

There is a broken exchange of information, which causes miscommunication, delays, and inefficiencies all along the project lifecycle. (Zulch, 2014). There is a lack of real-time collaboration because the current communication tools and methods are frequently disorganized and lack a single centralized platform. (Núñez, Ferrada, Neyem, Serpell, & Sepúlveda, 2018). Therefore, the existing practices and methods of construction industry are facing several obstacles in managing construction projects. According to the project management institute annual report of 2013, more than half of the projects are at risk due to poor communication and 56% of the cost of the project is negatively impacted by this improper communication methods. (Gamil, Abd Rahman & Nagapan, 2019).

To solve these problems and improve the general effectiveness of construction project management, it is necessary to embrace new technology and promote a new and efficient project management strategy. (Froese, 2010). A complete web-based solution that facilitates communication between clients, engineers, architects, and contractors is vital in this situation. Real-time exchange of documents, updates, and project-related data should be done on this platform. Also, this platform should give better results in a cost-benefit

analysis as compared to the traditional methods of construction project management. To inculcate new technology in the system, detailed information, and insights (i.e., usefulness, ease of use, attitude towards using, intention to use, actual system use) is needed, which is not clear in the context of construction project management. The study can contribute to the successful completion of projects by developing a user-friendly website that handles unique communication issues within the construction sector.

1.2 Problem Statement

There are several obstacles to construction project management that constrain the efficient management of construction projects among all the key stakeholders in a particular project including the clients, contractors, architects, and engineers. (Xie, Thorpe & Baldwin, 2000). One of the biggest disadvantages to the current system is that there is no specific program to facilitate the co-ordination of these activities and this results to time wastage, financial concerns and misunderstandings. In addition, there is a breakdown of communication between the stakeholders, which negates and slows down the project. (Olander & Landin, 2005). It is necessary to have a platform where all such interested parties would converge into a single point. In other words, for the construction industry to thrive, there is a need to create a market where such key stakeholders who are needed in a project are found. The role of this platform should be to bring all the management needs under one roof, and it should be versatile enough to offer a cost-efficient solution. Hence, this platform is required to fully encourage companies and other people in this field to move away from the traditional ways of conducting construction project management and adopt an online method to enhance efficiency in their project.

1.3 Objectives

Our objectives are:

1. To create a platform that provides clients with a better and more efficient method to find experienced personnel for their projects.
2. To ensure that the platform provides easier ways of communication throughout the project lifecycle.

3. To build a database with verified construction industry professionals.
4. To improve the platform based on the results of the analysis done via technology acceptance model.

CHAPTER 2

LITERATURE REVIEW

2.1 Project Management

The construction industry is a project-based sector distinguished by a distributed supply chain, significant complexity, and heterogeneity. Mutual ties between various stakeholders engaged in the generation, management, and effective utilisation of engineering data add to its complexity. Over time, communication problems between project participants and accurate information delivery on site are a major contributor to poor outcomes. (Schweigkofler, Monizza, Domi, Popescu, Ratajczak, Marcher & Matt, 2018)

Today, the construction industry has several problems like decentralized working areas, absence of the opportunity to access centralized construction projects through digital media and problem with finding sufficiently qualified self-employed workers. (Ayodele, Chang-Richards & González, 2020).

In addition to this, the project management of construction business experiences some of the challenges of communication, co-ordination, and the absence of a single tool, which all lead to the formation of the issues of productivity as well as the amount of time taken. (Livesey, 2016).

A survey has shown that manual tools in project management within the construction industry face many challenges. These lead to many negative impacts on the time needed for the completion of the project, hence becoming a major source of inefficiencies. (Tulenheimo, 2015).

Unlike the approaches indicated above, which includes methods of organizing project management, freelancer marketplace platforms help to decrease the operating costs, rationalizes procedures, signifies competition among service providers and has provided some flexibility with the price structure which is something that may lead to overall saving for the clients as well as the independent service providers. (Rahim & Haron, 2013).

Keeping the above issues in mind the architecture of the platform that we intend to create aims to improve cooperation and facilitate more efficient project completion by mitigating communication gaps, offering a dependable pool of freelancers, and optimizing project management while keeping the solution cost effective. These measures ultimately reduce delays and improve overall project outcomes.

2.2 Current Condition of the Construction Industry

A breakdown in expectations and communication is the most frequent cause of construction disputes. (Wolf, 2013). A project's start depends on the bidding procedure, which needs to be impartial and fair. (Peshkov, Doroshenko & Sukhanova, 2019).). The next issue that almost every project faces is delay. Completeness and timeliness of project information, provision for ease of communication, missing some detail in drawing and not completely understanding the client requirements are the major factors involved in causing a delay (Agyekum-Mensah & Knight, 2017). Communication is a significant issue that most projects encounter. Construction projects frequently experience issues like poor communication, mistrust, a lack of integration, and conflicting views among project stakeholders (Ahmed, Memon, & Memon, 2021).

As discussed above, the construction industry is a technology deficient field especially in Pakistan. (Farooq, Rehman, Javed, Jameel, Aslam & Alyousef, 2020). Most of the work done, including communication between all major personnel, is done manually and with traditional methods. (Hewage, Ruwanpura & Jergeas, 2008). It is very important for project efficiency to include as much technology as physically possible in this industry. (Chen, de Soto & Adey, 2018). From the above problem statement, we can determine that the best solution would be to create an online marketplace that incorporates all the features that are necessary in the construction industry.

To propose a solution, it is very important to note the current trends in the industry and the preferences of the clients. For any change to occur in the industry, the first thing to consider is our target audience. (Adner, 2006). When creating a solution, it's critical to take our customers' preferences and shifting trends into account. (Bughin, Chui & Manyika, 2010). Another thing to consider is the effect of Covid which caused important changes in the

industry. (Donthu & Gustafsson, 2020). After the pandemic, every industry saw an increase in freelancers. People working as salaried workers still work as freelancers as a side. (Zadik, Bareket-Bojmel, Tziner & Shloker, 2019). This created a relatively new subgroup of labor in the form of online freelancers and the online labor marketplaces where they look for work. (Stephany, Kässi, Rani, & Lehdonvirta, 2021) With an estimated 56 million online freelancers worldwide, the market for online labor has expanded by almost 50% in the last three years (Keung, & Shen, 2013).

The trends seen in the Pakistani industry may be different so we conducted a survey among students of the construction industry and the potential clients that may require a freelancer marketplace.

CHAPTER 3

RESEARCH METHODOLOGY

Our purpose is to create a project management system that will help the key stakeholders of the project to effectively communicate with each other. Our main purpose is to make the bidding process as easy as possible while incorporating technology that will make the entire process efficient. The methodology will be divided into the following steps.

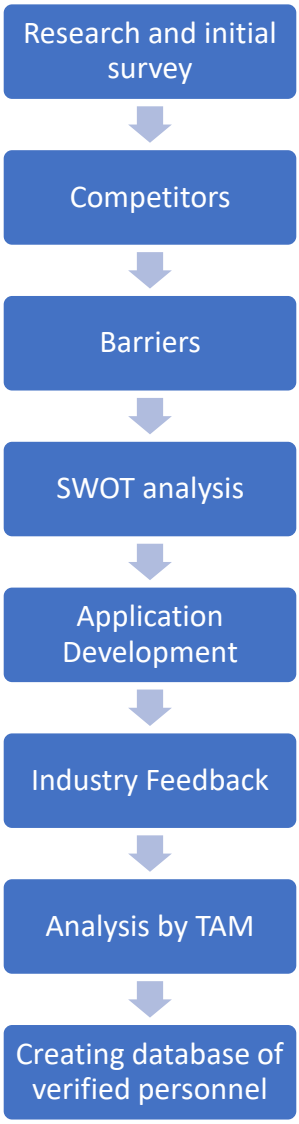

Figure 1: Methodology.

3.1 Research and Initial Survey

Extensive research was done to determine the key factors that were necessary to decide the need for a project management system. (Livesey, 2016). It was essential to comprehend the state of the market at the time and the areas in need of development. To introduce a new website or any new business venture it is very important to analyze the target audience and the recent trends. A survey was done before deciding the major purpose of the platform. The questions asked were set to figure out the current conditions of the industry and the problems in present methods of project management. There was a total of 56 participants with 24 female and 32 male participants.

The first query concerned the issues raised by the various project management techniques that were in use. 83% of the male participants and 70.8% of the female participants agreed that the project suffered because of the available approaches.

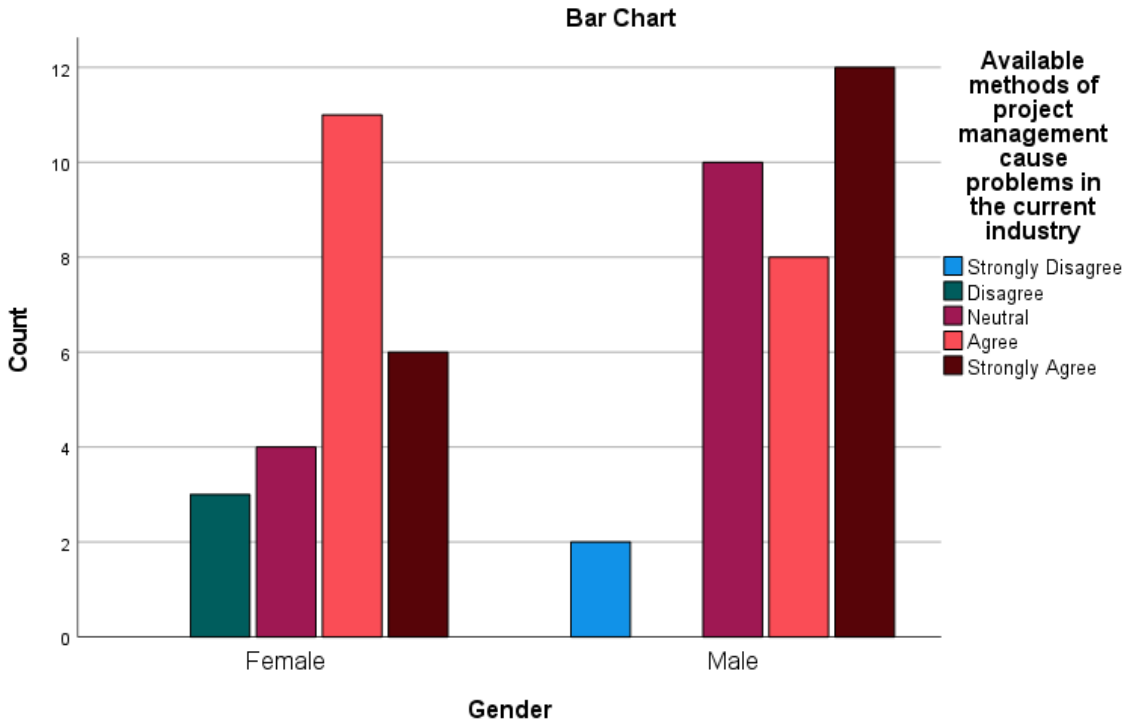

Figure 2: Available Methods

The second question was about the impact of poor communication on the construction projects. 87.5% of the female participants and 84% of the male participants agreed with this statement.

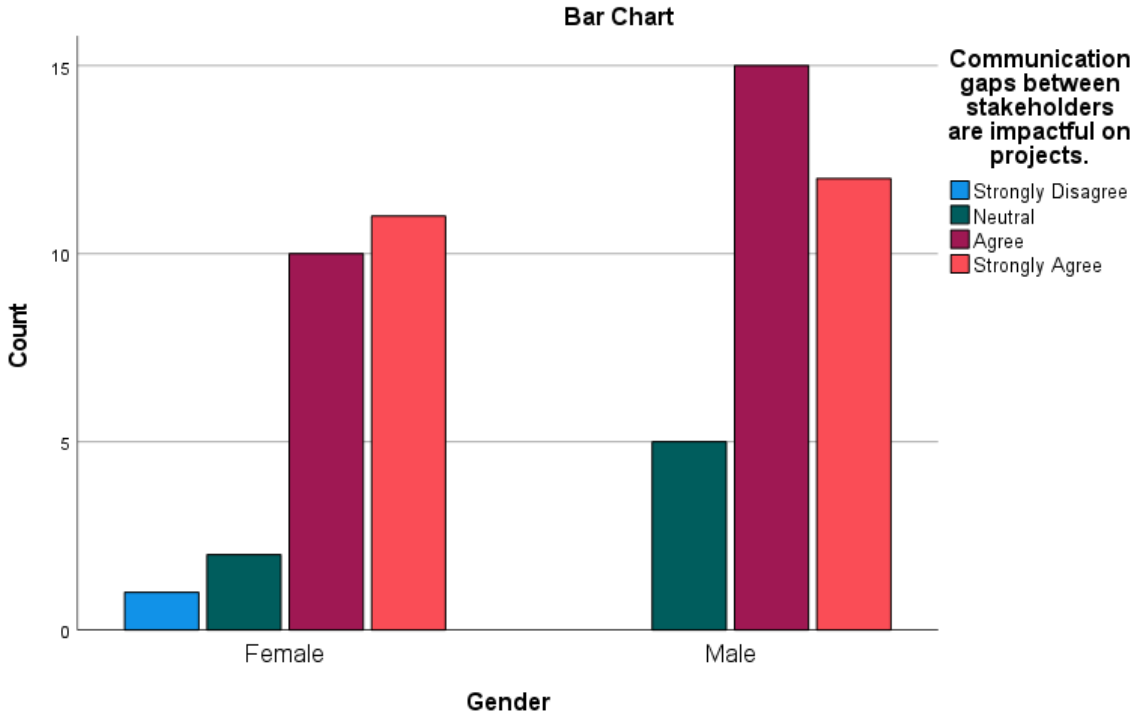

Figure 3: Communication Gaps

The third question asked gave the result that 75% of the female participants and 78% of the male population agreed that there is a need for a single platform that brings the entire project onto a single platform.

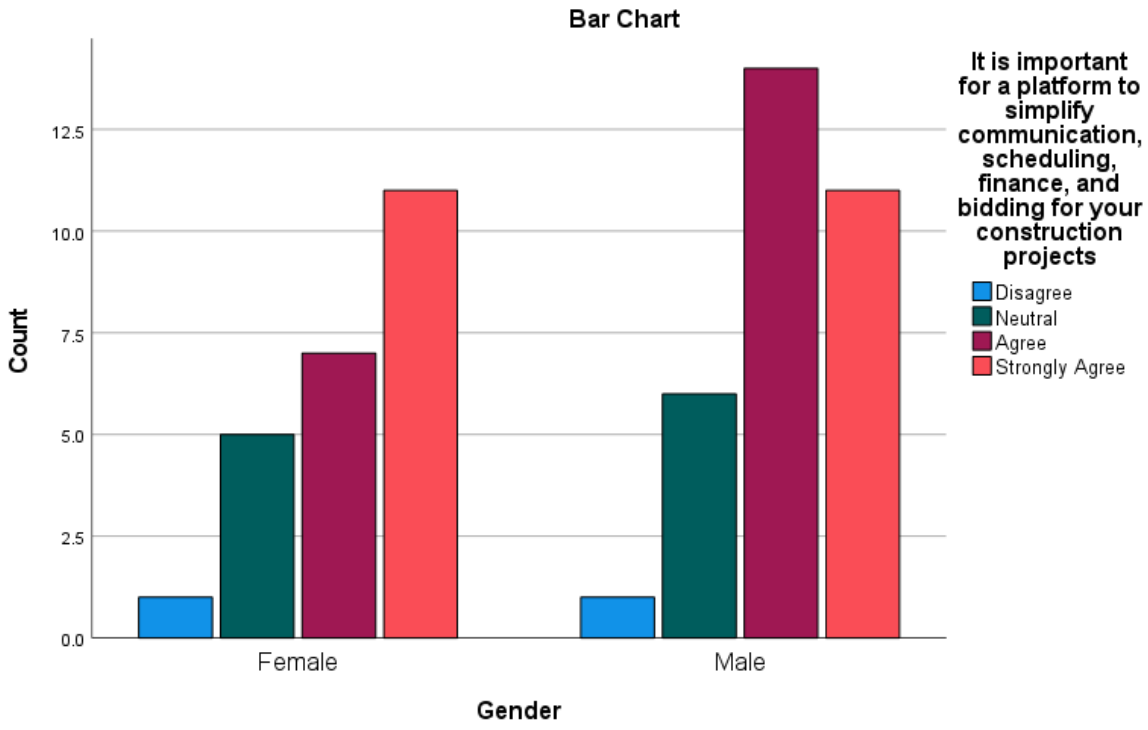

Figure 4: Unified Platform

3.2 Competitors

To start a new business or to create a new platform it is necessary to consider the existing competitors to determine how our solution may be different. There are several project management websites that provide several tools. So, the important thing to do is to bring something new into the field. To do so it is necessary to conduct an analysis of the existing competitors which are mentioned below.

3.2.1 Procore:

Procore is a popular construction project management website that provides capabilities for project planning, scheduling, and collaboration in addition to centralizing project information and streamlining communication. Weaknesses associated with this website include:

1. Procore does not provide a freelancing marketplace, which would offer a variety of skilled workers for certain project requirements.
2. Procore provides several services, but their solutions may be too costly for most of the consumers.

3.2.2 HomeAdvisor:

For home renovation tasks, HomeAdvisor is a platform that links homeowners with nearby service providers, including contractors. Weaknesses associated with this website include:

1. It provides a general marketplace which does not cater exclusively to the construction sector.
2. It does not provide project management tools, such as budgeting, scheduling, and collaboration capabilities.

3.2.3 Builder Trend:

Professionals working in home construction can use Builder Trend, a program for managing construction projects. It has tools for customer administration, communication, and project scheduling. Weaknesses associated with this website include:

1. There is no freelancing collaboration feature that lets clients choose skilled independent contractors for temporary or project-specific requirements.
2. It does not provide a talent marketplace assisting customers in locating the appropriate skill for their projects.

3.3 Barriers

Another important thing to talk about is the presence of barriers that every new business venture experiences. It is no different in the construction industry.

3.3.1 Industry Resistance to Change:

The construction sector, which is known for its outdated practices, could be reluctant to accept new internet platforms for freelance work and project management. It is essential to overcome this opposition by educating people and displaying the benefits of the platform.

3.3.2 Established Competitors:

Our website needs to set itself out from the competition and provide distinctive values to compete with well-known platforms and applications in the construction and freelancing industries.

3.3.3 User Adoption and Learning Curve:

The launch of a new platform will require users, both freelancers and customers, to adjust to a new method of project management. Creating an interface that is easy to use and offering thorough training and assistance helps lessen this difficulty.

3.3.4 Building a Trustworthy Freelancer Pool:

It might take some time to find and develop a pool of trustworthy and knowledgeable freelancers. Ensuring the quality of work and validating the qualifications of freelancers would be our priority.

3.3.5 Client Trust in Freelancers:

It's essential to foster trust between freelancers and clients. Over time, trust may be developed by putting in place clear evaluation and grading systems, as well as procedures for confirming the credentials of independent contractors. Maintaining the standard of the job will be essential.

3.3.6 Balancing Cost and Quality:

Lower-cost independent contractors may attract clients, possibly at the expense of quality. It will be an important issue to strike a balance between cost-effectiveness and the guarantee of competent and trustworthy freelancers.

3.4 SWOT Analysis

3.4.1 Strengths

The strengths of our website and what makes our website different from other websites include:

1. Unlike other websites and platforms, our website will aim to provide a single platform for the major services that are required by a construction management project.
2. Our website will aim to work on the initial and continuous collaboration between all the personnel involved in the project.
3. Our website will aim to provide a diverse talent pool for all the services provided on our website.
4. The website interface will aim to be user friendly even for people who may be a little technology hesitant.
5. Instead of creating expensive pricing models for our website, we will aim to provide services ensuring cost effectiveness.
6. Our website will provide a transparent bidding system that will provide the client with the opportunity to choose from our selected talents and it will also enable our personnel to decide which project to choose.

3.4.2 Weaknesses

Some weaknesses that are our platform may have that we need to work on includes:

1. Data privacy could be a concern in the long run. To counter that it will be necessary to counter any security concerns.
2. Our website depends on the availability of freelancers. To make sure that our website will remain functional, it is necessary to create a big pool of experienced personnel and provide incentives for their continuous work on our platform.

3.4.3 Opportunities

The opportunities presented to our platform may include:

1. During present economic conditions, the number of people who want to work in addition to their usual salaried jobs is increasing.
2. After the pandemic, the number of people who prefer online forums has increased. This will create a lot of future opportunities for our website.

Over time, we can increase the number of services that this website will provide. We may be able to increase the variety of profiles that can be accepted for this website.

3.4.4 Threats:

Every new business venture experience threats. These threats include existing traditions, existing platforms that serve as competition and economic fluctuations.

1. The existing trends that have been set in our construction industry may act as a hindrance tour website.
2. The existing companies may work to go against the idea of modernizing the industry.
3. People may prefer to use the platforms that are already available. So, it is necessary to involve features that are more different and unique.
4. Economic and political fluctuations may also serve to go against the trends that we are trying to set by introducing a site that breaks previous traditions.

3.5 Application Development

The WordPress platform, known for its wide range of uses and optimization is used to build our website. The user interface and experience have been carefully modelled after successful marketplace designs, guaranteeing simple navigation and use for all users. Our main objective is to give priority to elements that are relevant to users, making sure that each visitor has an ideal experience. Furthermore, to efficiently manage traffic increases we have chosen cloud hosting. This decision guarantees that, even in times of great

demand, our website will continue to function and be accessible. We can effectively scale our resources to manage variable traffic levels by using cloud technology, which ensures that our users will always have a seamless and continuous browsing experience. Our website is the result of thorough planning and execution, integrating the stability of cloud hosting, the user-friendliness of tried marketplace designs, and the reliability of WordPress to create a platform that is both readily available and accommodating to all users.

3.6 Industry Feedback

After creating the first version of the platform, we conducted industry visits to determine the viability and use of the platform. We asked the employees of several companies to fill out an extensive survey that had questions related to the phases to technology acceptance model. The industries that we visited are mentioned below.

3.6.1 TASKK Enterprises

TASKK Enterprises provides reliable services regarding traffic data acquisition, evaluation, and confirmation in Pakistan. They attribute to their skills in the complex and sophisticated traffic impact studies as well as in the integrated traffic designs for intricate transport planning issues and in the performance of credible road safety assessments. Such traffic surveys are even more useful when it comes to understanding conditions and bottlenecks, as well as the dispersion level observed in urban and rural settings, which, in turn, are areas in which the company has honed its expertise. The analyses are also helpful in a way that they provide useful information concerning traffic flow control or management, possibility of improving the infrastructure and regarding influences which may be helpful in making certain policies. This means that they can undertake complex work that requires some sort of special rating and achievement. According to policy formulated by TASKK Enterprises, it seeks top indicate that is keen to operate in a relevant field that embraces trends & advancement. They always introduce innovations in their services such as AI, learning machines, and Big Data. It displays details prediction, better decision makings and a superior traffic management solution on best innovations.

Figure 5: TASKK Enterprises

3.6.2 Construction & Project Management Services (CPM)

Construction & Project Management Services (CPM) was established in the year 1997 as a construction contractor and civil electrical engineering technology company, controlling more than two decades of its full-fledged operation in Construction Management and Construction New Project Execution areas CPM has established its worthy reputation among the competitor companies. Inestimable opportunities and specialization in the technical sphere help them to meet various tasks and problems in the construction field. As a result, CPM has provided service in everyday large and complex project during the years they have been in service. Among them some of the projects include construction projects of infrastructural facilities, commercial & residential constructions, industrial constructions, and others. Embedded in their past projects, their portfolio shows the scale of performance regarding construction processes and phases starting from a concept development, planning, and ending at construction phases. They practice professionalism and implement business rules and regulation as per the norms set by the industry and authorizing bodies to make sure that the work they undertake is safe and effective. This way, they constantly equip their company with the newest innovation in constructing technology as well as project management tools to advance their services or products.

Hence, with the help of ICT technology, CPM has been able to demonstrate that its projects are not only effective in terms of production but also could be implemented as sustainable and environmentally efficient.

Figure 6: Construction and Project Management

3.6.3 Asad Builders

Concerning the services Asad Builders offers the market, it must be mentioned that the company specializes in construction services and has a wide range of targets that can meet clients' needs. Today, Asad Builders' formation can claim a lot since it has completed a considerable number of different projects of various sectors provoking immense dedication to the quality and satisfaction of the client.

Another interesting motive that has been identified in Asad Builders company is that it is not restricted to large scale construction projects which are undertaken through contracts only. Moreover, through numerous services of construction, they have well established themselves in terms of how they are capable of being versatile and efficient in offering the kind of construction services that clients within the business structures, as well as house

holders, may require. As a company that starts with constructing corporate campus and hi-rise buildings and is also involved in home redesigning, Asad Builders has the same level of dedication towards their work.

In addition to construction of commercial and residential building, some other projects that implemented by Asad Builders were in the industrial sector buildings. These projects involve construction of factories, warehouses as well as other types of structures normally found in industries that have demands in high precision and speed in execution of duties which also must adhere to standard operating procedures and policies as well as compliances to safety measures. Altogether this indicates that Asad Builders have been involved in several large and small construction projects and they have planned the kind of quality construction that they provide their clients and thus can be a worthy source for them. Considering this, through flexibility and relations with the market, their quality has been well supported, making them credible contractors. Now as a result the capabilities of Asad builders has sky shot themselves in the eyes of their clients for constructing such good higher standards.

Figure 7: Asad Builders

3.6.4 Zeeruk International Pvt. Ltd

Consulting services in Zeeruk International Pvt. Eng are very dynamic. Zeeruk International is an exemplified type of company as it focuses on definite kinds of industries and intricate strategies in problem solving in the structure of problem solving and consulting, offering high technology problem solving and consulting largely based and intricate in nature which can't be inferred and designed without ample amount of planning, imaginative designing, advisory on transaction, co-ordination with the client, and project management. The focus of the new clients of Zeeruk International is also clearly defined by highly specialized fields with little or no competition from similar services, which would be another great asset for the company. The skills that engineers at Zeeruk International possess enable the firm to address the profile of each sector meaning that whether the sector involves infrastructural construction, energy, environmental design, or information technology the firm can effectively address it. The feasibility of strategies provides a general outlook into the consultancy firm and their consulting services which Zeeruk International lacks and include responsible client relations. Being very conversant with the procedural method of establishing and quantifying each concept to make the right connection between the client need and their production, they understood the importance of stating and defining each idea with the client. It also has a way of bringing order to the interaction and manner in which people deal with each other so as to facilitate the creation of harmony that is essential in enhance the general success of any endeavor. Thus, It can be concluded that the Engineers at Zeeruk International Pvt. Ltd. are skilled professional consultants equipped to handle dealing with the difficult to define and offering high end consulting services to various sectors as well as multi-disciplinary project. Satisfying potential customers and particularities of every one project, Zeeruk International started to demonstrate that varied planning and zoning, engineering, design, transaction, communication, and project management can lead to accurate distinctive engineering approaches that might be useful for further efficient projects.

Figure 8: Zeeruk International

3.7 Technology Acceptance Model (TAM)

In theory, the TAM gives a roadmap that shows practitioner's expectations for the acceptance and uptake of technologies by the users. In this model, perceived behavioral control is added to the attitude and subjective norm in the prediction of behavior, and more specifically in the actual behavior concerning the utilization of a certain technology, where the actual behavior is largely determined by the person's intention to use the specific technology. This intention is mainly based on the level of usefulness of the technology and the level of ease with which individuals can use the technology (Masrom, 2007).

In our project, our research method of choice will be the Technology Acceptance Model and through it, we will determine users' perceptions and behavioral intentions concerning our construction project management. Therefore, by gauging the users' impressions of the platform's usability and simplicity in the platform, we are provided with data regarding elements that either encourage or hinder the users from using the platform. It will assist in further enhancing the platform's design, as well as ensuring that it fulfills its requirements

more effectively, and consequently leads to the improved odds of implementation and utilization within the construction industry.

The measure of perceived usefulness is the extent to which the users of the platform trust it can help improve their performance in their tasks. This will still make it easier for us to know the type of feature that will be of most benefit to the users and in line with what they want to accomplish using the platform.

Perceived ease of use is defined as the extent to which users believe the platform is easy to use in their work. Assessing this area enables us to make valuable decisions regarding the usability of the interface by helping the developers to eliminate technical barriers to use if any.

Thus, the choice is made in favor of the TAM framework, which will allow us to use a step-by-step approach to collecting and analyzing users' feedback regarding the benefits of its use and the ease of using our construction project management platform. For this reason, this approach will help in proper selection to carry out feature improvement, user interface changes, and other design changes in accordance to recommended user standards.

In the end, the use of the Technology Acceptance Model in the project will enable us to design a platform that is efficient, relevant and most importantly accepted by the personnel in the construction domain. This will help the platform succeed and endure as the kind of construction project management requirements will go well served through the platform.

3.8 Building a Database.

Reliable supply has also been created for our platform, including only professionals checked against the required requirements. Our platform will also have a system of evaluating clients in which other clients that have transacted with such professionals in other projects provide a profit-success ratio. This rating system fosters accountability and efficiency while offering clients a voice as they seek to know specific performances of the professionals to trust.

The background check and verification mechanisms employed are expected to be quite efficient and accurate to guarantee the inclusion of appropriate and reliable professional

profiles in the database only. These procedures are quite complex and include comprehensive assessment of qualifications, experience, and compliance with relevant standards and requirements, which helps generate a lot of trust among consumers.

These measures are initial and targeted at establishing an open and reliable climate on the platform. By allowing the client to constantly rate the professionals, we encourage the experts to be ethical and very proficient. Of even greater importance is that this environment is healthier for the clients and the profession since it ensures that clients can seek professionals with notable competence and integrity, while, at the same time, professionals are compelled to work within a rather rigid framework that helps to promote the improvement of professional standards.

Thus, forming the base of checked-up specialists and developing the organizational system of client's rank improvement do amplify the general credibility and efficacy of our service. These features guarantee that it becomes easier for the clients to make informed decisions based on quality information as well as credible information. On the other hand, the professionals get encouraged to stick to high ethical standards as well as produce quality service deliveries. By adopting this approach, the company encourages trust, accuracy, and quality in the construction project management platform, hence enhancing its success rate.

CHAPTER 4

ANALYSIS AND RESULTS

4.1 Hypothesis

In the framework of the Technology Acceptance Model (TAM), the research hypotheses play a critical role in defining key assumptions and expectations regarding the acceptance of modern technologies by end users. These hypotheses are postulated from the hypothesized theoretical constructs of the top variables useful in the research such as perceived usefulness, perceived ease of use and behavioural intention. The role of hypotheses in TAM is enormous in that it is employed for several tasks.

1. Firstly, it provides a conceptual model that would enable a theorisation of user behaviour within the domain of technology acceptance.
2. Secondly, hypotheses function as a necessary and sufficient means to foresee trends in the behaviour of users with regards to specific types of technologies and on that basis apply this knowledge in the adoption and implementation of such technologies.
3. Also, hypotheses have functioned as a reference as well as a funnel through which empirical research is conducted through, a context in terms of research questions, methods, and approaches towards data analysis.
4. This indicates that the hypotheses in TAM have real life consequences on technology designers and developers in addressing the issue of how more individuals can be driven towards adopting technologies in designing and implementing resulting strategies.
5. In TAM, hypotheses make it possible to understand the process of adoption of technology better, and through tests and modifications, plays a role on the development of technologies that are more personalized towards the users.

Variables like perceived usefulness, perceived ease of use, attitude towards using, behavioural intention to use, and actual system use are used in the technology adoption

model. These variables have a relation between them that show the feedback of users or people that might use your technology.

For our platform, we used these variables to create the following hypothesis and the subsequent analysis will attempt to show the accuracy of the hypothesis.

1. H1: Perceived ease of use positively influences perceived usefulness.

   The likelihood that someone will find the building project management platform useful increases with its ease of use.

2. H2: Perceived ease of use positively influences attitude towards using.

   Individuals who find the platform user-friendly are more inclined to view it favourably.

3. H3: Perceived usefulness positively influences attitude towards using it.

   Positive attitudes regarding the site are more prevalent among users who find it useful.

4. H4: Attitude towards using positively influences behavioural intention to use.

   Users with a positive attitude towards using the platform are more likely to intend to use it.

5. H5: Perceived usefulness positively influences behavioural intention to use.

   Users who perceive the platform as useful are more likely to intend to use it.

6. H6: Behavioural intention to use positively influences actual system use.

   It is more likely that those who plan to use the platform will do so.

7. H7: Perceived usefulness positively influences actual system use.

   Users who perceive the platform as useful are more likely to use it.

4.2 Survey Design

The survey was conducted with the help of questionnaire and was developed from the theory of perceived ease of use and perceived usefulness which belongs to the technology acceptance model (TAM). (Aburbeian, Owda, & Owda, 2022). Based on issues identified and in relation to the five-group classification scheme for questions shown in Table 1 in the context of extending the TAM model, it shows how users' perception towards acceptance of certain form of technology can be well understood. It can be assumed that these phases can be equated to analysing various aspects of user engagement with the technology, each responding to the perceived usefulness, perceived ease of use, attitude towards using, and the behavioural intention to use, actual system usage. The questions range from basic questions as regards the users' awareness and familiarity with the technology, to intermediate questions on how the technology is considered by the users who have either used it for trial purposes or are still in the process of considering the technology, to the final stages of users' conversion where questions are asked about how the users feel about adopting the technology finally. It can classify users by their level of use, which will give insights into factors that alter or remain the same with perceptions of usefulness and ease of use among users when fulfilling a particular task using the technology.

Table 1: Survey Questions

Variable No.	**Variables**	**Survey Questions**
1.	**Phase 1 (Perceived usefulness)**	How important is it for a platform to simplify communication, scheduling, finance, and bidding for your construction projects? What do think about the importance of features aimed at addressing delay factors in the construction project management platform?

		To what extent do you believe that addressing delay factors through the platform would enhance project efficiency and effectiveness?
2.	**Phase 2 (Perceived Ease of use)**	How comfortable are you with using technology for project management? How comfortable do you feel about using our platform to perform construction project management tasks? How easy do you think it would be to learn how to use our construction project management platform?
3.	**Phase 3 (Attitude towards using)**	How impactful are communication gaps between stakeholders on project timelines and outcomes? How satisfied are you with existing platforms or websites for managing construction projects? Overall, how favorable is your attitude towards using our construction project management platform?
4.	**Phase 4 (Behavioral Intention to use)**	How likely would you be to use a website that helps manage projects more efficiently? How much do the available methods cause problems in the current industry?
	Phase 5 (Actual System use)	How satisfied were you with your experience using our construction project management platform during your first interaction? Did you find the platform intuitive and easy to navigate during your initial use?

		How would you rate your overall experience using the platform for the first time?

4.3 Sampling

In this case, while collecting information, we deliberately targeted respondents involved in actual professional practices or organizations of construction projects managers, contractors, architects, etc., meaning that our vision was more selective in this approach. Their belief and experience shapes insights, proven by the fact that they engage in the practical application and have a great amount of knowledge in the specified area. We also got the opportunity to meet many industries for this purpose and the employees so that we could administer the questionnaire to them.

Therefore, we employed selective sampling technique to ensure we had reasonable validity for the results we got, and we ensure that participants would be interested in using the platform in future. Therefore, we showed our platform to only those who have a stake in construction undertakings and who would hence be keen on enhancement performance strategies. To that end, the research was conducted on a selected cross-section of these people who should give a typical impression of the target user base and help the research decipher the specific needs and anticipations of the prospective audience.

The research was conducted in an ethical manner and ensured that certain important aspects that may be detrimental to the participants answering the research questions were abided.

1. To secure the confidentiality of the respondents in responding to some questions, we made fill the survey separately to respond to the questions.
2. All data collected was kept anonymized.
3. To ensure validity of findings and participants' rights, ordinary checklists for participants' informed consent were given to participants before the completion of the surveys wherein the functions, purpose, and way on how the participants' information given will be used in the study would be stated. This made it easier to

manage participant interaction and the outputs we achieved are accurate and dependable for the objectives of validity and reliability tests.

Thus, the participants expressed their consent for taking part in the research while being absolutely oriented concerning the ethical issues, because we have invited only the industry professionals for the participation in the research. To this end, the recruitment of participants was done in a way that would help secure reliable data that would go a long way in enhancing our platform to meet the needs of players in the construction industry.

4.4 Data Analysis and Results

The analysis of the data collected for the research project followed the framework outlined in the Technology Acceptance Model (TAM). (Aburbeian, Owda, and Owda, 2022). Descriptive statistics were conducted using SPSS and Excel to provide a comprehensive overview of the respondents' perceptions.

The survey utilized a Likert scale ranging from 1 to 5, with 1 representing "strongly disagree" and 5 representing "strongly agree." For purposes of data analysis, measures of central tendency and variability were used whereby the mean was computed to determine the central tendency of response for each question while standard deviation was used to establish variability of the responses towards each question.

The maximum mean value of 4.26 was achieved in the total score variable, indicating maximum agreement for questions concerning actual system use, therefore, the statement concerning this question was mostly approved by respondents. On the other hand, the minimum mean was 0. 98 was noted for ASU2; these findings indicate that the respondents were less likely to agree with the corresponding statement.

Descriptive statistics are useful for giving a basic overview of the distribution of the responses in relation to the different aspects explored in this survey as well as an understanding of the perceived consensus among the participants. This knowledge will help researchers conduct additional examinations and interpretations under the lens of TAM to analyze and differentiate the patterns, progress, or even the advantages and disadvantages of technology acceptance in the construction industry.

Table: 2 Descriptive Statistics

Variables		Mean	Std. Deviation	N
Perceived usefulness	PU1	3.79	.713	66
Perceived usefulness	PU2	3.85	.916	66
Perceived usefulness	PU3	3.97	.841	66
Perceived ease of use	PEU1	3.88	.920	66
Perceived ease of use	PEU2	3.83	.776	66
Perceived ease of use	PEU3	4.23	.760	66
Attitude towards using	ATU1	3.97	.822	66
Attitude towards using	ATU2	1.85	.749	66
Attitude towards using	ATU3	4.21	.713	66
Behavioral Intention to Use	BIU1	4.14	.782	66
Behavioral Intention to Use	BIU2	4.21	.713	66
Actual System Use	ASU1	4.09	.717	66
Actual System Use	ASU2	.98	.123	66
Actual System Use	ASU3	4.26	0.664	66

Secondly, Cronbach Alpha coefficient is used to verify the reliability of the survey results. (Christmann & Van Aelst, 2006). Cronbach's alpha or Coefficient alpha is understood as

internal consistency reliability coefficient instrumental in attempting to estimate the reliability of a given set of items, questions, surveys, etc. In other words, Cronbach's alpha quantifies internal consistency of the scale and thus the items are coherent with the overall scale thus giving reliability.

Cronbach's alpha is the most common coefficient that estimates the scale's internal consistency, and its value ranges from 0 to 1. Typically, values above 0.7 are deemed to be satisfactory for research, even though controversy continues to surround the specific level that could be regarded as acceptable, depending on the circumstances and purpose of the measurement.

The study found that Cronbach's alpha is applied to estimate the reliability of scales or instruments in surveys, questionnaires, and tests used by researchers in the field of psychology. It facilitates confirmatory procedures that aim at verifying that items in a scale are accurately and reliably measuring the intended variable. Cronbach's alpha if found below a certain level can be interpreted as some of the items in the scale measuring a certain variable do not add to the overall measurement of the chosen variable or that the scale has poor internal consistency and should be refined further, or have its items modified. (Hollis, 2024).

Researchers commonly utilise Cronbach's alpha to evaluate the reliability of behavioural scales, survey instruments, and other measuring tools. (Christmann & Van Aelst, 2006).

Using the variances of our data, we calculated our alpha as:

Table 3: Reliability Analysis

K	14
sum of item variance	7.796
variance of total score	23.040
Cronbach's alpha	**0.713**

The formula used to compute Cronbach alpha is given below. (Bonett & Wright, 2015).

$$\alpha = \frac{k}{k-1}\left(1 - \frac{\sum s^2 y}{s^2 x}\right)$$

K = Number of test items

$\sum s^2 y$ = sum of item variance

$s^2 x$ = variance of total score

As we can observe from Table 03, it yields a Cronbach alpha of 0.713, therefore, the above results are tolerable for further investigation. This makes it possible for the items within the scale to be reflecting the same construct in a uniform and reproducible manner, and so the results are now ready for the next level of analyses, it means the test is ready.

As it has been explained earlier, Cronbach's alpha shall be estimated following the next instructions that, if Cronbach's alpha is more than 0.7, it provides assurance that the scale is in the rightful measure to capture the construct in the rightful manner and for the responses to follow as rightful for further analysis. Researchers can go to the extent of being confident in the results and conclusions arrived at in the study courtesy of data collection processes.

However, it is important to note that while 0.7 is normally seen as okay, it is not enough to make a sound decision regarding the validity of the scale. Internal validity refers to the extent to which the scale used to measure the variable is measuring it to a degree of precision as originally planned. Thus, the researchers also must carry out the reliability and validity analysis of the content validity, construct validity, and criterion-related validity of the scale to guarantee that the scale developed will reflect the intended construct validly.

Finally, concluded that if the average of Cronbach's alpha is higher than 0.7 this is good enough for researchers to have believable information that this result can be used further. However, there are other types of validity by which the research study should not ignore so that minimize confounding and make both internal and external validity of the study meaningful in the real world. (Tavakol & Dennick, 2011).

Additionally descriptive statistics for the variables were also constructed that determined the maximum and minimum means for each variable.

Table 4: Descriptive Statistic Analysis

	Mean	Std. Deviation	N
Perceived Usefulness	3.8687	0.59594	66
Perceived Ease of Use	3.9798	0.53550	66
Attitude Towards Using	3.3434	0.49258	66
Behavioral Intention of Use	4.1742	0.57172	66
Actual System Use	3.1111	0.37591	66

After reliability analysis, correlations between the variables were conducted (Hair, Howard & Nitzl, 2020). However, it does so in a manner governed by certain principles, namely, the correlations that are printed in the table are Pearson correlation coefficients. These coefficients express the strength and the slope of the straight-line relationship between two variables and range from 0 to 1 when the relationship is positive and from 0 to -1 when the relationship is negative. If the value is equal to 1, the type of relationship is defined as perfect positive linear relationship, meaning that the two variables increase or decrease together. It means that they have a positive relationship that means that they are directly proportional. On the other hand, when the coefficient of determination equals to – 1 such

that it implies high negative correlation where when one variable goes up, the other variable goes down. If the coefficient is equal to 0, then this indicates that the relationship existing between the two variables in the study is one of a linear kind as there is in fact, no real correlation between them. It forms a most general notion towards the determination of the value of variables for creating a relation and for other tests and analyses of the study findings. (McCluskey & Lalkhen, 2007)

Table 5: Correlation Analysis between Variables

	PU	**PEU**	**ATU**	**BIU**	**ASU**
Perceived Usefulness	1				
Perceived Ease of Use	.516**	1			
Attitude Towards Using	.302*	0.130	1		
Behavioral Intention of Use	.362**	.414**	0.066	1	
Actual System Use	.440**	.436**	0.012	.410**	1

4.5 Hypothesis Testing

In the end, we employed the p values for the hypothesis testing. The probability values that compare the hypothesis to the null hypothesis are called P-values. The presumption that the characteristic or effect under investigation doesn't exist is known as the null hypothesis. The precision and dependability of the hypothesis are determined by the p value, which shows how strong the evidence is against the null hypothesis. We set significance at 0.05 to provide a trustworthy testing procedure. Therefore, a p value of less than 0.05 should indicate that the hypothesis is supported. In hypothesis testing, P-Values form a determinant in the consideration of the results of the test as well as the hypothesis that the researcher uses.

The difference between null and empirical hypothesis is that null hypothesis has no influence or association while empirical hypothesis affirms positive influence or association. It depicts the probability level at which the research will reject the null hypothesis.

There we are using a certain fixed value of significance level α often it is chosen to be equal to 0.05 or 0.01. If the calculated p-value is less than α then the null hypothesis is rejected in favor of the suitable or better hypothesis if there were any, as we are permitted to witness significant outcomes.

Table 6: Hypotheses Testing

Hypothesis	**Path**	**B**	**t value**	**P Value**	**Result**
H1	**PEU-PU**	0.369	2.848	**0.006**	**Supported**
H2	PEU-ATU	0.10	0.7	0.944	Not supported
H3	**PU-ATU**	0.302	2.465	**0.017**	**Supported**
H4	ATU-BIU	-0.009	-0.63	0.950	Not supported
H5	**PU-BIU**	0.126	0.929	**0.036**	**Supported**
H6	BIU-ASU	0.150	1.909	0.061	Not Supported
H7	**PU-ASU**	0.179	2.155	**0.035**	**Supported**

From our hypothesis only three were rejected that is that perceived ease of use has an impact on attitude towards using the platform and that attitude towards using has an impact on behavioural intention to use the platform.

4.6 Survey Charts

Specifically, the objective of the study was also to establish the gender differences in the questions posed by the participants through the five stages of TAM, which could be determined from the surveys conducted among the participants. All together, the participants were collected from the dataset of 66 out of which 30 were females and 36 were male. The technical questions were asked to all participants and their responses shown concern their perception and assessment of the investigated as well as technological advancement with a rating of 1–5. In the frame of the present study, ‘gender’ has been chosen as the factor of interest to investigate how it potentially impacts the acceptance of modern technologies in the populace, based on the findings of the survey in terms of gender differences with respect to the three stages of the TAM. Due to this, we were able to determine whether there are any behaviours that would be common or different between the male and female participants as we analysed the results obtained from this investigation.

4.6.1 Perceived Usefulness

The perceived usefulness phase showed positive response among the participants. Seventy percent out of all the female participants agreed with the statement and perceived the technology as useful, as well as seventy six percent out of all the male participants agreed to the statement and perceived the technology as useful. It is for this reason that the observation made signifies that there were many reports of the various uses of the technology by male and female applicants where females recorded slightly higher percentage of positive attitude towards the technology. Paying attention to the gender differences in this stage of the TAM reveals how respondents make their evaluation of the technological correspondence and how they perceive the utility of the projects being offered for their own work. They provide greater insights into the role of motivational characteristics on technology acceptance behaviours recognised by the various demographic factors, hence providing deeper perspectives on the study findings.

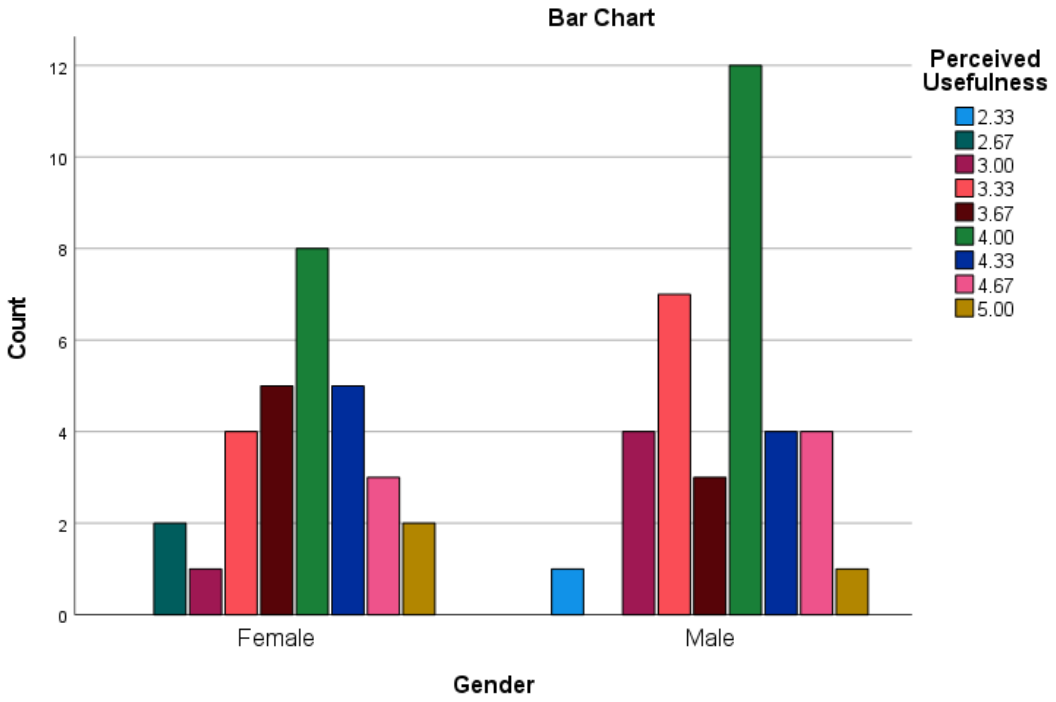

Figure 9: Perceived Usefulness

4.6.2 Perceived Ease of Use

While discussing PEO, we came to grasp that, for this phase, many participants gave positive responses, 93% of the female participants and 89% of the male participants, to be specific. As indicated within this study, the perceived usability with regards to the specific type of technology in question does not differ significantly between female and male participants. In this phase of the three-phase model of TAM, gender specific response has its impactful position to comprehend overall perception of the technology among both male and female participants. In this way, by separating the ideas of attitude towards the ease of use of a new technology in terms of gender, this analysis presents a probable source of most of the insights that might be required for some perceptions of how gender may or may not correlate with other behaviors in the technological acceptance model.

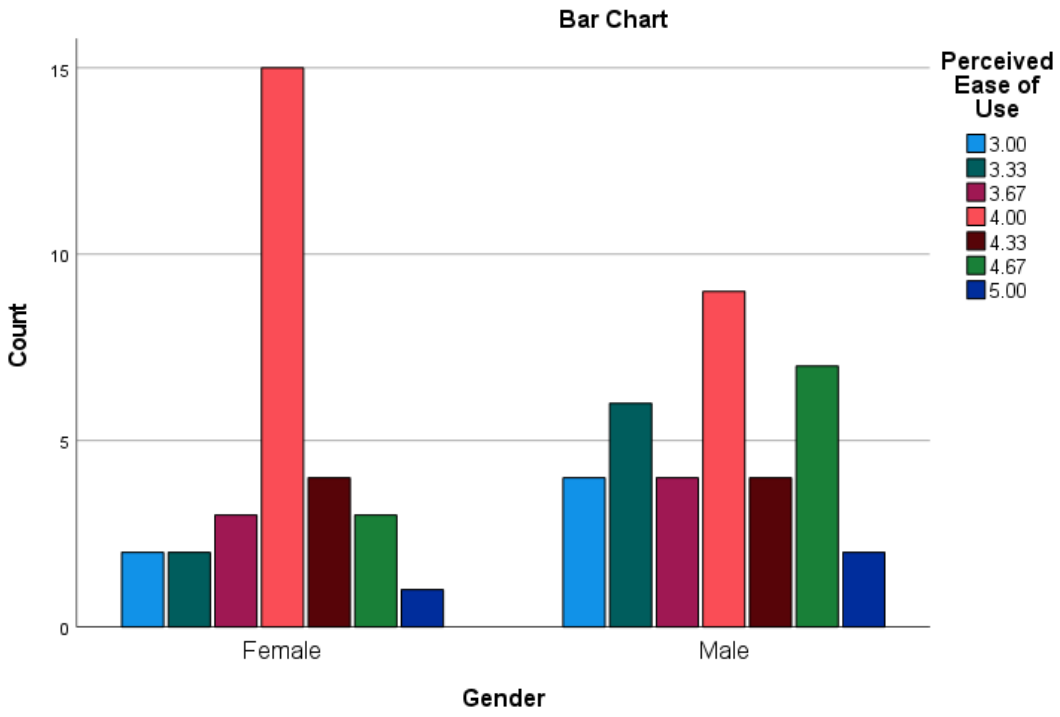

Figure 10: Perceived Ease of Use

4.6.3 Attitude Towards Using

By analysing the given response with reference to the attitude towards the use of phase, it can be noted that 60% for the female participants and 69% for the male participants agreed with the above statement. This observation is quite informative because, in relation to it, the results revealed that, while there was an exceptionally high percentage of positive attitudes concerning the use of the technology in general. Male participants are more positive than their female counterparts. Since, this paper tries to evaluate responses related to 'gender' in this phase of the TAM, the perception and inclination towards technology acceptance in gender diverges clearly. These differences indicate that the present study is useful for understanding variations in our technology acceptance behaviour and attitude when comparing them, so it aids in understanding the outcomes of our investigation.

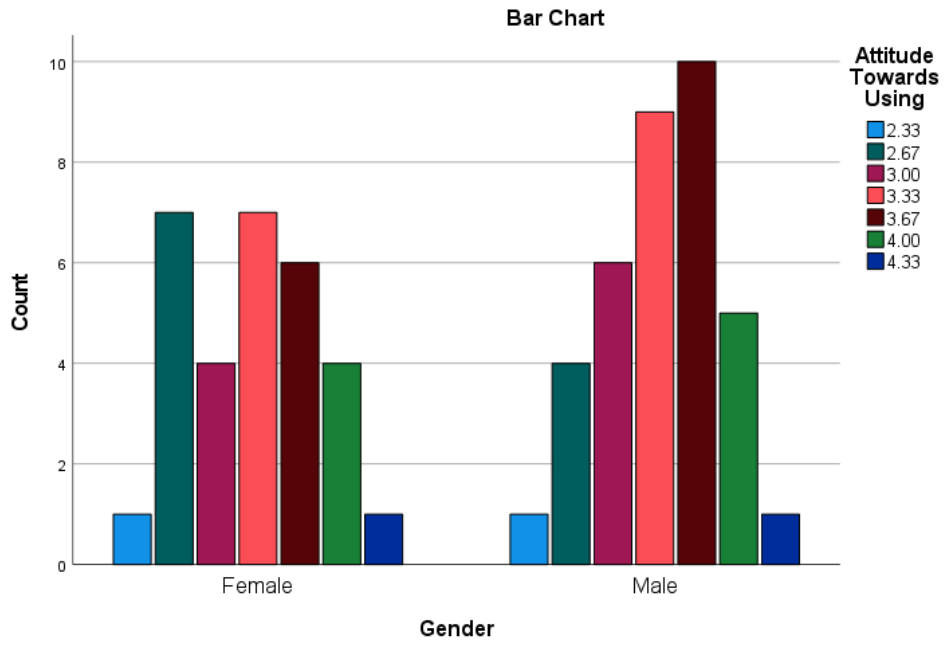

Figure 11: Attitude Towards Using

4.6.4 Behavioral Intention to Use

In the case of behavioral intention to use phase, we observed that, the positive responses were high where 97 percent of the female participants and 92 percent of the male participants expressed a positive intention to use the technology. Overall, it reveals the level of interest in the proposed technology is high among both genders. The perceived higher interest from female participants seems evident given that most of the mean percentage scores are way above 70%. Besides, it aids in determining the factors that influence the technology acceptance behaviors offering some degree of interpretation to the outcomes determined during conducting this research.

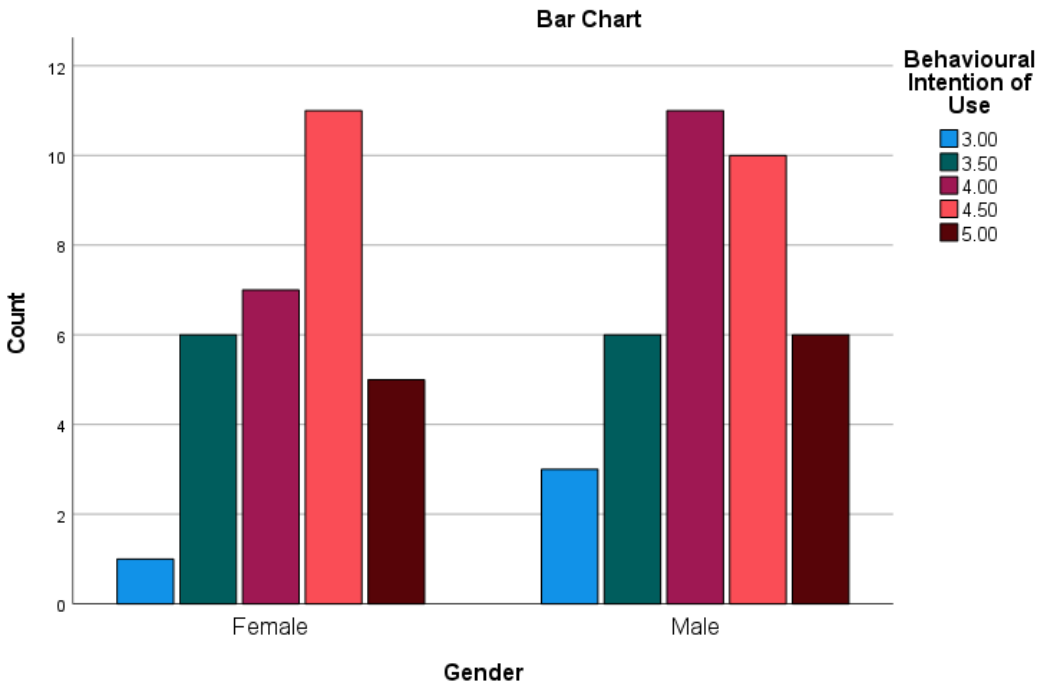

Figure 12: Behavioural Intention to Use

4.6.5 Actual System Use

The study revealed that the participants' response was highly encouraging, 97% females and male students in the study sample alike. This may be a trend that most users are happy with this technology paying no attention to their gender hence, we can conclude that there is no gender disparity about this phase of acceptance to this technology. In this regard, the findings concerning gender varied responses in this segment of the TAM model are quite valuable in understanding real-life experience of the prospected users while evaluating the technology that is easily accessible to them. The methodology of this analysis contributes to the creation of a comprehensive viewpoint of the behaviour regarding technology acceptance and utilization to support the decision making as well as the future endeavours during the identified research.

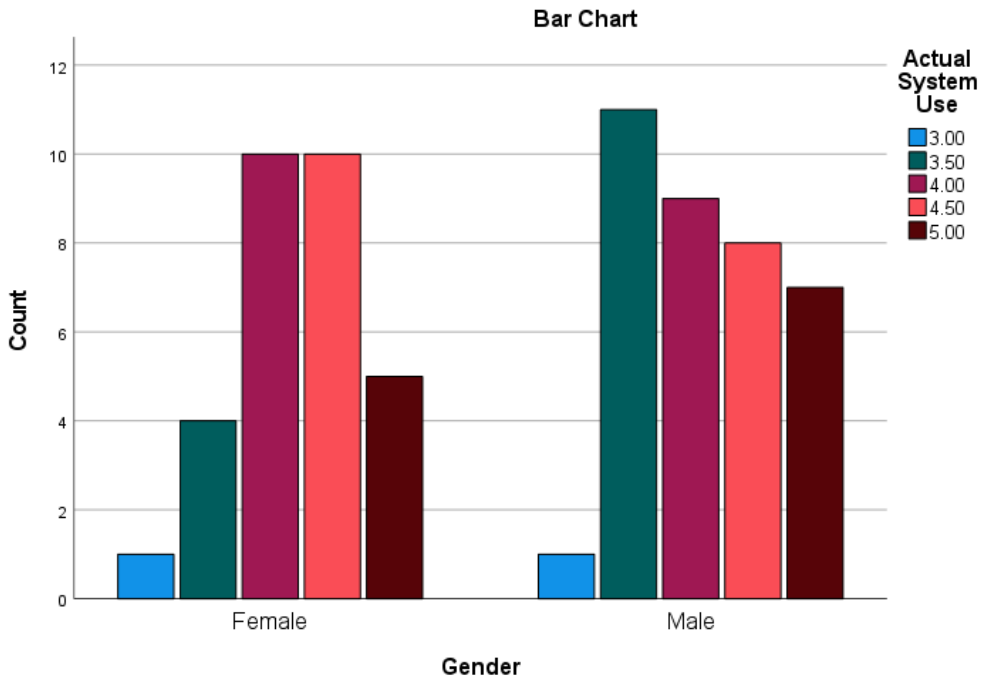

Figure 13: Actual System Use

4.7 Discussions

The Technology Acceptance Model (TAM) analysis results show that the links between behavioural intention to use, perceived usefulness, perceived ease of use, and actual system use within our platform are strongly supported. The results mentioned above confirm the key principles of the Technology Acceptance Model and offer significant perspectives on the elements driving technology adoption and user acceptance within the construction sector.

The relevance of perceived usefulness and ease of interaction in influencing the tendency of users to engage with our platform is shown by the large positive correlations found between perceived usefulness and intention to use, as well as between perceived ease of use and intention to use. It shows that clients are more likely to adopt our technology if they believe it will suit their project management needs and if they find it straightforward to use and navigate.

Also, the connection and dependence of actual system of use and behavioural intention on other variables tells us of the intention of the client to use our platform. This means that people are more likely to make this platform a part of their work if they have an intention to use it.

Looking back at the previous findings, we realize that the platform's usefulness and ease of use which effect the individual's intention to use and which in turn effects the actual use of the platform are necessary for the platform's success in the construction industry. By incorporating all these elements in the final design of our platform, we can make sure that it is used in the industry and gain approval from the personnel involved in this industry.

4.8 Final Platform

The final platform was created with more detail as the previous ones while incorporating the entire findings from the above analysis. This encompasses the programme to be well developed in its graphical user interface to enhance easy usage from all user's perspectives of their computer literacy levels. In construction, it would mean that project planning, scheduling, and controlling the project from the beginning to the end of the project is done effectively. When it comes to communication, the effectiveness of sending and receiving information within different users is set with regards to the capacity of the system in storing the necessary documents relevant to the project, then the performance is considered at its optimum level. Reporting analytical features of projects focuses on decision-making by producing consistent reports that explain project efficiency. We can be certain that the program is compatible with mobile devices since it is designed to be runnable on various platforms of diverse types, and the customization options shall also be helpful as they allow configuring the program to fit different settings of various users. In conclusion, the platform is user-centred and aims at enhancing support and enlarging the understandings of usability, the usefulness of space and interactions in creating construction projects.

4.8.1 Home Page

To illustrate, when a visitor enters the home page of the site, they are guaranteed to be captured by well designed graphics, and well penned and sited content. The arrangement of the site is basic and uncluttered, which is taken as 'clean' looking and creating the impression of the reliability of the site's information. The beautiful and minimalist design of the site's header is a great advantage, as it offers the navigation options through the main sections of the site; that is why the users can find some features and option of the site easily. Overall, the homepage has all the necessary components that give the client a guidance concerning the primary value that this model provides that makes them want to try other features of this platform and services. Due to all the mentioned elements being integrated into the design of the site, and the remarkable call-to-action within the header section and invitations to perform more actions, the homepage lays a correct foundation of a well-designed website and encourages the guests to continue to scroll down the website.

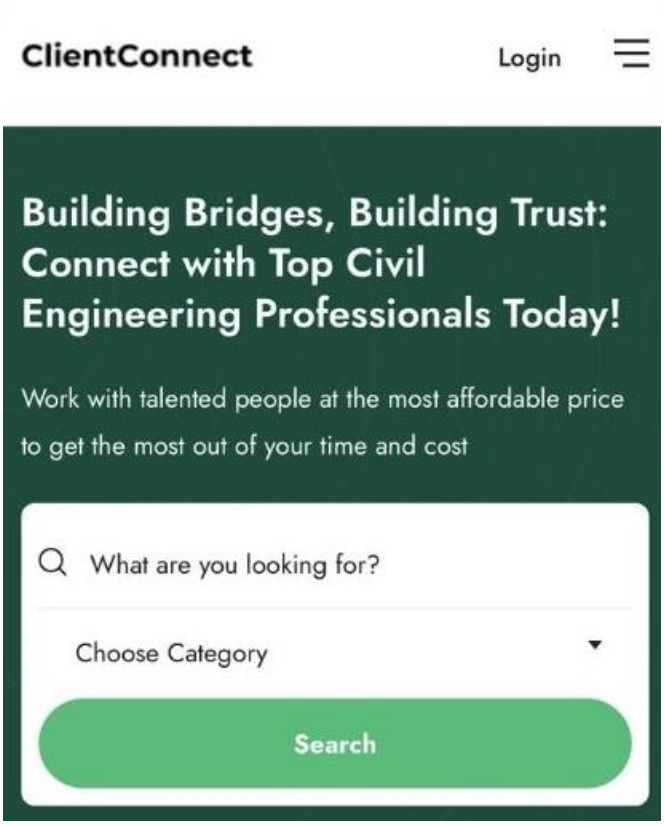

Figure 14: Home Page

4.8.2 Register Page

The full capability of the website will not be enabled unless the visitor signs up for the website and specifies if he is an employer or freelancer or not. The registration of the website is quite easy. Basically, the user is supposed to enter his or her e-mail address, the desired name, and the password. During registration for the use of services, freelancers are provided with access to a website in which they must create personal profiles to allow them to undertake projects and to allow communication with clients. Similarly, the employers are also able to advertise that position, which is vacant in their organization, manage the freelancers and manage the project. In this case, registration is the second influence that may benefit users by the functional aspects of the constructed website that provides them with the facilities in accordance with their professions in the construction industry.

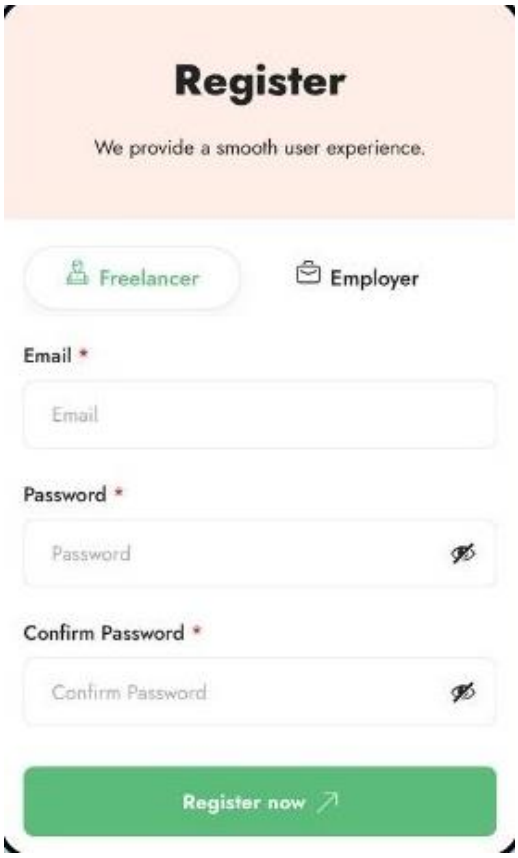

Figure 15: Registration Page

4.8.3 Build a Profile.

Freelancers share their extensive descriptions and credentials on the platform, completing detailed profiles where the audience can consider freelancer's experiences and recognition, as well as the overall qualification of the specific worker for potential consumers. These profiles serve as a database that enables freelance to post backgrounds, accomplishments, previous sample works associated to their specialty. It has the capability of showing the potential client and employer a sneak preview into who the freelancer is, as well as the type of employee that will be hired, and what they can expect from that freelancer. A freelance employee's profile may contain simple information about them such as certification details, specialization, educational background, and even snapshot of previously done jobs. Similarly, freelancers may also include elements like the list of the completed projects, the corresponding client responses, or the ratings as the signs of trust. In a nutshell, therefore, it is very informative and practically advantageous to create dynamic freelancer profiled which can in a way help in marketing the freelancers as constructors and eventually attract new clients in the construction industry.

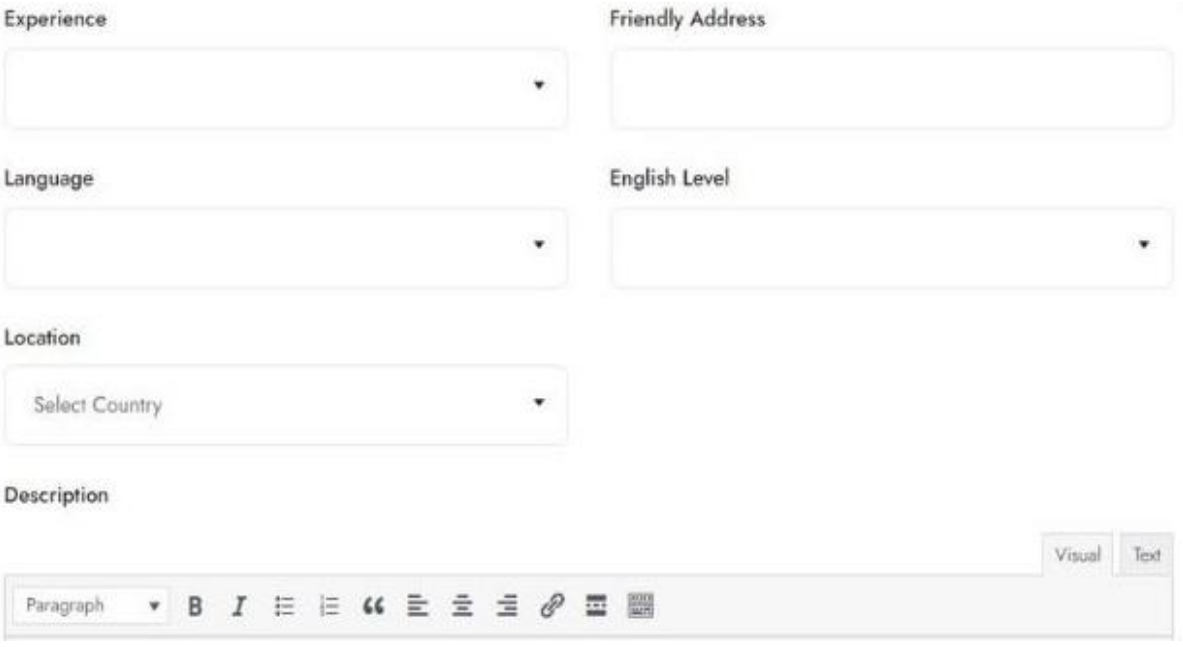

Figure 16: Build a Profile.

4.8.4 Dashboard

Every individual whether he is a freelancer, or an employer will have his own dashboard, which will show his rating, chat box, posted projects etc. in short, the dashboard will show everything that the individual will need to function on the site.

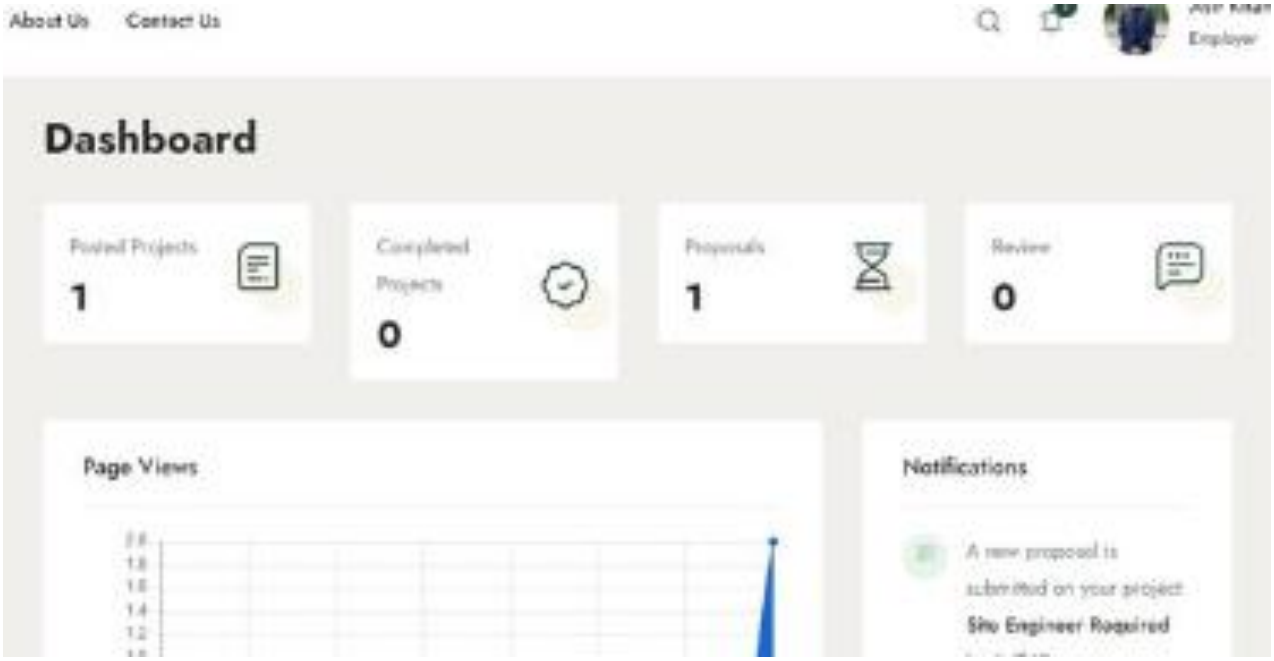

Figure 17: Dashboard

4.8.5 Popular Services

As with our current service offerings, a wide selection of essential services is available perfectly to target the diversified needs of users within the construction domain. Contracting services are significant including the aspects of general contracting to various sub-trades comprising plumbing, electrical, and carpentry. To elaborate, Architecture services are being kept busy with architects providing solutions to building design, interior design, and even the exterior design. Engineering services can be defined as a vast range of services that embrace numerous fields such as structural engineering, project management and civil engineering that is used to determine the structural fitness and

efficiency of the building projects. Moreover, the management services include the general and administrative management services that involve managing projects from the inception stage to the completion stage, which entail project management services, construction management services, and quality assurance management services. These services, taken together, are among the extensive services of the platform, with respect to the demands of clients amidst professionals in construction.

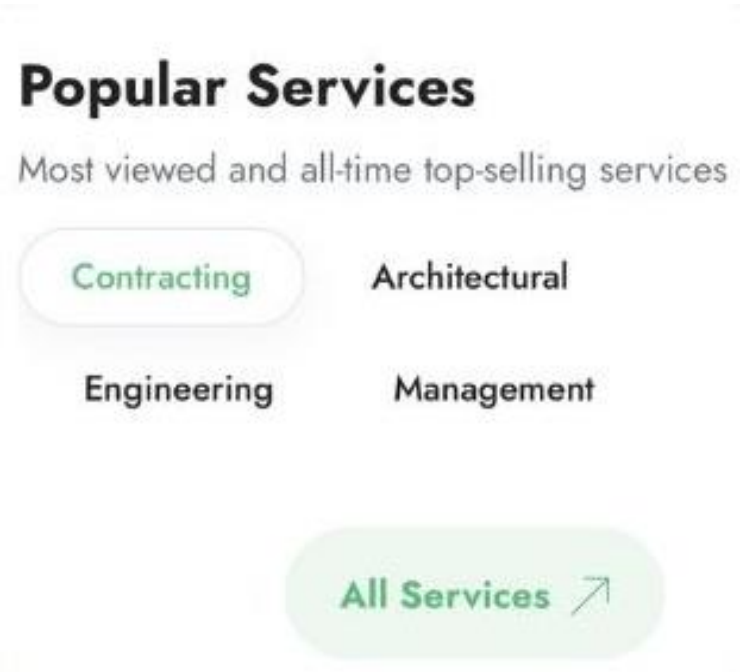

Figure 18: Services.

4.8.6 Post a New Project.

When users wish to post their new project for freelancers on the platform, the users will be expected to complete fields that will help the freelancers grasp the fundamentals of a given project, its specifications, and the expectations that the users have for the freelancer. The form illustrated in Figure 19 is effectively a strategic guide that aids in the collection of these critical information specifics. Such details include a title that describes the project, a project description that describes the overall aim of a given project and the project objectives that define the project goals. Further, the users are requested for details on the

proficiency level, specialization, and other qualifications to employ the freelancer for successfully finishing the project. Other specifications may be regarding the financial aspect of the project, the time span mentioned, and things that are required to be done and should be achieved based on the project. Thus, users make sure that freelancers know what a particular project is all about, and they can provide the best offer befitting the project in a bid to be selected. This helps in minimizing the gap between user and freelancer hence increases specific significance within construction industry hence an increased chances of success in the construction projects.

Figure 19: New Project.

4.8.7 Posted project.

Employers on our platform can advertise a project that they are willing to offer to a freelancer by posting it on our site, making it accessible to freelancers who seek construction projects. Figure 20 below shows a sample of the posted project to show how the freelancers will be provided with all the necessary details to aid them in the decision-making process of whether to take the project or not. A few common features of job listing may consist of the project name, project description, and goals as means through which

freelancers will be able to see the extent of the project and what is expected of them. However, it is also common for other key factors which include the financial aspect of the project, the time frame for project completion, and the qualification or experience level as well as any other virtues that may make the freelancer more suitable for the project may be included to help with the decision-making process of the freelancers. This way, the presentation of project information and structure helps in providing easier navigation and efficient filtering of opportunities that might interest freelancers or fit their skills set. This visibility also gives employers an opportunity to access capable and qualified freelance individuals required for the provision of various services in the construction industry.

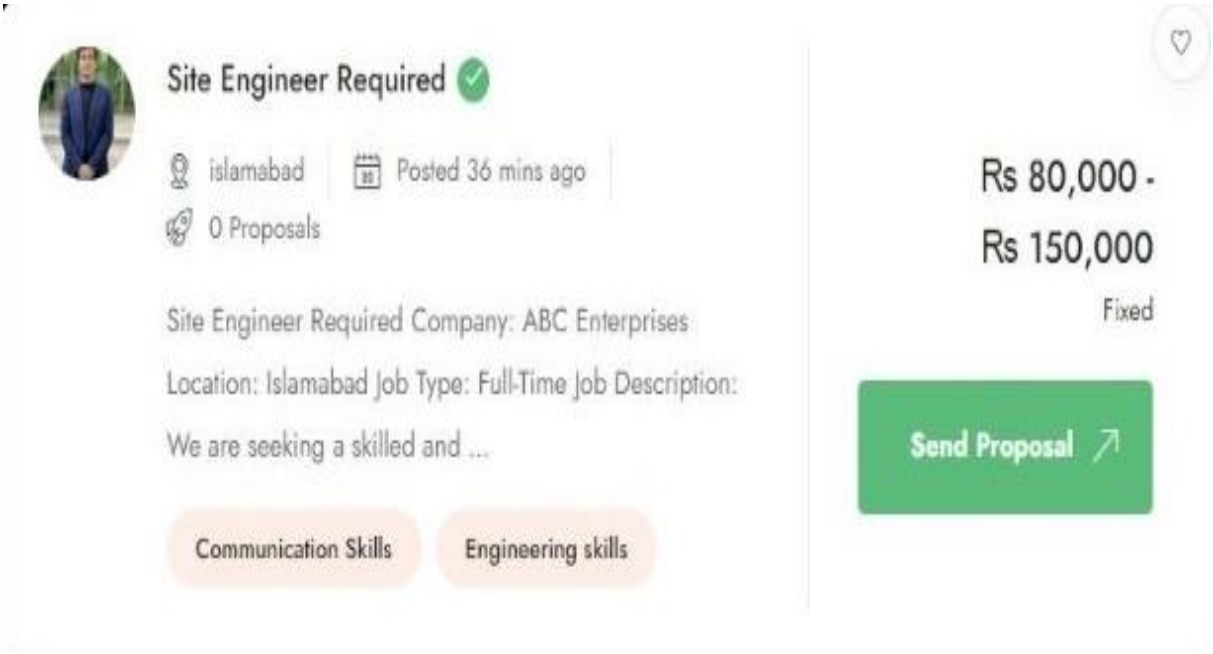

Figure 20: Posted Project.

The project will be shown on the dashboard in the way shown below.

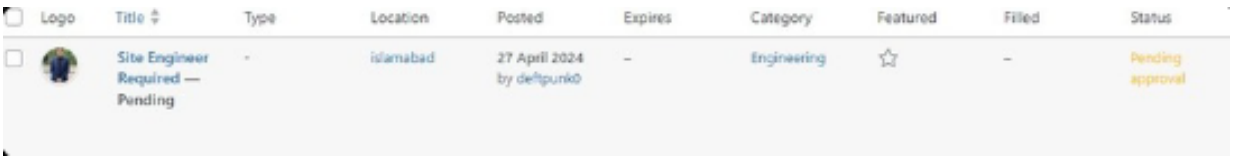

Figure 21: Project on Dashboard

4.8.8 Checkout

Like all platforms, it will allow payments on the website. After the project is finished the employer will pay the set amount of payment to the freelancer. The website will cut a very small platform fee and pay the rest of the amount to the freelancer. This will finish the project life cycle.

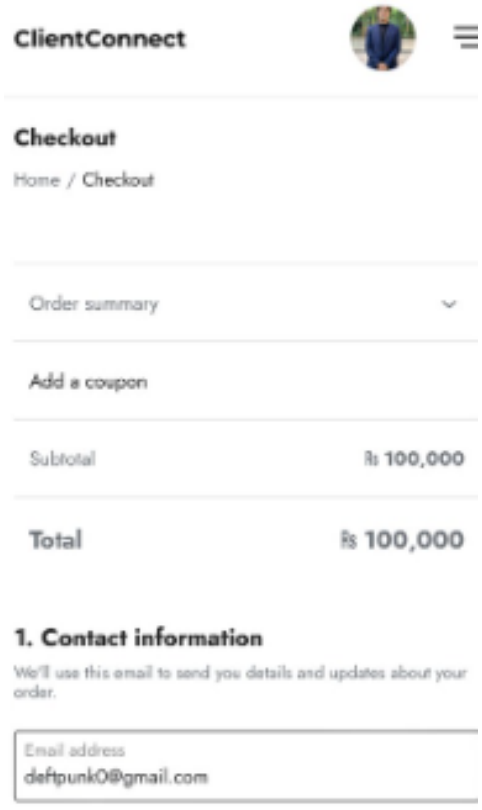

Figure 22: Checkout

4.8.9 All features

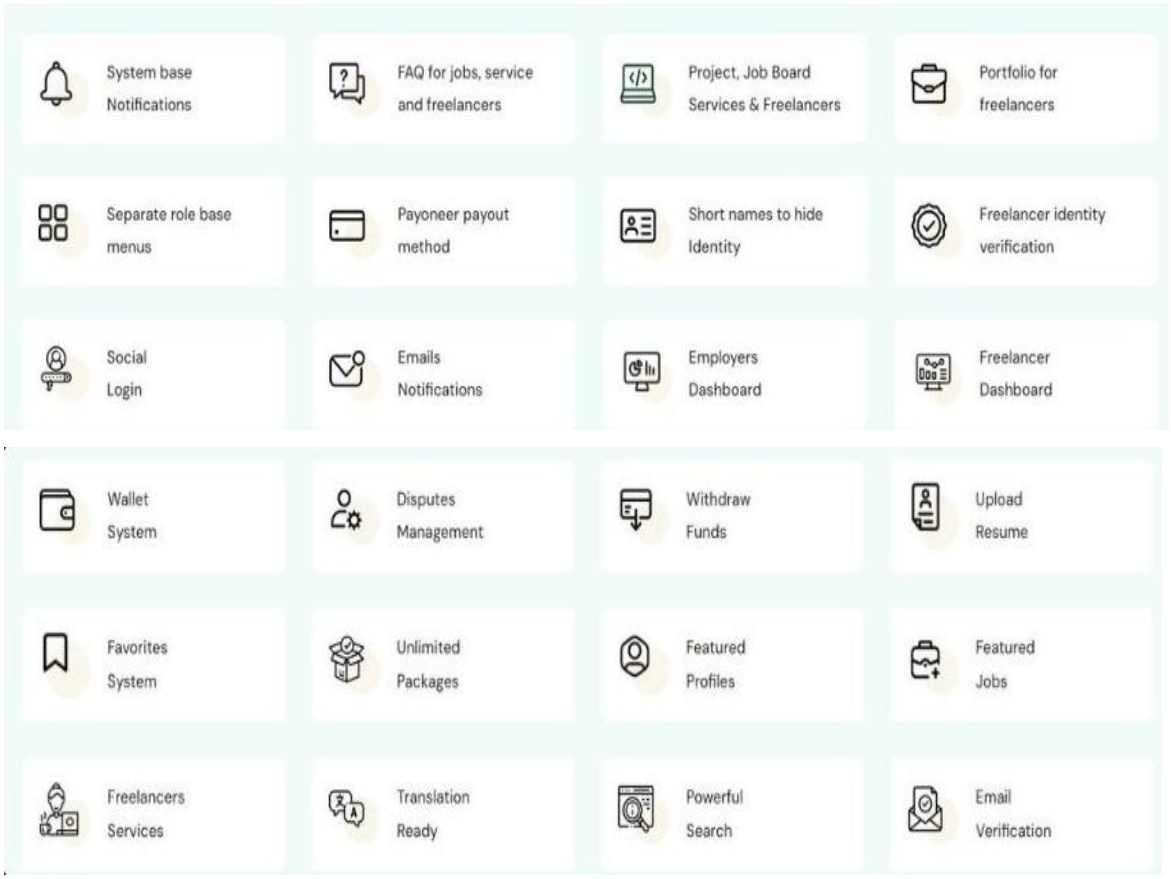

Figure 23: All features

CHAPTER 5:

CONCLUSION

5.1 Conclusion

This study helped to figure out the relationship between the key variables involved in the creation of this cloud-based project management system. Among the users that we found in universities and during our industry visits, we figured out the key variables involved were perceived usefulness, perceived ease of use, attitude towards using, behavioral intention to use and actual system use. These results also tell us of the importance of incorporating efficiency, connectivity and usefulness of this platform that should be designed to solve the issues highlighted in our surveys. The results suggest that our platform's ability to speed up the financing, scheduling, bidding, and communication processes will determine how successfully it can handle the main problems with traditional construction project management. Continuing the study of a user acceptance point of view of the construction industry might have further elaborated the factors as researched in the present study but might have unveiled other factors like perceived value, level of trust, and satisfaction. Each of these variables has a role to play in shaping the attitudes and behavior regarding the given technology. Perceived value refers to the assessment made by the user of the various features of the platform and the benefits that he can gain from using the platform as compared to the cost or the loss of using the platform or the demerits of the platform over the others. Trust, on the other hand, may refer to the faith a user has placed on the site in terms of operations, security, and valid authority. Also, the constructs of user happiness apply the emotions that stem from the user experience, hence the satisfaction, enjoyment and accomplishment that users attain from the platform.

The results of the above analysis mean that such concepts are incorporated into developing the platform where its advantage rises and leads to the needed adoption within the building industry. This is to create more noticeable features and functions that users can benefit from

in a way that can be easily trusted with, and in general, evoke happiness. For instance, the pricing strategy should reveal all the charges involved in rendering services, effective securities measures that will ensure that the client's property is secure, which will make them feel valued. The delivery of services should give every client a unique experience, such aspects will ensure that clients are satisfied and confident with the available value. Again, to make sure that the platform is changed, developed and adapted to the various needs and breakthroughs of the users, one must get feedback from the users, conduct surveys on user satisfaction and employ features as needed by the users. Ultimately, understanding all these other factors that affect acceptability by users of the set platforms enables one to design a platform that is more appealing and one that can attract frequent interaction from the users in the building industry.

5.2 Recommendations

Several important conclusions can be made concerning the priorities and actions that the construction industry participants should focus on via utilizing the findings of the current research to improve efficiency and cooperation as well as achieve sustainable development goals.

1. There are significant gaps that suggest best practices of communication within stakeholders and professional learning and development programs are needed.

The arguments of this paper suggest that the construction industry has become increasingly dynamic, and this means that there is need to keep up with changes, innovations, and practices in the field. Training programs, workshops, and certifications again show that firms can invest in their workforce and guarantee an expert workforce that can cope with the continuously changing and growing industry.

2. Facilitating proper implementation and use of effective project management tools and practices particularly those that incorporate the use of technology is mandatory.

Conducting construction projects being an elaborate process, the management of construction projects is an integral part of the process as it aims at delivering the construction projects in the stipulated period, within the agreed cost and with the right quality.

3. Implementing software and other IT solutions, project managers can achieve a few goals, namely, to make a variety of processes more efficient, easier to manage, and to improve overall cooperation.
4. Increasing information literacy and the effectiveness of cooperation between project participants is critical for preventing communication breakdowns during project implementation.

Since stakeholders can bring ideas on how different project teams are working, sharing latest ideas and best practices, and provide recommendations on how projects can be accomplished effectively and efficiently, they can serve as enablers to change existing processes.

In conclusion, regarding the impacts on the environment and the management of resources, stakeholders must ensure that sustainability becomes the goal of construction in all its projects. This includes adopting green building standards, following energy efficient technologies as well as practicing environmentally friendly policies and avoiding and minimizing on wasting environmental factors. Therefore, when sustainability is considered as one of the key priorities, not only the adverse impact of construction projects on the environment can be avoided, but projects developed by stakeholders will also become more resistant to future risks and will help to build a new, more sustainable environment for the construction industry.

5.3 Future research

The developments which the construction industry is expecting in the coming years include introducing use of technology advancements, maximizing the utilization of newly introduced technologies like artificial intelligence, establishment of effective and appealing measures for both involving and empowering the stakeholders of projects.

1. Smart operations could be considered as sustainable practices when it comes to a construction project as they provide a feasible way how to urge environmentally conscious processes and utilization of resources. Building Information Modelling (BIM), Internet of Things (IoT), and smart sensors can be used to control energy

use or efficiently design building when construction is at its design stage and reduce wastage at the construction phase as well as utilization of ecological systems.

2. Advancements in materials technology, for instance, the use and integration of environment-friendly and reusable construction material can serve as a solution to controlling the negative impacts caused by the construction industry.
3. Energising mechanisms are crucial for prompting cooperation, creativity, and access to other members who belong to or interact with the constructions industry.
4. Regular communication systems involving stakeholder engagement platforms, collaborative project management techniques, and other similar tools can help in carrying out the project with more engagement and better involving of the related project teams, clients, contractors, or others.
5. Training and educating the stakeholders as well as involving them in the general decision-making processes will further help foster their sense of responsibility and implied ownership over the projects which, in result, will help them to be more effective and, therefore, contribute to the overall stability of the IM industry on the long term.

It is evident that the integration of modern technologies such as artificial intelligence could potentially transform many aspects of the construction industry. Recent scalable solutions introduce Smart project planning, dynamic resource allocation and better predictive upkeep strategies for better project delivery. For example, pattern recognition is possible using AI and algorithms whereby large data sets are assessed. In addition, those self-automated technologies with the use of artificial intelligence in construction boost production rates, safety, and standards using robots that can efficiently and effectively perform repetitive tasks.

In conclusion, there are predictions for future construction developments of more integration with sustainable techniques and approaches; integration of advanced technologies like Artificial Intelligence to improve the performance; and use of innovative and motivating strategies to encourage the stakeholders to take part more effectively in construction. That means the construction industry, by adopting these reorganizing trends

and innovations, will be able to effect change for the positive in its projects and enhance the resilience and sustainability of construction projects.

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