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The Development of Construction Service Marketplace System using Laravel Framework

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Abstract: Many local consulting firms and contractors struggle to engage and have better communication with clients or vice versa. This struggle may or may not cause work overload and difficulty to maintain client relationships. Hence, this study proposes developing a construction services marketplace system where clients and service providers can interact on a single platform. This study has initiated a collaboration with a construction consultant company named TrisM Kontrak Sdn Bhd that addresses the associated issue by integrating the current practice with modern technology and cloud computing architecture.

Keywords: Construction Service, Marketplace System, Laravel, Web-based

1. Introduction

In Malaysia and around the world, construction is a vast, dynamic, and complicated sector. Construction is the process of turning an architect's or engineer's vision into reality [1]. Major engineering and infrastructure projects may involve many different construction businesses, while smaller projects may involve a single firm building and renovating a single home or a commercial or industrial building.

Without question, many local consulting firms and contractors struggle to engage and have better communication with clients or vice versa. This struggle may or may not cause difficulty to maintain client relationships as clients continue to seek service providers from different sites, small service providers have a lower chance of being hired by clients and the likelihood of clients encountering service providers with bad intentions is highly significant.

Today's construction sector must look at information and automation technology as potential assets to leverage and improve efficiency. Information technology (IT) can be used to improve the efficiency and efficacy of construction, according to Soetanto et al. [2]. Therefore, the objectives of the project are to design the Construction Service Marketplace System using an object-oriented approach, to develop the Construction Service Marketplace System using Laravel framework, and to test the developed Construction Service Marketplace System.

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This project focuses on client engagement, improved communication, and strengthening local economies and communities. On this platform, clients and service providers can engage. It is also a system that can be managed and monitored by the administrator. Thus, clients, service providers, and administrators can profit from the proposed system.

This article is organised into five sections. The first is an introduction describing the context of the project. The second section describes the analysis of the relevant work. In the third section, it explains the methodology. The implementation and testing of this system is described in the fourth section. In the last section, a conclusion.

2. Related Work

2.1 Client acquisition process of construction

Currently, construction companies market their business by posting content on Facebook, Instagram and LinkedIn. Consequently, customers take time to find the best and suitable provider for their construction project as they search on different platforms. Figure 1 represents the process of how clients search construction companies in a flowchart form.

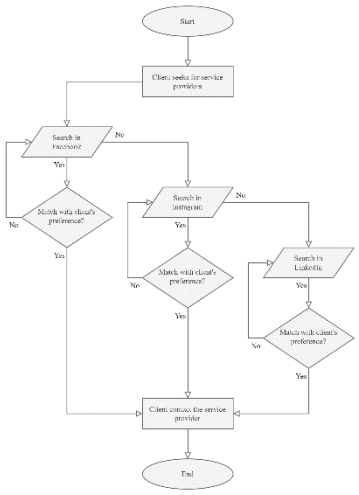

Figure 1: As-is flowchart

Using Facebook or Instagram does not guarantee immediate success. Besides, the newsfeed algorithm does not ensure that their followers will see their posts. Also, customers anticipate a quick response if customers contact them via social media. If they take too long to respond, customers may switch to competitors. Other than posting content, companies go all-in on local SEO. However, their pieces of information are not complete or missing, such as their contact numbers or business hours.

Additionally, firms are entering a new era of competitiveness, one that emphasises strategic thinking and considers corporate strategy, systems, and business processes. Mbugua et al. [3] argue that it is difficult to draw clear comparisons between contracting firms. It is due to their disparate commercial interests. Handayani [4] also supported that consulting companies and contractors must improve their performance to improve service, compete, and gain an advantage. These organisations must use strategic management concepts. For this reason, developing the proposed system is to drive competitiveness in the construction industry and give people more exposure to small-medium service providers. Therefore, the proposed system implements a service marketplace method for the construction services. The following section will explain the service marketplace.

2.2 Service marketplace

A service marketplace platform is an online platform that initiates, facilitates, and concludes the acquiring and offering of services between service seekers and providers. According to Tripathi [5], it is a place where service disclosure forms the company's offering to customers/clients and creates opportunities for paid work through its offering to consultants/experts. It has increased the fluidity, administration, and simplicity of online marketplaces. Makkonen [6] also argue that marketplaces can outperform competitors by making the process of purchasing services significantly faster, more accessible, more inexpensive, and more dependable. These four benefits are critical to the success of service marketplace platforms, and companies can also use them to expand their businesses.

As a result, implementing the service marketplace method might establish an industry-standard while also accepting responsibility for the quality of service supplied to the customer, thereby creating long-term relationships and trust. Apart from that, the proposed system will function as a one-stop shop, providing a plethora of services to its customers under one roof. As a result, customers will browse different services on a single platform and quickly, safely, and reliably hire any service. Likewise, the service providers will prove their abilities and have a reasonable chance of success.

2.3 System Comparison

The following table will compare ten available features in the existing related systems and the proposed system.

Table 1: System's comparison

Features	Kaodim System	ServisHero Application	HeyJaga System	Construction Service Marketplace System
SME construction service	√ Focuses all types of services	√ Focuses all types of services	√ Focuses all types of services	√ Focuses only on construction services
Registration form	√	√ Using google form for the service providers' registration	√ Using the monday.com form for the service provider's registration	√
Service provider's background verification	√ IC and SSM	√ IC	√ IC and SSM	√ IC, SSM and CIDB
Service providers and their services listing	√ View on a separate page	X View services only	√ View under one page	√ View services list first, then service providers list
Order system	√	√	√	√
Job completion monitoring	√	X	X	√ The organisation will also go to the worksite for quality control
Invoice	√	√	X	√

Based on Table 1, firstly, only the Construction Service Marketplace System focuses on one type of service: construction compared to other systems. It is better to focus on one type as construction has various services. Secondly, the system does not use Google form, monday.com form or another system

for the registration form. Thirdly, the system is more trustable as it requires service providers to upload IC, SSM, and CIDB for the background verification in order to avoid scammers. Next, the system has a feature of monitoring the job completion of the service provider. As a result, the Construction Service Marketplace System has exclusive features compared to the other systems.

3. Methodology

This project chooses the prototyping model because it is an excellent methodology for developing a system with unclear user requirements and a one-year schedule. Figure 2 shows the model of the system prototyping, starting from the planning phase to the implementation phase.

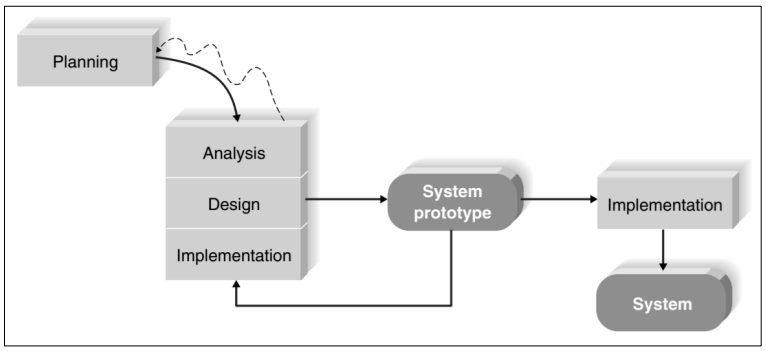

Figure 2 : Prototyping model [7]

As illustrated in Table 2, each phase produces a specific task and output throughout the project's progress.

Table 2: Tasks and outputs for each phase

Phase	Task	Output
Planning	□ Plan task scheduling and identify problem, scope and objectives.	□ Project proposal □ Develop Gantt chart
Analysis	□ Collect and analyse the collected information	□ Functional and non-functional requirements □ User requirement analysis □ Software and hardware requirements □ UML diagrams □ Requirement traceability matrix
Design	□ Design a logical of the structure of the system	□ Architecture Design □ Database Design □ Interface Design
Implementation	□ Develop the system □ Test the system	□ Program code □ Test Case
Prototype	□ Repeat task from planning phase until implementation phase and detect errors again on the system and repair the existing system	□ System prototype □ Final system

The scopes involved in the Construction Service Marketplace System divides into three parts; the module, the users that are available for each module and the function of each user's module. Table 3 states the description of the scope:

Table 3: Scope of the system

Module	User	Function
Login	All	Login to the system
Service	Client	View and browse list of service
	Service Provider	Creates, manages, and advertise service
Order	Client	Order service
	Service Provider	Manages clients' order
	Administrator	Monitors order completion by service providers
Message	Client and Service Provider	Message to each other
Payment	Client	Pays the ordered service
	Service Provider	Receives payment from administrators
	Administrator	Manages payment
Client	Administrator	Manage clients
Service Provider	Administrator	Manage service providers
Report	Administrator	Generate report

The project requirements in developing the proposed system consist of software, tool and libraries. Table 4 states the list of software requirements:

Table 4: Software requirements

No	Software/Tools/Library	Requirements
1	Microsoft Visual Studio Code	Source Code Editor
2	XAMPP	Web Server
3	Google Chrome	Web Browser
4	Microsoft Word	Word Processing
5	Microsoft Visual Paradigm	UML Case Tool
6	Composer	Dependency manager
7	Laravel	Server-side Framework
8	Bootstrap	Front-end Framework

System analysis describes the general structure or flow and its function. Indirectly, it will help close the proposed and developed systems gap. UML is a general-purpose, developmental, modelling language in software engineering that intends to provide a standard way to visualise the design of a system. Hence, the project utilises the UML diagrams using an object-oriented approach. Following show shows the UML diagrams:

3.1 Use Case Diagram

Figure 3 shows the use case diagram that represents the overall activity of the construction service marketplace system. The following states the description of the use case diagram:

- The construction service marketplace system has eight use cases and three users.
- Client users will be associated with log in use case, service use case, order use case, message use case, and payment use case.
- Service provider users will be associated with log in use case, service use case, order use case, message use case, and payment use case.
- Administrator users will be associated with log in use case, order use case, payment use case, client use case, service provider use case, and report use case.

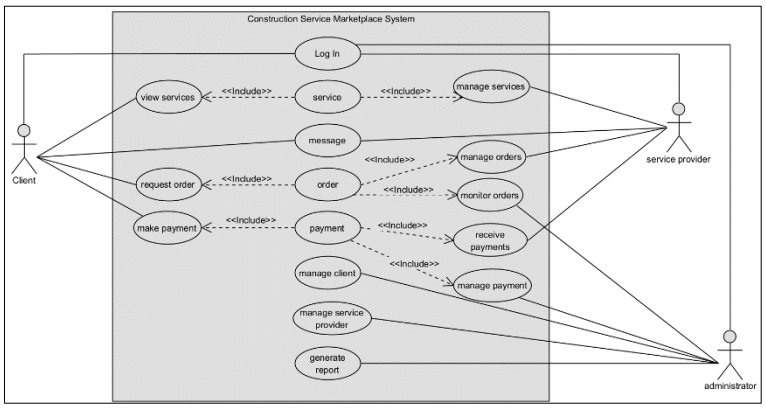

Figure 3: Use case diagram

3.2 Class Diagram

Figure 4 shows the class diagram of the construction service marketplace system.

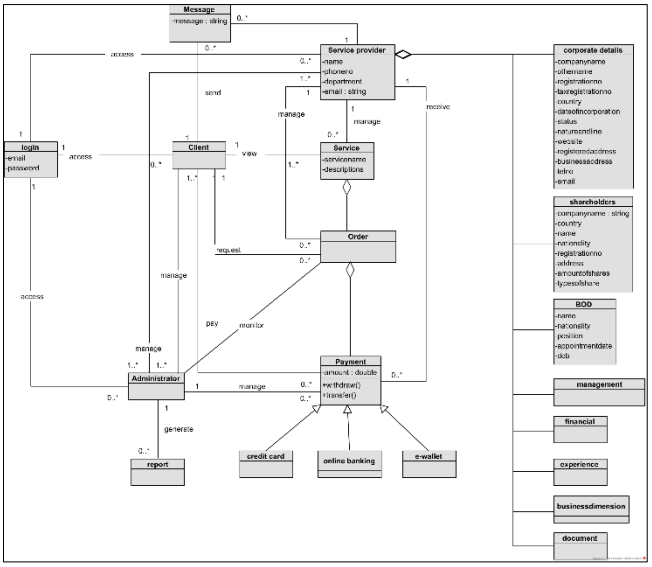

Figure 4: Class diagram

4. Results and Discussion

4.1 Implementation

Figure 5 shows the interface for the service provider to register an account by filling out their business details.

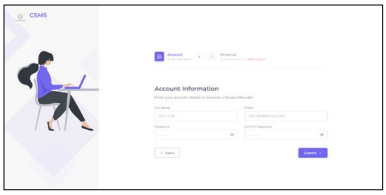

Figure 5(a): Register form

Figure 5(b): Corporate details form

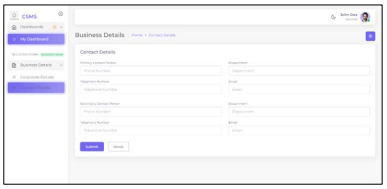

Figure 5(c): Business details form

4.2 Testing

Table 5 shows the test case for the service provider to register an account

Table 5: Example of presenting data using a table

No	Test Cases	Expected Output	Actual Output
1	Show error message if press button with empty field	Show error message	Pass
2	Show error message if register using existing email	Show error message	Pass
3	Show error message if password is not 8 characters and above	Show error message	Pass
4	Show message when success register the account	Show message	Pass

5. Conclusion

In conclusion, this article explained the overview of the construction service marketplace system for the TrisM Kontrak Sdn Bhd. The introduction discusses the dilemma and problems faced by most construction firms. Next, related works describe the results of studies before proceeding with the development of this system. Last, the methodology discusses the system development workflow, analysis and design. previously mentioned.

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