

CHAPTER II LITERATURE REVIEW

2.1 Literature Review

Other research in Malaysia, it said that contacting automobile service providers is the main concern as the public has limited information to the providers. Moreover, the rise of tow truck scam where operators themselves engineered the accidents by the use of oil or nails, has increased the percentage of total breakdown, being stranded on the road seeking helps in rural place at the same moment. Problems faced by car owners are not solely breaking down which not only cause distress, but will then trigger owners to take bad decisions by agreeing on scammers. Also, one who doesn't possess any workshops' numbers can only rely on the by-pass cars and high risk of being scammed (Sheng, Baharudin, & Karkonasasi, 2016).

While in this case, one of factors that influence the choice of service center is through recommendations from colleagues, adverts on television or radio, resorted to the nearest center due to vehicle breakdown (Vroom & Eshun, 2016).

Based on the findings, it's hardly to discover any workshop without any knowledge from publics and it is showing null value to any precaution before breakdown happens.

In other research, various unavoidable failures occurred in automobile components due to improper preventive maintenance which results in losing several human life. It is also stated the loss of human life is due to ignorance in

vehicle maintenance, which means cars service and maintenance are not prioritize than owners' productivity (F, P, Gokul, & Hiran, 2017).

Other finding in India, one of the world's largest car markets, it is stated satisfied services will lead to customer loyalty and retention. Using crosstab method, also indicates high rates in customer retention in purchasing second products and a quick call handling is recommended (Malik, 2015).

While in research being done by Iswarya, Devaki, & Ranjith, 2017, mobile application provides details of hospitals, service stations, flat tires service provider has successfully provides ease of access (one-touch access) for locating require services. This is due to precaution of any unfortunate and unforeseen event of a breakdown or road accidents.

The table shown below for research comparison against the project that is going to be developed.

Table 2.1

Literature Review

| <i>No</i> | <i>Authors</i> | <i>Title</i> | <i>Conclusion</i> |
|-----------|----------------------|--|---|
| 1 | (Sheng et al., 2016) | A car breakdown service station locator system | Contacting automobile service providers is the main concern as the public has limited information to the providers. |
| 2 | (Vroom & Eshun, | Establishing | It's hardly to discover any |

| <i>No</i> | <i>Authors</i> | <i>Title</i> | <i>Conclusion</i> |
|-----------|------------------|--|--|
| | 2016) | Automobile Repair and Service Workshops at Technical Vocational Education and Training (TVET) Institutions: (Case Study: Takoradi Polytechnic) | workshop without any knowledge from publics and it is showing null value to any precaution before breakdown happens |
| 3 | (F et al., 2017) | An Investigation on Failure of Automotive Components in Cars | The loss of human life is due to ignorance in vehicle maintenance, which means cars service and maintenance are not prioritize than owners' productivity |
| 4 | (Malik, 2015) | Impact of Customer Relationship Management on Customer Loyalty and Customer Retention with reference to Automobile Sector | High rates on customer retention in purchasing second products and a quick call handling is recommended |

| <i>No</i> | <i>Authors</i> | <i>Title</i> | <i>Conclusion</i> |
|-----------|------------------------|----------------------------------|---|
| 5 | (Iswarya et al., 2017) | Road Assistance System Using GPS | Mobile application provides details of hospitals, service stations, flat tires service provider has successfully provides ease of access (one-touch access) for locating require services |

On this research, author develops a mobile application, focusing in repairing and maintenance works to minimize problems which are defined by (F et al., 2017; Sheng et al., 2016; Vroom & Eshun, 2016)'s researches. They concluded it's rarely to find automobile repair workshops without any public information, furthermore breakdown in rural places. The mobile application, being named as *FixHER*, will focus in customer service with real-time notification to provide immediate responses to automobile owners (Malik, 2015). With that, author believes the mobile application surely helps communities, especially automobile owners and automobile repair workshops by implementing part of system flow found by (Iswarya et al., 2017).

2.2 Theoretical Basis

2.2.1 Scrum

Scrum is not just a definitive method or technique but a framework to help in achieving a clear view of the relative efficacy of various techniques and product management (Rahman et al., 2018). To summarize, scrum consists on creating an incremental framework for projects, where a project can be understood as any complex activity or task developed and achieved within the course.

Scrum has milestone of sprints which each iterations must not last more than a month, and must be acquired in a consecutive manner without pause, especially when it is time-boxed. With this, developers are able to acquaint with time submissions and work cycles (Jurado-Navas & Munoz-Luna, 2017).

It's proved scrum, an agile methodology has produced a good quality software in a short period of time and can be applied immediately either desktop application, web application or mobile application. It is also mentioned they had successfully delivered an useful application for a client and were motivated to use scrum in future projects (Ventura et al., 2017).

2.2.2 React Native

React native is an open source JavaScript framework developed by Facebook that allows to render mobile applications for both iOS and Android. It makes them possible to write two different applications just by using single language, in which saves time, ease in fragmentations, shortens development processes, and also helps in migrating web to mobile development (Caroline,

Fiorenza, Dutta, Mishra, & Shukla, 2018). It utilizes the JavaScript runtime of the targeted system, either Android devices or iOS devices.

All business logic, such as data models, controller actions is written in JavaScript which enables large parts of the code base to be shared among different environments. React native application view is composed from actual native elements, that all elements such as buttons, text, lists as well as animations will be running in the exact same way as in a regular, native application (Lelli & Bostrand, 2016).

Study conducted by Ur, Quazi, & Sinha, 2018, determined react native as a finest cross-platform framework which performs faster than Ionic application and PhoneGap application with best execution time. The comparative analysis is conducted in Android-platform which covers almost 76% of the whole smartphone market. Total execution time is 2903ms, 1082ms, 2399ms taken by Ionic application, React Native application and PhoneGap application respectively.

A project which aims to introduce a pet friendly social networking site where shelters are found for an abandoned animal whose information uploaded on the site has been successfully built using React Native as front-end and developed using Android Studio while the back end of the project is developed using NodeJS to work with yarn and npm packages (Caroline et al., 2018).

2.2.3 Laravel (PHP Framework)

Laravel, an MVC based website development, is known as PHP framework for web artisans, designs to improve software quality by providing expressive, clear and time-saving syntax (Devianto, 2018). It is free, open source PHP framework wherein applications are built in the MVC pattern, with the aim to make the entire web development process quick, example common tasks to have in every projects, authentication, routing, session have been covered by Laravel itself.

Since Laravel manages all essential tasks from web routing and database management, it's called a full stack framework. It also supports Rapid Application Developing (RAP) which using Blade template, a built-in template engine features for common web application tasks; RESTFUL controllers by taking advantages of HTTP protocols and can be run from the artisan command line (Solanki, Shah, & Shah, 2017).

Laravel has claimed as the best framework in the prior studies and led to its usability in terms of design. In the study to examine the significance to strengthen the brand image of Higher-Education Institutions (HEI), Laravel is able to support the study on all indicators of brand image of Reputation, Recognition, Affinity and Brand Loyalty compared to other old web without Laravel framework (Series & Science, 2018).

2.2.4 Information System

Information is a set of classified and interpreted data used in decision making and it has also been defined as some tangible or intangible entity which serves to reduce uncertainty about future state or events. Information can also be described as data, source, value, choices or even actions which involves course of action. While system itself is a set of combine elements to reach particular goals (Mishra, Kendhe, & Bhalerao, 2015).

Information system is an integrated set of components for collecting, storing and processing data and for delivering information, cards, and digital products, commonly used to carry out and manage operations in firms (Berisha - Shaqiri, 2014). The main function of information system to avoid the uncertainty and unknown circumstances creating a solid basis for qualitative decision making in the management and leadership.

2.2.5 Application Programming Interface (API)

API is a set of software chunks, in xml format. There are different methods in communicate between different platforms by using GET, POST, DELETE, PUT (Wulf & Blohm, 2017). User sends request to API with specified service database and get responses by the calls accordingly.

It plays roles of the interface between different software programs and make ease of their interaction similarly as user interface facilitate between human and computer. In general, API is machine readable interfaces that connect multiple applications, provide methods to govern interaction and establish

communication between applications without the need to understand the inner flow of how the API works (Gite, 2017).

2.2.6 JavaScript Object Notation (JSON)

JavaScript Object Notation (JSON) is a text format for the serialization of structured data. It is derived from the object literals of JavaScript. It can be represent four primitive types (string, numbers, Booleans and null) and two structured types (object and arrays) (Yusof & Man, 2017).

JSON is chosen in this project because of its flexibility and can handle high throughput and low latency without sacrificing and scalability. JSON is also directly supports inside JavaScript and the best suited for JavaScript application; thus provide significant performance compare to XML or relational databases.

2.2.7 Entity Relationship Diagram (ERD)

Entity Relationship Diagram is a collection of entities where interacts between each other entities in a diagram. Entity Relationship Diagram is defined as a conceptual and abstract of data representation. Entity relationship is a method of database model use to provide a visual starting point of database design which helps organization to determine requirements of information system. While diagram is to view or draw Entity Relationship, in which is called as Entity Relationship Diagram or ER Diagram or ERD (Al-Masree, 2015).

Entity Relationship Diagram is a basic approach which designed in a graphical way to provide an overview of the scope of the projects and how datasets are related with each another. Entity Relationship Diagram not only

provides a modeling features but also helps in providing the blueprint of a physical manifestation which to be categorized straightforward to database designers, analysts and even end-users (Abdel-Salam Al-Btoush, 2015).

2.2.8 Unified Modelling Language (UML)

Definition quoted from Ogedebe & Silas (2015) about UML, an acronym stands for Unified Modelling Language, one of accepted clarified requirements in industrial languages, creates a modern approach to modelling and documenting software and is known as the most popular business process modelling techniques.

While taken from Makkar & Sikka (2017), Unified Modelling Language is a standard procedure in construction and notation modelling intends to be used in analysis, design, and implementation of software-based systems.

UML expresses the data flow of a software, to illustrate the structure in the system, to document and build up – it is an expression that mocks up the blueprint. UML itself is used in several of handling to support analyzing software development.

Various patterns of UML which are:

1. Use Case Diagram

According to Ogedebe & Silas (2015), use case diagram is a representation of sequence of transactions executed by actors from external. Use case diagram is a methodology used in system analysis to identify, clarify and organize system requirements, shows how a system interacts with the

external entities which are end-users (Aleryani, 2016). Several symbols in use case diagram are shown below (Refer Table 2.2).

Table 2.2

Symbols in Use Case Diagram

| No | Symbols | Name | Description |
|----|---|----------------|--|
| 1 |  | Actor | Specify acts of actor in interacting with use case |
| 2 |  | Dependency | Relation of modification in which if dependency element is altered, then will also change the value of independent element |
| 3 |  | Generalization | Relation of in which descendent share function or behavior from the upper level of element (ancestor) |
| 4 |  | Include | Specify the source of use case explicitly |
| 5 |  | Extend | Identify use case target in which cover the source of use case |
| 6 |  | Association | Identify relation of object with another |
| 7 |  | System | Specify packet which display system boundary |
| 8 |  | Use Case | List of action in which returning value to the actor |
| 9 |  | Collaboration | collaboration between procedures and elements in providing bigger function or behavior |

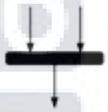
| No | Symbols | Name | Description |
|----|---|------|--|
| 10 |  | Note | Physical element that exist when compile, use to describe elements |

2. Activity Diagram

Ogedebe & Silas (2015) define activity diagram as a diagram concerns with dynamic behavior of a systems that drives event or object from one to another state. Activity diagram consists of nodes and edges, where nodes mainly contain basic activity nodes, object nodes, and control nodes (Chen & Lin, 2017). Several symbols in activity diagram are shown in Table 2.3.

Table 2.3

Symbols in Activity Diagram

| No | Symbol | Name | Description |
|----|---|-------------------------------|---|
| 1 |  | Start | Represents the beginning of the process or workflow in an activity diagram. |
| 2 |  | Activity | Indicates the activities that make up a modeled process and the main component of an activity diagram. |
| 3 |  | Connector | Arrow line that shows the directional flow / control flow of the activity. |
| 4 |  | Join (synchronization bar) | Combines two concurrent activities and re-introduces them to a flow where only one activity occurs at a time and can be represented vertically or horizontally. |
| 5 |  | Decision | Represents the branching or merging of various flows with the symbol acting as a frame or container. |

| No | Symbol | Name | Description |
|----|---|----------------|---|
| 6 |  | Note | Allows the diagram creators or collaborators to communicate additional messages that don't fit within the diagram itself. |
| 7 |  | Receive signal | Demonstrates the acceptance of an event. |
| 7 |  | Send signal | A signal is being sent to a receiving activity, as seen above. |
| 9 |  | Option loop | Used for modeling a repetitive sequence within the option loop symbol. |
| 10 |  | Flow final | Shows the ending point of a process' flow. |
| 11 |  | End | Represents the completion of a process or workflow. |