**AsPr Lemai Nguyen**

**Unit Chair**

Submitting to:

Abstract

The analysis of a proposed food ordering application for BanhMi2u is undertaken to meet stakeholders’ requirements and Requirement modelling is performed by using methods like House of Quality, Use case diagrams Sequence and Class diagrams and Business Process Modelling.

MIS701- Business RequirementS analysis

Assignment 2 – BanhMi2u Project Requirement analysis and Modelling

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| **Executive Summary (based on findings of parts 1, 2, 3 and 4)** |
| **BRIEF BACKGROUND**  This is a requirement and elicitation analysis report done by a team of 5 Business analysts, at Analytics consulting firm for BanhMi2u, a food service business in Melbourne to help gather stakeholder requirements as well as functional and non-functional requirements to aid the creation of a food ordering mobile application which was one of the strategy recommended in the enterprise and business analysis planning report done previously.  **PROJECT GOAL**  The goal of the analysis is to help BanhMi2u identify key stakeholders and their requirements for their successful interaction and running of the application, provide functional and non-functional requirements that would help meet each requirements of the stakeholders and give a comprehensive knowledge of the business process, data involved or generated, all these done to ensure that the proposed food ordering mobile application satisfies the overall business needs and adds value. This will enable BanhMi2U to make effective use of technology to grow their customer base, increase retention and loyalty and use the data generated to better understand their customer engagement, expanding customer base, retention, loyalty as well as understanding the customers’ food ordering pattern.  **TECHNIQUES USED** are: House of Quality, Requirements Modelling using use case, sequence and class diagrams, business Process Modelling  **OVERVIEW OF THE RESULTS**  Using each of the techniques and methodologies stated above, critical requirements and understanding to aid the creation of the proposed food ordering mobile application for BanhMi2u where gathered.  The House of quality helped to analyse the stakeholders and solutions to meet those requirements. It captures the customer needs, technical requirements of the application, show how each individual requirement correlate with one another and helps calculate the level of importance of each requirement. The technique helped to identify the five key major stakeholders: Customers, Drivers, administrator, owners and Chef. It also helped to know the level of importance of each stakeholder requirements. From the technique, the team discovered that customer wanting payment options, browsing and placing of orders easily, timely delivery; drivers and chef wanting notifications for orders; and tracking of delivery have higher level of importance than other requirements. The requirement modelling techniques carried out involved the use of the use case, class domain and sequence modelling diagrams. The use case techniques helped to better depict the functionality of the new system and show how Actors (identified stakeholders in the house of quality) would interact with the system with the aim of ordering and fulfilling orders.  With the sequence diagram, the food order process is made clear. It gave understanding of the process involved right from ordering of food by customer and sequence of events and messages necessary till the order is delivered and fulfilled. The class diagram helped define the structure of the system as it relates to objects, attributes and functions. It helped show the data of each objects.  **PROPOSED SOLUTION**  In conclusion, based on the analysis carried out, BanhMi2u should create a food ordering mobile application with the following:   1. Allows customer place order easily with friendly graphical user interface 2. Allow customer access to electronic menu for order placement 3. Give customer the options to make payment securely using PayPal or credit card 4. Have a route optimizer feature that driver can use make decision on best route to take to aid timely delivery 5. Allow each key stakeholder track orders and delivery at every giving point 6. Have a make table reservation options for customers who want to dine at the restaurant 7. Allow customer to integrate their social media pages to the application. Customer can use this medium to drop feedbacks and create awareness for the application by sharing beautiful food pictures.   With the above features, BanhMi2U will be meet their goal of effectively using technology to grow their customer base, increase retention and loyalty and use the data generated to better understand their customer engagement, expanding customer base, retention, loyalty as well as understanding the customers’ food ordering pattern. |

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| **Analysis of Business Needs, Stakeholder requirements and their Importance (including assumptions)** |
| **Analysis of Business Needs**  Insights to better understand the current state of BanhMi2u, its problems and needs were gotten from the exploration of Banhmi2u problem space and the SWOT analysis carried out. One of such needs is the ability for BanhMi2u to provide great, quality and professional services to customers which would in turn help satisfy the business objectives and goals which includes but not limited to investing in technology to help increase customer base, engagement, retention and loyalty as well as help understand customer purchasing patterns. The creation of a food ordering mobile application is one of the recommended strategies that would help Banhmi2u meet its needs, goals and objectives.  **STAKEHOLDER IDENTIFICATION:**  The important stakeholders of the food ordering mobile application are:   1. Customers 2. Drivers 3. System administrators (which could be the waiter or the member of the technical team) 4. The project owners (Head of IT, Restaurant owners) 5. Chef   **MOST CRITICAL/URGENT STAKEHOLDER REQUIREMENTS:**  Some of the most important stakeholder requirements are based on the house of quality technique used are:   1. Customers want to make payment securely and easily 2. Customers want to search for menu and place order easily 3. Customers want food to be delivered on time 4. Drivers and chef want to get notified about orders to enable them prepare and deliver order respectively. 5. Chef wants know when an order comes in to enable timely food preparation. 6. Customer and staff would also like to track order and delivery.   These are very important requirements since the purpose of creating a mobile food ordering application and business needs would not be met. Other stakeholder requirements are important but are not as critical or mandatory at the initial stage of creating the application since the proposed food ordering mobile application can run effectively and yield results without them. |
| **Analysis, Recommendation and Justification of Solution requirements of relationship matrix, correlation matrix, and targets (including assumptions)** |
| **Analysis:**  The House of quality shows the level of importance of each stakeholder and solution requirements. The mobile application is expected to meet certain solution requirements based on the percentage of their relative importance shown in the House of Quality.  **Recommendation:**  The mobile application must compulsorily meet certain and critical solution requirements. These are:   1. Enable customers, drivers and administrator have the option to either pay on delivery or online via payment gateway 2. Enable real time order data and history stored into database 3. Enable customer access to electronic food menu to place order easily. 4. Enable driver access to route optimizer to provide best route via which order can be delivered on to time. 5. Enable customer and administrator get order status notification and track order and delivery.   **Justification:**  These features not only have high relative importance but help to meet the most important stakeholder requirements as well as the business needs. Without these features or solution requirement being met, the Banhmi2u’s recommended strategy, goals and objectives would not be satisfied.  Without these features, customers would not be able to place or pay for orders, drivers would not be able to pick up or deliver orders timely and the chef would find it difficult to know when and what meal to prepare.  **Non-functional requirements / Targets:**  Some of the behavioural requirements that the food ordering application must meet.   * The application should have a friendly and easy graphical user interface * The application should have a secured payment process * Location / estimated order arrival must be accurate and timely Push order status notification sent * Data must be accurate and complete to aid business intelligence |

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***Enter numeric values in Relationship Matrix: +***

Strong – 9

Medium – 3

Weak – 1

**++**

***Enter the following values in Correlation Matrix:***

Strong Positive **++**, Positive **+ ++**

Strong Negative **--**, Negative **-**

(Replace the X placeholders)

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| **Solutions**  **Requirements**  **Stakeholder requirements** | **Importance (5 – High, 1 –Low)** | 1. Enable customer create personalized account. | 1. Enable customer access to electronic food menu to place order easily. | 1. Enable customer have the option to either pay on delivery or online via payment gateway | 1. Enable customer and administrator get order status notification and track order and delivery. | 1. Enable real time order data and history stored into database. | 1. Enable driver access to route optimizer to provide best route via which order can be delivered on to time. | 1. Enable customer and staff to view analysis and report based on order history. | 1. Enable customer integrate to social media to rate and review services and chat with support staff. | 1. Enable customer to book for spots and reserve tables in restaurant. |
| 1. Customer wants to browse, select and place order for food easily. | **5** | 1 | 9 | 3 |  | 1 |  |  |  |  |
| 1. Customer wants to have Banhmi2u membership account | **2** | 9 |  |  |  | 1 |  |  |  |  |
| 1. Customer wants easy and various payment options | **5** |  |  | 9 |  | 1 |  |  |  |  |
| 1. Administrator and Customer wants to track order status and delivery. | **4** |  |  |  | 9 |  | 1 | 1 |  |  |
| 1. Customer wants food delivered on time. | **5** |  | 1 |  |  |  | 9 |  | 1 | 1 |
| 1. Drivers and chef want to get notified about orders placed with detailed pick-up and delivery information | **5** |  |  |  | 3 | 3 | 1 |  |  | 1 |
| 1. Head of IT want to understand customer Purchasing Behaviour | **4** |  | 1 | 1 |  | 9 |  | 9 | 1 |  |
| 1. Customer wants to rate and review services | **3** | 1 |  |  |  |  |  |  | 9 |  |
| 1. Customer wants to make table reservations. | **3** |  |  | 3 |  | 1 |  |  |  | 9 |
| **Target** |  | GUI must be easy to use and navigate | Food menu photos must be attractive and categorised appropriately | Payment Gateway must be secure | Location / estimated order arrival must be accurate and  Timely Push order status notification sent | Data must be complete, accurate and secure | Route optimizer must be accurate. | Data must be accurate and complete to aid business intelligence | Must have easy integration to all social media platforms | Reservation booking system must be reliable and efficient |
| **Absolute Importance** |  | 26 | 54 | 73 | 51 | 66 | 54 | 40 | 36 | 37 |
| **Relative Importance** |  | 5.95% | 12.3% | 16.7% | 11.7% | 15.1% | 12.4% | 9.2% | 8.2% | 8.5% |

**N.B Total of Absolute Importance = 437**

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| **Use case diagram (next page)** |
| **Analysis and assumptions**  The use case diagram for the proposed Banhmi2u’s food ordering mobile application shows the system’s functional requirements that satisfies each stakeholder requirements. It shows how 5 actors; customers, driver, administrator, chef and owner interact with the system to achieve sets of objectives with the overall aim of ordering food, tracking and fulfilling orders.  **Actors and their uses cases**   1. **Customer**   Customers get to interact with the application for the main purpose of ordering food. Customer can create account, browse to find menu, place order, make payment via the platform; using credit card or PayPal, get their social media integrated to the application to rate and review the services, make table reservations and track orders placed (this involves tracking order status at every point in time through to the time drivers arrives at customer’s location).   1. **Administrator**   The administrator could be any staff at the restaurant (waiter, system administrator, It personnel, etc.) He/she interacts with system by managing all orders that are placed, tracking orders and able to **view report analysis** generated from customer’s order history.   1. **Chef**   The chef would mainly use the application to **view order list** to know when an order has been placed so as to know what food to prepare at the right time.   1. **Driver**   The driver just like the chef, gets to use the application to view order list to aid timing for order pickup and delivery. The driver also interacts with application to **view best route** using the route optimization feature on the proposed application to aid timely delivery of meals to customers.   1. **Owner**   The owner could be the project owner (Head of IT) or restaurant owner. They interact with the application with the aim to **view report analysis** based on order history aiding business intelligence.  **Assumptions**   1. Create Account: Customer and driver can get to manage profile when an account has been created. This means that for each actor to delete, update their contact details, each actor must either create an account (new or unregistered customer or driver) or log in (old or registered customer or driver) using their unique username and password. 2. Browse Menu: Customer browsing or searching through for menu, can select food to order or save the menu for future purpose. 3. Place Order: For customers to order food, order must be selected, and payment can be made via the system (Using PayPal, credit card) |
| **Use Case overall diagram** |

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| **A2. P3. Requirements Modelling / Class and Sequence Diagrams** | |
| **Primary sequence diagram for the selected use case (most important and fairly complex and from the use cases)** | **Name of the Selected Use Case** |
| **Customer Food Order Process** |
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| **Domain Class Diagram** |
| **CLASS DIAGRAM OF CUSTOMER FOOD ORDER PROCESS:** |

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| **Sequence diagram and Domain class diagram - Analysis and Assumptions** |
| **Analysis of Sequence diagram:**  The use case chosen for sequence diagram is food order process which depicts the clear picture of all the processes involved in ordering a food by the customer with the help of the mobile application. Using sequence diagram, we are able to capture the flow of messages and the sequence of events occurring in the food ordering process carried out by the customer through mobile application.  **Assumptions made for sequence diagram:**  In the sequence diagram, the actors involved in the food order process are the driver, customer, system mobile application and the system admin.   1. Firstly, customer creates an account in the application by getting verified by the system admin on providing their username and contact details. However, it is not mandatory that a user must get registered with the mobile application but then they can order food without getting registered online. 2. The mobile application authenticates the user when the system admin accepts the registration. 3. The user can search for the food displayed by the application accordingly that enables the user to select the food. 4. The total price is displayed by the application in form of invoice and it helps the user to make the payment. 5. The payment confirmation is done by the system administrator by sending a notification to the customer that the order is being processed. The notification is being sent to the drivers also. 6. The driver picks up the food and deliver to the customer 7. The customer has the access to track the driver. 8. Finally, the customer can give feedback on their choice through the mobile application. Here, the mobile application serves as an interface for the user and system administrator.   **Analysis of Class diagram:**  The above class diagram contains the classes like Customer, Menu, Order, Staff, System Administrator, Technical team, Supervisors, Chef, Payment, and Driver. Payment has subclasses like card and cash. The represented class diagrams also contain information about the operations performed by individual classes and the data types to which they belong to. The hierarchical relation between the classes is also represented clearly so that the user can get the exact idea of the classes and their relations.  **Assumptions made for domain class diagrams:** In the class diagram, Customer is a class which has one to many relationships with the classes like Driver, Menu, Order, Payment and the system Administrator. It stores all the data regarding the operations performed with these classes. Here, the system administrator authenticates the customer when the customer tries to get registered with the mobile application. All the details belonging to the payment done by the customer are stored in the database when the customer views the menu and orders the selected food. At the same time, the system administrator validates the payment and stores the details of it. Mode of payment done by the customer may be through card or cash. So, the details belonging to those are also stored in the database and it is showed by creating sub-classes for payment like card and cash. As the driver delivers the food to the customer, the details are also stored in the database and the relation between them is also represented. All these one-many relationships are shown using the function called association. As every order contains menu, they are connected by using the function called aggregation. The details belonging to the staff are also stored in the database, and so they are represented as classes in the class diagram by using the connectivity called composition where, the system administrator, supervisors, technical team and chef come under staff. So, in this way we use class diagrams to represent the static view of an application and the data stored in the database corresponding to it. |

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| **Business Process Modelling - Analysis and Assumptions** |
| The following system is proposed based on the assumption that the customer is already logged on to the application and the application shows food that is available in the restaurant to order. The business process flow consists of two lanes. The administrator/restaurant and the driver together form the internal lane and the external lane is the customer. Communication between the pools is done through messages.  The sequence of task from the customer’s view is as follows:   * Select and order food * Pay for the food. This step may consist of different measures that is the payment may be made through a credit card or through PayPal * The customer gets notified that the payment is confirmed and gets a notification saying the order has been placed * The customer is also notified when the driver arrives at the restaurant for collecting the food for delivery * Once the driver arrives with the food, the customer collects the food and the order is fulfilled   The sequence of task from the admin’s view is as follows:   * Once the customer makes the payment, the admin is notified saying the payment is made for an order and the admin in turn notifies the customer saying he received the payment and the time within which the food would be prepared, and the time needed for the delivery. He also notifies the driver giving him the approximate time in which the food would be prepared and the time within which he must reach the restaurant. * Along with notifying the customer and the driver, he also notifies the chef for food preparation. Once the food is prepared and the driver reaches the restaurant for picking up the food, the chef is notified, and the food is handed to the driver for delivery. * After the food is delivered to the customer, the admin is notified with the same, and he pays the driver   The sequence of tasks from the driver’s view is as follows:   * Once the driver is notified by the restaurant, he has an option to accept or decline the order. If he declines the order, a new driver will be notified who will again be given the choice to accept or decline * If the driver accepts the order, he would be provided with the restaurant address and the driver reaches the restaurant. The driver will be provided with a time interval within which he has to reach the restaurant * Once the driver reaches the restaurant, the restaurant is notified, and the food is handed to the driver. The customer is also notified saying the food has been picked up and is notified with the remaining time required for delivery. * The driver is provided with the customer address. Once the driver arrives at the address, the customer is notified and asked to collect the food * The customer collects the food and the restaurant is notified saying the food is delivered. * The driver is paid by the restaurant after the food delivery and the driver gets notified about the payment * After the driver gets paid the order is fulfilled and the process is completed. |

**REFERENCES**

Hauser, J. R., & Clausing, D. (1988). The house of quality.

Madu, C. N. (2006). *House of Quality (QFD) in a Minute*. Chi Publishers Inc.

Zowghi, D., & Coulin, C. (2005). Requirements elicitation: A survey of techniques, approaches, and tools. In *Engineering and managing software requirements* (pp. 19-46). Springer, Berlin, Heidelberg.

Li, X., Liu, Z., & He, J. (2001, October). Formal and use-case driven requirement analysis in UML. In *25th Annual International Computer Software and Applications Conference. COMPSAC 2001* (pp. 215-224). IEEE. Li, X., Liu, Z., & He, J. (2001, October). Formal and use-case driven requirement analysis in UML. In *25th Annual International Computer Software and Applications Conference. COMPSAC 2001* (pp. 215-224). IEEE.

Klimek, R., & Szwed, P. (2010). Formal analysis of use case diagrams. *Computer Science*, *11*, 115-131.

Aguilar-Saven, R. S. (2004). Business process modelling: Review and framework. *International Journal of production economics*, *90*(2), 129-149.