UTM

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SYSTEM ANALYSIS AND DESIGN

Group Project 1 - Group 3

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1.0 Introduction

In this era of globalization, the rapid advancement of digital technology has significantly transformed the way businesses operate, particularly in the retail and service sectors. In recent years, many small and medium enterprises (SMEs) have increasingly adopted digital platforms to expand their market reach, improve operational efficiency, and enhance customer engagement. One such enterprise is XIANG EN Hamper Trading, a Penang-based company specializing in the design and sale of festive hampers, especially during the Chinese New Year season.

Established in 2008 by Ms. Crystal Ooi, the company began as a small stall in Jelutong, Penang. Through her dedication and creativity in crafting unique and customizable hamper designs, XIANG EN Hamper Trading quickly gained popularity among local residents. However, the outbreak of the COVID-19 pandemic and the enforcement of the Movement Control Order (MCO) in Malaysia posed significant challenges to physical businesses, prompting the company to shift towards digital operations. To adapt to these new conditions, XIANG EN began promoting its products via social media platforms such as Facebook and Instagram, marking the beginning of its transition to online business.

Despite this transition, the company currently lacks a structured digital system to effectively manage its core business operations, including order management, internal communication, and inventory tracking. At present, all processes are handled manually, which often leads to inefficiencies, miscommunication between departments, and poor stock control.

This project proposes the development of a comprehensive and user-friendly digital system tailored specifically to the needs of XIANG EN Hamper Trading. The system aims to streamline order processing, automate communication between teams, and implement real-time inventory management. By doing so, it will support the company's ongoing digital transformation and significantly enhance operational performance.

Beyond benefiting the stakeholders of XIANG EN Hamper Trading, this initiative also serves as a valuable example of how SMEs can embrace digital solutions to modernize their business operations. It demonstrates a practical pathway for other small businesses to explore innovative technologies in order to stay competitive and resilient in a rapidly changing business environment.

2.0 Background Study

2.1 Organization Background

XIANG EN Hamper Trading is a small-to-medium enterprise (SME) based in Penang, Malaysia, specializing in the design, assembly, and sale of festive hampers, particularly for occasions such as Chinese New Year. The company was founded in 2008 by Ms. Crystal Ooi, an entrepreneur with a passion for creative and personalized gift packaging. Prior to establishing the business, Ms. Ooi spent two years learning and mastering the techniques of hamper packaging, with a focus on Chinese cultural aesthetics and customer preferences.

The business began as a humble operation from a stall located in Jelutong, Penang. Its emphasis on variety, customization, and presentation quickly earned the attention of the local community. By offering unique and thoughtfully arranged hampers, XIANG EN Hamper Trading built a reputation for high-quality, tailor-made festive gifts that catered to both individuals and corporate clients.

Over the years, the company expanded its customer base and established a loyal following due to its commitment to quality and customer satisfaction. However, like many other physical retailers, the company faced challenges during the COVID-19 pandemic, particularly during the Movement Control Order (MCO) period in Malaysia. With restrictions on physical business operations, XIANG EN Hamper Trading began transitioning to a digital business model to sustain its operations.

In response to these challenges, the company embraced online marketing and customer engagement strategies. It started promoting its products via popular social media platforms such as Facebook and Instagram. This shift allowed the company to maintain its presence in the market and reach a broader audience beyond its local customer base. The transition marked the beginning of the company’s evolution from a traditional retail model to a hybrid approach that incorporates both physical and digital sales channels.

Today, XIANG EN Hamper Trading continues to adapt to changing consumer behaviors by exploring digital tools to support its business operations. The company remains committed to offering high-quality, beautifully packaged hampers while actively seeking opportunities to enhance its internal processes through digital innovation as digital tools and systems, aiming to improve operational efficiency and support future growth.

2.2 Case Study

Currently, XIANG EN Hamper Trading operates using a manual and personalized approach to manage its daily business activities. Orders are primarily received through social media platforms such as Facebook and Instagram, where customers communicate directly with the company via private messages. Once an order is received, staff members manually record the customer's details and specific hamper requests using handwritten notes or simple digital tools like spreadsheets or messaging apps.

After the order is documented, the information is passed on to the production team through informal communication methods, such as phone calls, screenshots, or verbal instructions. The production team then prepares the hampers based on the provided instructions. If there are changes to the order such as customization requests or modifications to the hamper contents, the updated information is relayed manually, which may involve back-and-forth messaging between the customer service team and the production team.

In terms of stock management, XIANG EN Hamper Trading relies on annual stock-taking procedures to assess inventory levels. During peak seasons, especially in the lead-up to Chinese New Year, staff conduct physical counts of items stored in their inventory to determine availability. The stock data is then recorded manually, usually in notebooks or basic spreadsheets, which helps the team estimate purchasing needs for the upcoming festive season.

Although this operating model has served the company during its initial years and into its early stages of digital promotion, it is heavily dependent on human coordination and manual tracking. The approach reflects a traditional, hands-on business process that prioritizes direct customer interaction and personalized service, which has helped the company maintain a strong connection with its customers.

As the company continues to expand in the digital space, there is increasing potential to improve and modernize this operational workflow by introducing a more structured system that supports automation, real-time data access, and centralized communication. This will allow the business to preserve its customer-focused values while enhancing efficiency and scalability.

3.0 Problem Statement

XIANG EN Hamper Trading is currently facing several operational challenges following its transition from a traditional physical storefront to an online business model. The lack of a centralized and automated system has led to the following issues:

1. Inexperience in Managing Online Business Operations
   As the company is relatively new to the digital marketplace, it lacks the necessary tools and systems to effectively manage online transactions, customer interactions, and operational workflows. This inexperience has resulted in inefficiencies in day-to-day operations.

2. Manual and Time-Consuming Order Processing
   Orders are currently received through personal messages on social media platforms such as Facebook and Instagram. This method is not only time-consuming but also increases the risk of orders being missed or mishandled, especially during peak periods when the volume of customer inquiries is high.

3. Unstructured Workflow Between Sales and Production Teams
   The current process for handling order modifications is informal and lacks proper communication channels. When customers request changes to their orders (e.g., substituting items in a hamper), these updates are not always communicated promptly or accurately to the production team. This often results in errors in order fulfillment, such as incorrect product preparation or delivery of incomplete hampers.

4. Lack of Real-Time Inventory Management
   The company does not utilize a stock management system to track inventory levels. All stock-checking is performed manually, typically on an annual basis. This inefficient practice makes it difficult to monitor stock availability in real time, leading to frequent over-purchasing or understocking of essential items, ultimately affecting cost efficiency and customer satisfaction.

These challenges underscore the urgent need for a structured and digitized system that can streamline daily operations, facilitate clear and efficient internal communication, and significantly enhance the overall productivity and effectiveness of the business.

4.0 Feasibility study

a) Technical Feasibility

The technical feasibility of implementing and upgrading to a digital system for XIANG EN Hamper Trading involves assessing whether the proposed system can be successfully developed , integrated, and maintained given its current technical resources and potentially upgraded technical infrastructure .

First , the digital system will need computer hardware to support its core function.For hardware requirement,the digital device for office such as desktop and laptop must have a high RAM and SSD in order for smoother performance and faster data handling of the system. Besides , they also need high internet connectivity to prevent latency and for real time syncing with cloud services. A desktop or laptop with high RAM (at least 16Gb) and SSD (1TB) can be easily bought from a computer shop . High internet speed can be achieved by using fiber internet which can be obtained from TM Malaysia .

In terms of the computer software requirement needed for developing the system, first you will need a Database Management System (DBMS) which will be essential for organizing, storing, and managing critical business data such as customer orders, stock levels, product listings, and sales history. Given Xiang En Hamper Trading's current business scale as a growing SME, SQLITE and MYSQL are the two widely used open-source DBMS options that are technically feasible for the Xiang En Hamper Trading system.Judging from the study , it is technically feasible to implement a system designed for XIANG EN TRADING.

b) Operational feasibility

Operational feasibility examines whether the proposed system will function effectively in the company's day-to-day operations and whether the people involved are willing and able to adopt it. In the case of Xiang En Hamper Trading, the project is considered operationally feasible due to several key factors.

Firstly, the initiative to digitize operations and implement a more systematic order and inventory management system is strongly supported by top leadership. Ms. Crystal Ooi, the founder and managing director, has expressed full commitment to modernizing the business to improve efficiency, especially during peak festive seasons. Her proactive involvement

demonstrates high-level backing, which is critical for successful implementation and adoption.

Secondly, the company faces real and recurring operational challenges. The current manual process leads to delays in order processing, miscommunication between departments, difficulty in tracking inventory in real time, and inefficient handling of customer modifications and follow-ups.These issues highlight a strong operational need for a centralized system. The introduction of a centralized digital system would directly address these problems by automating key tasks, streamlining interdepartmental communication, and providing up-to-date inventory and order information. As a result, this would significantly reduce the workload of staff members. Given these improvements, the operational burden will decrease, and employees are likely to be willing and motivated to adapt to the new system, especially if it enhances their daily work processes and reduces stress. In conclusion, the proposed system is operationally feasible.

c) Economical feasibility

Economic feasibility assesses whether the proposed digital system for XIANG EN Hamper Trading is financially viable by evaluating costs, benefits, and return on investment. While the company may need to allocate funds for system development, hardware upgrades, and staff training, these upfront costs are likely to be offset by significant operational savings and efficiency gains. Automating order processing, streamlining internal communication, and enabling real-time inventory tracking will reduce manual errors, minimize stock wastage, and save time, especially during peak seasons.

Additionally, a structured digital system will enhance customer satisfaction by ensuring accurate and timely order fulfillment, which in turn can lead to increased sales and customer loyalty. The improved capacity to handle higher order volumes and expand the customer base through enhanced digital engagement also presents a strong potential for revenue growth. Furthermore, digitised business operations will strengthen the company’s competitive edge in the SME (small or medium enterprise) retail market and ensure its adaptability to future changes in consumer behavior. Overall, the return on investment from digital transformation is expected to be favorable, making the project economically feasible and beneficial for XIANG EN Hamper Trading.

5.0 Objective

The primary objective of the project is to help XIANG EN Hamper Trading design a proper system with compatible system architecture. This project focuses solely on the design phase, ensuring a smooth transition from a physical shop to an online shop business. The system is intended to reduce manual work, minimize human errors and improve overall business efficiency without requiring technical expertise from users. The project has been proposed to achieve the following objective:

1. Create a User-friendly Online System
   Design a system with built-in automation to help the company reduce the need for manual digital handling. The system also contains AI-powered chatbot specifically for ordering systems and provides structured access to all business activities.

2. Create a centralized Online Order Management Module
   Establish a website where customers order placement is handled and subsequently will be stored in a database. Admin can view, update and manage the orders through a dashboard to improve order handling efficiency.

3. Implement a Workflow Tracking Module
   Enable administrators to assign the order to the production team. The production staff can update the admin related to the production status using predefined labels such as “Pending”, “In Production”, “Completed”, and “Delivered”.

4. Design a Real-Time Inventory Management
   Create an inventory tracking system that manages the inventory levels in real time and record the restocking data as well as notifies administrators of low inventory quantity.

6.0 System Scope

The system will encompass the following core modules and functionalities:

1. Online Order Management Module

   In this module, customers can place orders via a standardized online form or official website. The incoming orders will be stored in a centralized database where the admin can easily access the database to track the number of orders each day. They can also view, update and manage the orders through a secure dashboard where any modifications made by customers will be clearly displayed in real time. On top of that, real time notifications are also sent to customers regarding order status updates as a confirmation. Eventually, it reduces manual order tracking and prevents any human error or missed messages.

2. Production Workflow Tracking Module

   Administrators can assign orders to the production team while allowing the production team to update the production status accordingly and directly through the system. Admin can view progress at the dashboard where labels such as “Pending” , “In Production”, “Complete” and “Delivered” are labeled for every order, allowing an effective progress monitoring.

3. Real-Time Inventory Management Module

   The system automatically updates the inventory levels as orders are placed via the admin dashboard. Low-stock alerts will pop-up at the dashboard to notify the admin to do restocking in time before stockouts. This module supports the addition, deletion and modification of products and quantities easily. Furthermore, purchase order records are also documented, detailing the items quantities , prices and specific transactions.

4. AI Chatbot Integration

   With the help of AI chatbot in ordering systems, the admin can have extra time to deal with other tasks rather than dealing with basic interaction. AI assistants can provide customer support by assisting the users in placing orders and answering frequently asked questions. Administrative burden and workload can be reduced since AI

assistants can work 24/7.

5. Administrative Interface

   A single admin interface is designed to allow the admin staff to view, filter and manage the orders without oversight. Moreover, the centralized platform can monitor the inventory level as well as the production workflows more efficiently and timeless.

7.0 Project Planning

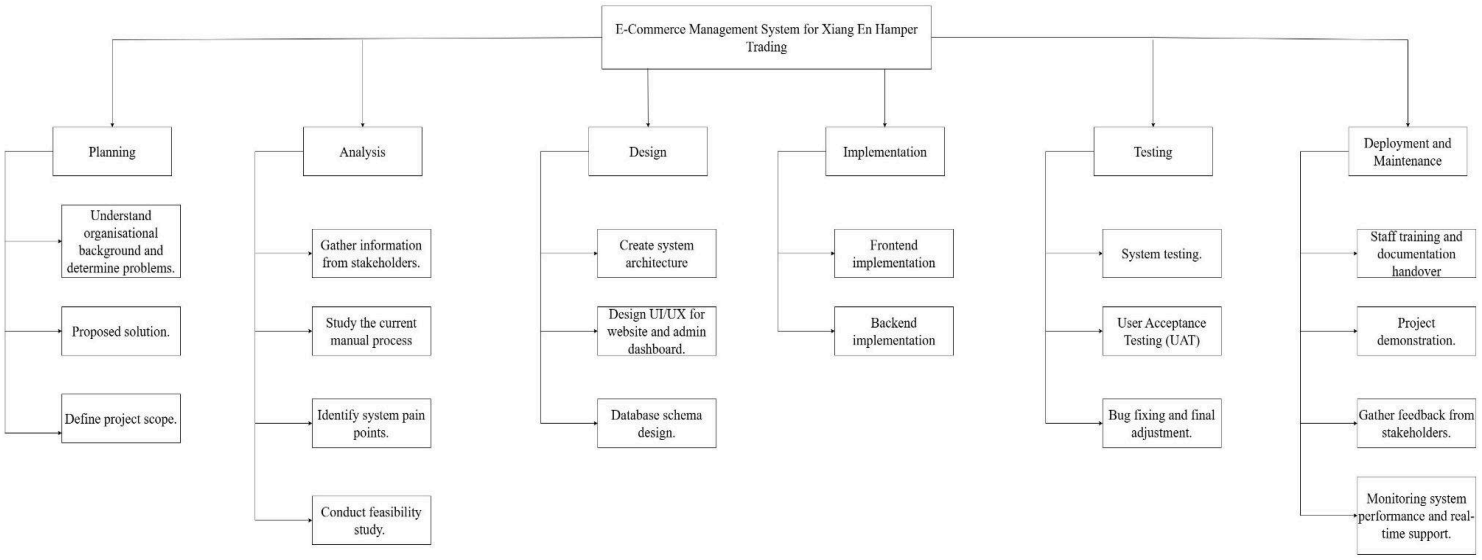
7.1 Human Resource

To ensure the successful planning, development, and delivery of the system for Xiang En Hamper Trading, the team needs to have several roles to maintain a smooth and productive workflow throughout the project lifecycle.

Role	Responsibilities
Project Manager & Planner	Oversees the whole project, schedules meetings, monitors deadlines, leads communication with clients, and prepares WBS, PERT, and Gantt charts.
System Analyst	Leads client interview sessions, gathers system requirements, defines problem statements, use case, and functional requirements.
UI/UX Designer	Designs user-friendly and responsive interfaces for both admin and customer views using figma.
Frontend Developer	Implements user interfaces using HTML, CSS, and JavaScript (or frameworks), connects with backend via APIs.
Backend Developer	Designs and manages database structure, develops server-side logic, and ensures data flow among modules like inventory, orders, and tracking.
Quality Assurance & Documentation	Conducts system testing, ensures bugs are reported, writes user manuals, and documents the development process.

All of our group members are equally responsible for keeping GitHub up to date, using GitHub Projects for task tracking, and ensuring consistent collaboration.

7.2 Work Breakdown Structure (WBS)



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Level 1: Web-Based E-Commerce Management System Development

Level 2: Project Phases

1.Planning

- Understand organisational background.
- Determine problem.
- Proposed solution.
- Define project scope.

2.Analysis

- Gather information from stakeholders.
- Study the current manual process.

- Identify system pain points.
- Conduct feasibility study.

3.Design

- Create system architecture (modules: order, inventory, production)
- Design UI/UX for website and admin dashboard.
- Database schema design.

4.Implementation

- Frontend implementation (customer order form, admin dashboard)
- Backend implementation (order tracking logic, inventory module)

5.Testing

- System Testing.
- User acceptance testing (UAT) with Xiang En staff.
- Bug fixing and final adjustments.

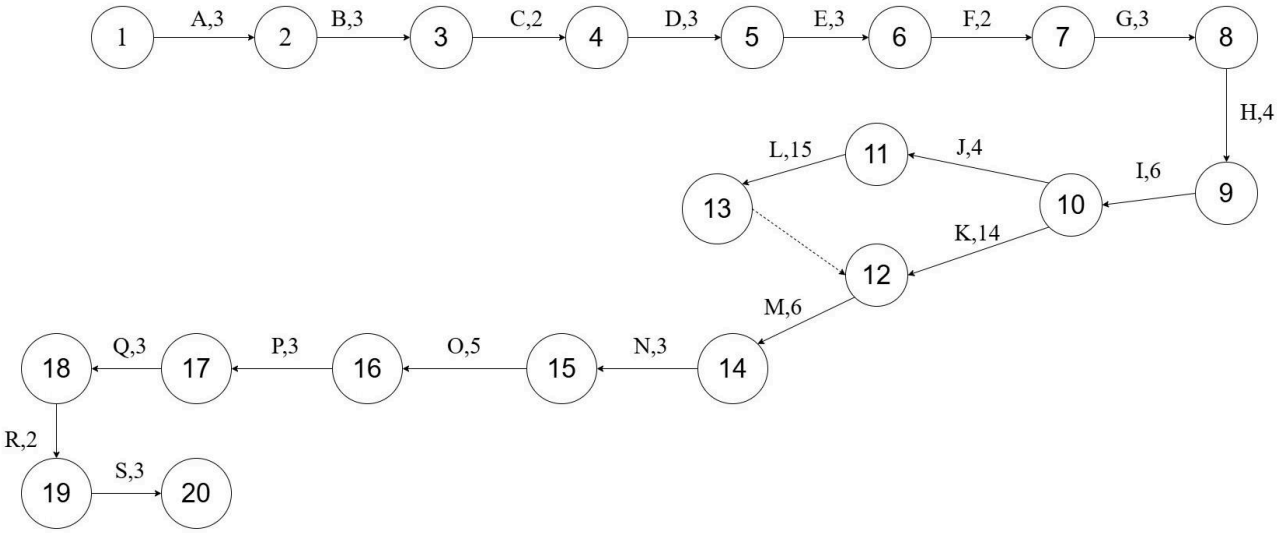
6.Deployment and maintenance

- Staff training and documentation handover (user guide)
- Project demonstration.
- Gather feedback from stakeholders.
- Monitoring system performance and real-time support.

7.3 Pert Chart

Activity	Description	Predecessor	Estimated Time (days)
A	Understand organisational background and determine problems.	None	3
B	Proposed solution.	A	3
C	Defined project scope.	B	2
D	Gather information from stakeholders.	C	3
E	Study the current manual process.	D	3
F	Identify system main points.	E	2
G	Conduct feasibility study.	F	3
H	Create system architecture. (order module, inventory module and production module)	G	4

I	Design UI/UX for website and admin dashboard.	H	6
J	Database schema design.	I	4
K	Front-end implementation.	I	14
L	Backend implementation	J	15
M	System testing.	K,L	6
N	User Acceptance Testing (UAT) with Xiang En staff.	M	3
O	Bug fixing and final adjustment.	N	5
P	Staff training and documentation handover.	O	3
Q	Project demonstration.	P	3
R	Gather feedback from stakeholders	Q	2
S	Monitoring system performance and real-time support.	R	3



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Note: All durations are in days

Path 1: A-B-C-D-E-F-G-H-I-J-L-M-N-O-P-Q-R-S

Length:3+3+2+3+3+2+3+4+6+4+15+6+3+5+3+3+2+3=73

Path 2: A-B-C-D-E-F-G-H-I-K-M-N-O-P-Q-R-S

Length:3+3+2+3+3+2+3+4+6+14+6+3+5+3+3+2+3=68

Path 1 is the critical path as it represents the longest duration in the network diagram.

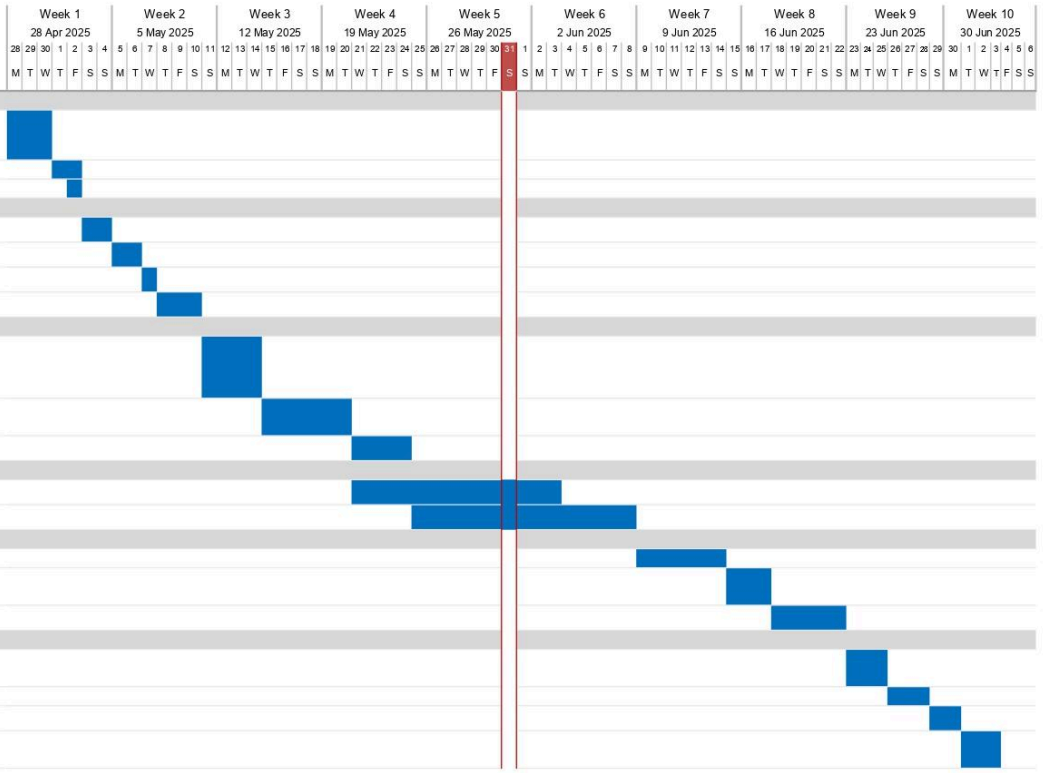
7.4 Gantt Chart

Hamper Ordering System Project Schedule - Gantt Chart

XIANG EN HAMPER TRADING

Project Start Date: 4/28/2025 (Monday) | Display Week: 1 | Project Lead: Group 3

WBS	TASK	LEAD	START	END	DAYS	% DONE	WORK DAYS
1	**Planning Phase**			-			-
1.1	Understand organisational background and determine problems		Mon 4/28/25	Wed 4/30/25	3	0%	3
1.2	Proposed solution		Thu 5/01/25	Fri 5/02/25	2	0%	2
1.3	Defined project scope		Fri 5/02/25	Fri 5/02/25	1	0%	1
2	**Analysis**			-			-
2.1	Gather information from stakeholders		Sat 5/03/25	Sun 5/04/25	2	0%	0
2.2	Study the current manual process		Mon 5/05/25	Tue 5/06/25	2	0%	2
2.3	Identify system main points		Wed 5/07/25	Wed 5/07/25	1	0%	1
2.4	Conduct feasibility study		Thu 5/08/25	Sat 5/10/25	3	0%	2
3	**Design**			-			-
3.1	Create system architecture. (order module, inventory module and production module)		Sun 5/11/25	Wed 5/14/25	4	0%	3
3.2	Design UI/UX for website and admin dashboard.		Thu 5/15/25	Tue 5/20/25	6	0%	4
3.3	Database schema design		Wed 5/21/25	Sat 5/24/25	4	0%	3
4	**Implementation**			-			-
4.1	Frontend Implementation		Wed 5/21/25	Tue 6/03/25	14	0%	10
4.2	Backend Implementation		Sun 5/25/25	Sun 6/08/25	15	0%	10
5	**Testing**			-			-
5.1	System Testing		Mon 6/09/25	Sat 6/14/25	6	0%	5
5.2	User Acceptance Testing (UAT) with XIANG EN staff		Sun 6/15/25	Tue 6/17/25	3	0%	2
5.3	Bug fixing and final adjustment		Wed 6/18/25	Sun 6/22/25	5	0%	3
6	**Deployment and Maintenance**			-			-
6.1	Staff training and documentation handover (user guide)		Mon 6/23/25	Wed 6/25/25	3	0%	3
6.2	Project demonstration		Thu 6/26/25	Sat 6/28/25	3	0%	2
6.3	Gather feedback from stakeholders		Sun 6/29/25	Mon 6/30/25	2	0%	1
6.4	Monitoring system performance and real-time support		Tue 7/01/25	Thu 7/03/25	3	0%	3



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8.0 Benefit and Overall Summary of Proposed System

In summary, the proposed digital system provides benefits to XIANG EN Hamper Trading, especially in enhancing operational efficiency, communication, and customer experience. The main benefits include improving order accuracy and efficiency by using automation order-taking processes through a centralized platform which reduces the risk of human error. Moreover, the system also provides up-to-date tracking of inventory, which helps in better stock control. This function also prevents the stocking issues such as overstocking and understocking, especially during peak seasons. Furthermore, the system allows for automated stock adjustments based on incoming orders.

Furthermore, the digital platform ensures customers receive immediate confirmation and regular updates regarding their orders. The incorporation of automated responses or AI chatbots provides 24/7 customer support which will help to improve user engagement and satisfaction. The centralized database enables seamless coordination between the sales, production, and delivery teams. This reduces reliance on manual updates, screenshots, and phone calls which help to minimize miscommunication and save time. The workflow tracking module also aids in information update which reduces information miscatching between the staff. All order histories, inventory data, and customer preferences are stored in a centralized location. These data sets can be used to generate reports and analyze trends, assisting management in making informed decisions regarding marketing, product offerings, and resource planning.

In conclusion, the proposed system provides a practical and strategic solution to the challenges currently faced by XIANG EN Hamper Trading. By transforming key business into digital functions, the system improves order management, inventory tracking, and customer service. It also increases internal efficiency and builds the foundation for sustainable business growth. The adoption of this system supports the company’s vision of embracing digital transformation while maintaining quality and customer satisfaction.