



**UTM**  
UNIVERSITI TEKNOLOGI MALAYSIA

**SCHOOL OF COMPUTING**  
**SESSION 2023/2024, SEMESTER 1**  
**SECV2113**  
**DATABASE**  
**SECTION 10**

**PHASE 2: DATABASE CONCEPTUAL DESIGN (ERD)**  
**GROUP: DATA NINJAS**

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## **1.0 Introduction**

A lot of UTM (Universiti Teknologi Malaysia) students engage in small businesses on campus, primarily for financial gain, project assignments or to occupy their leisure time. However, they encounter a significant challenge in terms of lacking a platform for promoting their businesses. What they already do is promote their businesses on WhatsApp or Telegram groups, requiring them to join multiple groups for broader outreach, which, in turn, consumes a considerable amount of time, effort, and mobile space.

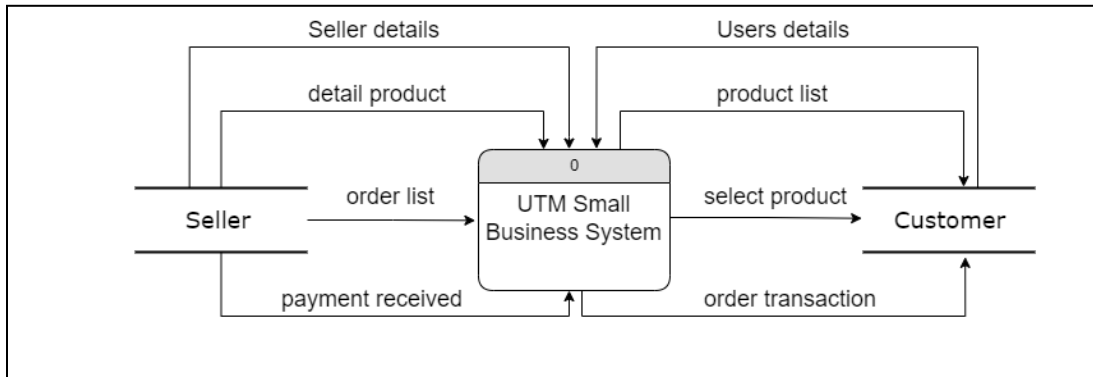
To overcome these challenges, we are going to build a platform for small business owners around UTM. All small business owners can use this platform solely to promote their businesses. This platform will encompass a wide range of features and functionalities, including e-commerce capabilities, marketing and customer engagement, and analytics and insights. People around the UTM will be able to participate in the platform to get to know what businesses are there and buy their products. This will make it easier for those students who do not have any transportation to go outside the university to buy the items needed.

This project is a collaborative effort that involves a dedicated team of developers, system analysts, and small business owners. We are committed to delivering a solution that is not only technologically advanced but also responsive to the real-world challenges faced by small business owners.

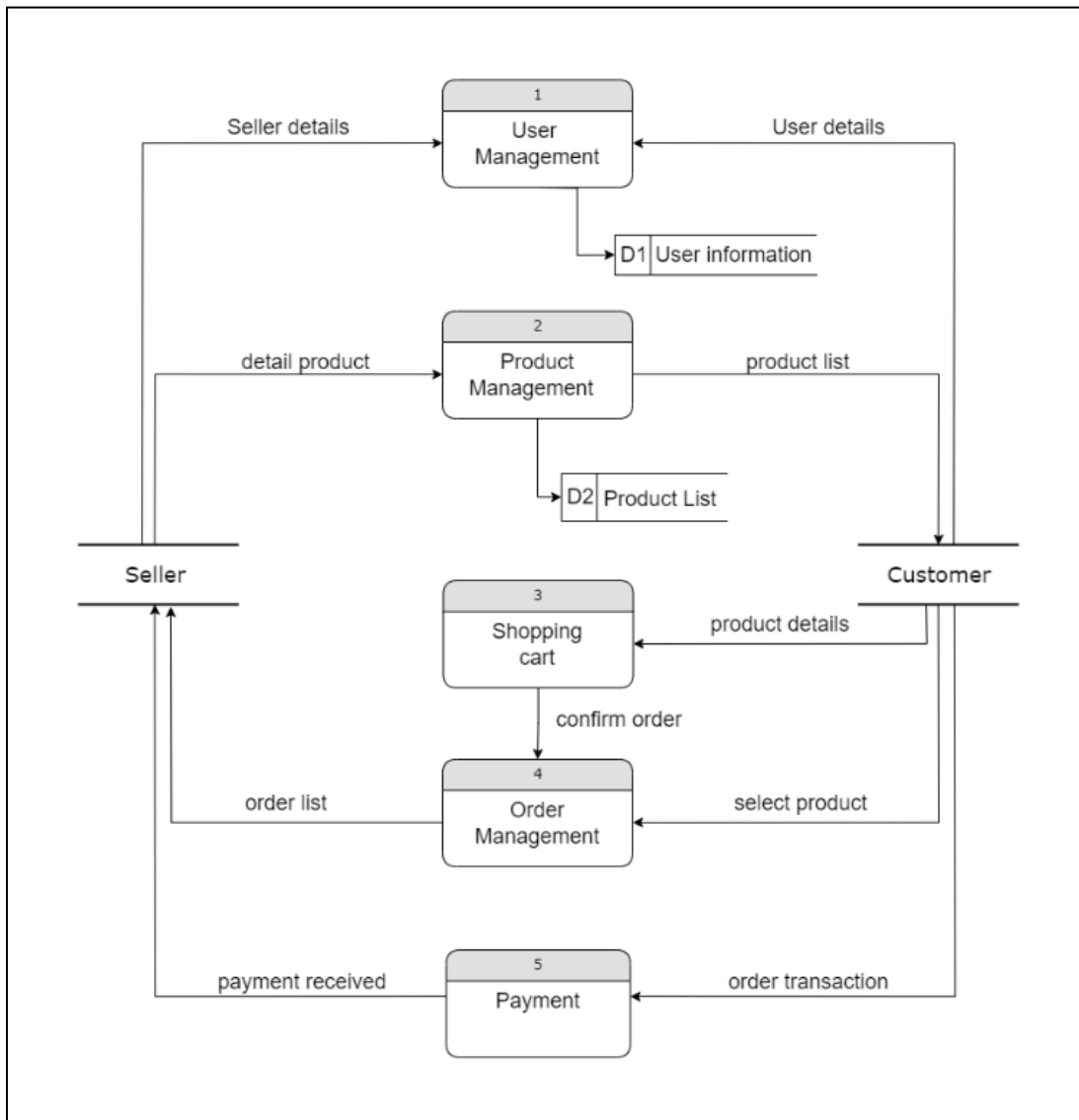
Through this platform, we are all about inspiring creativity and giving a helping hand to small business owners in UTM. We're dedicated to bringing a user-friendly platform that perfectly fits the needs of small business owners in the area.

## 2.0 DFD (to-be)

Context Diagram

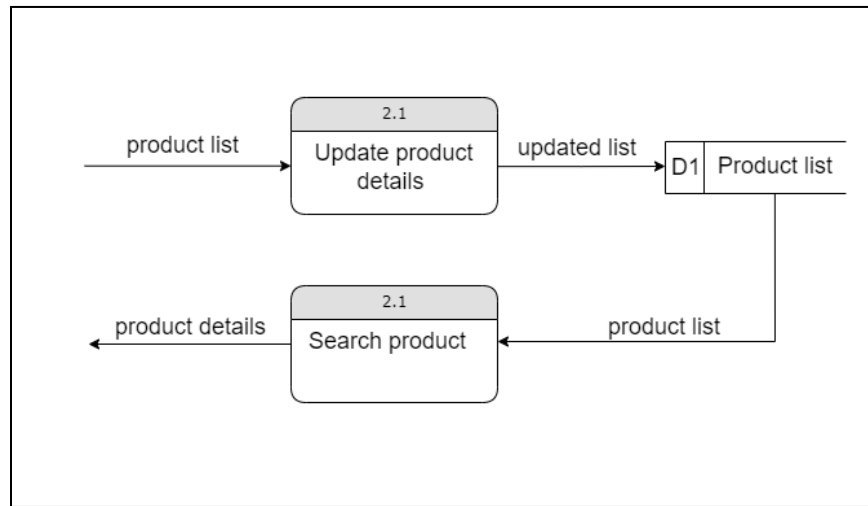


Level 0 Diagram

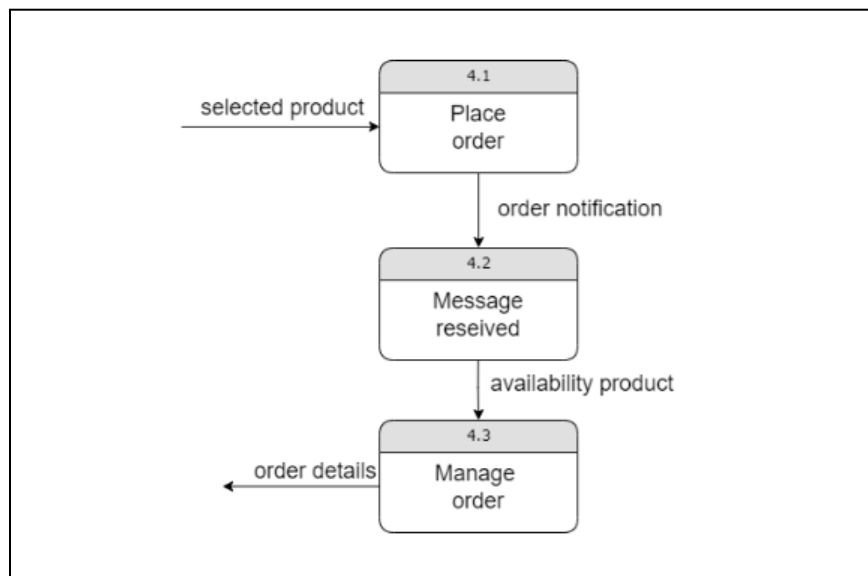


## Child diagram

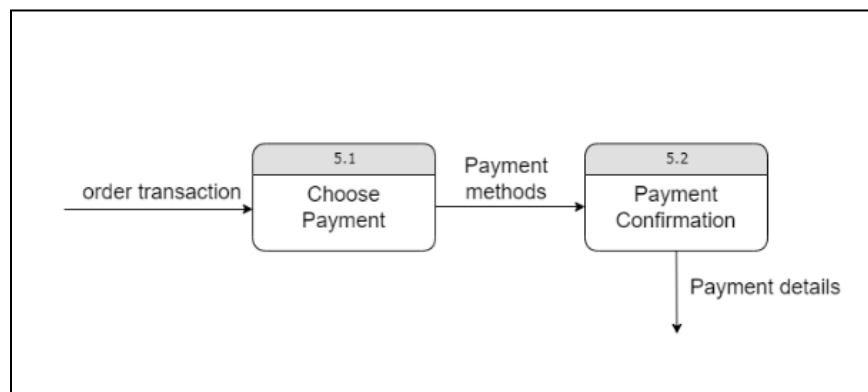
### Process 2.0



### Process 4.0



### Process 5.0



### **3.0 Data & Transaction Requirement**

#### **3.1 Proposed Business Rule**

UTM Small Business system:

1. The owner of a small business registers and fills out their profile.
2. A small business owner updates their listing with new goods or services.
3. Users peruse offerings and put goods in their shopping carts.
4. When placing an order, customers supply information about payment and adress.
5. Order alerts are sent to small business owners, who then get orders ready for delivery.
6. Owners of small businesses deliver orders and give clients access to tracking details.
7. Small business owners can get orders from their customers and receive feedback from them.

## **3.2 Proposed Data & Transactional**

### **Data Requirements**

#### **Business Owner**

A business owner refers to an individual who owns and manages small enterprises.

#### **Customer**

A customer refers to an individual who engages with small enterprises associated with ordering through e-commerce. Customers may include students, staff, or other individuals within the UTM community.

#### **Shopping Cart**

In an online shopping system, a shopping cart serves as a temporary storage area for selected products or services before the customer proceeds to complete the purchase. Customers can add or remove items from the shopping cart, view a summary of their selections, and proceed to the checkout for payment.

#### **User Management**

User management would involve the administration and control of users who engage with the platform. User management plays a pivotal role in our system by establishing distinct roles, including customers. Each role is associated with specific rights related to order management operations through meticulously defined user roles and permissions.

#### **Order Management**

Order management for the UTM Small Business Platform encompasses the end-to-end process of efficiently handling and overseeing customer orders placed by users on the platform. It involves various stages, from order placement to fulfillment, with the aim of ensuring a seamless and satisfactory experience for both small business owners and customers.

#### **Product Management**

Product management for the UTM Small Business Platform involves the systematic organization, presentation, and optimization of products or services offered by small business owners on the platform. It includes features that allow businesses to effectively showcase their offerings, manage product information, and enhance the overall visibility of their products to potential customers.

## **Checkout and Payment**

Checkout and payment functionality for the UTM Small Business Platform involve the seamless and secure process through which customers finalize their orders and make payments for products or services offered by small business owners on the platform. It includes features that ensure a smooth transaction experience, secure payment processing, and order confirmation.

### **Transaction requirement**

#### **Data Entry for Shopping Cart**

- 1) Enter the name of the item
- 2) Enter the quantity of an item
- 3) Enter customer details
- 4) Enter shipping address

#### **Data Entry for User Management**

- 1) Enter the user role (Customer, Admins, or Sellers)
- 2) Enter create a user account
- 3) Enter the user details (username, password)
- 4) Enter the send email verification link
- 5) Enter Activate user account

#### **Data Entry for Order Management**

- 1) Collect and save important details of each order
- 2) Track the status of each order
- 3) Store payment information
- 4) Record timestamps of each order

#### **Data Entry for Product Management**

- 1) Enter the product item.
- 2) Enter the description of the product.
- 3) Enter the price.

#### **Data Entry for Checkout and Payment**

- 1) Add a new product to the inventory, specifying details such as product name, description, price, quantity, and category.
- 2) Introduce a new customer to the system, providing information like customer name, email address, shipping address, and contact number.
- 3) Record a new order, including the customer ID, product ID, quantity, and transaction date.
- 4) Input a new discount or promotional code, specifying the code, discount amount or percentage, and validity period.



- 5) Add a new review for a product, including the customer ID, product ID, rating, and review text.

#### **Data Update/Deletion for Shopping Cart**

- 1) Update/delete the name of the item
- 2) Update/delete of item
- 3) Update/delete customer details
- 4) Update/delete the shipping address

#### **Data Update/Deletion for User Management**

- 1) Update/delete user role
- 2) Update/delete user account
- 3) Update/delete user information

#### **Data Update/Deletion for Order Management**

- 1) Update/delete order details
- 2) Update/delete status order
- 3) Update/delete payment details
- 4) Update/delete changes made to the order

#### **Data Update/Deletion for Product Management**

- 1) Update/Delete product item.
- 2) Update/Delete the description of the product.
- 3) Update/Delete price.

#### **Data Update/Deletion for Checkout and Payment**

- 1) Modify the details of an existing product in the inventory, allowing updates to price, quantity, or other relevant attributes.
- 2) Update customer information, enabling changes to contact details, shipping addresses, or other customer-related data.
- 3) Edit an existing order, allowing modifications to quantities, products, or customer details.
- 4) Remove a discount or promotional code from the system, specifying the code to be deleted.
- 5) Delete a customer review, providing the review ID for identification.

#### **Data Queries for Shopping Cart**

- 1) Identify the name of the item
- 2) List all the item's quantity
- 3) List customer details
- 4) List shipping address

### **Data Queries for User Management**

- 1) List the details of users in a given role.
- 2) Identify the total number of users in each role.
- 3) List the username, email, and role of users, ordered by username.
- 4) Identify the total number of active users and the sum of their roles.
- 5) Identify the total number of sellers with active accounts.
- 6) List the usernames and emails of users with inactive accounts.
- 7) Encrypt critical data, including payment information and user passwords.
- 8) Develop a solid backup and recovery strategy to avoid data loss in the event of an unintentional deletion or a system failure.
- 9) Keep user profiles with important details such as name, contact information, and address.

### **Data Queries for Order Management**

- 1) Identify customer information
- 2) List the order details
- 3) Identify payment details
- 4) Identify shipping information

### **Data Queries for Product Management**

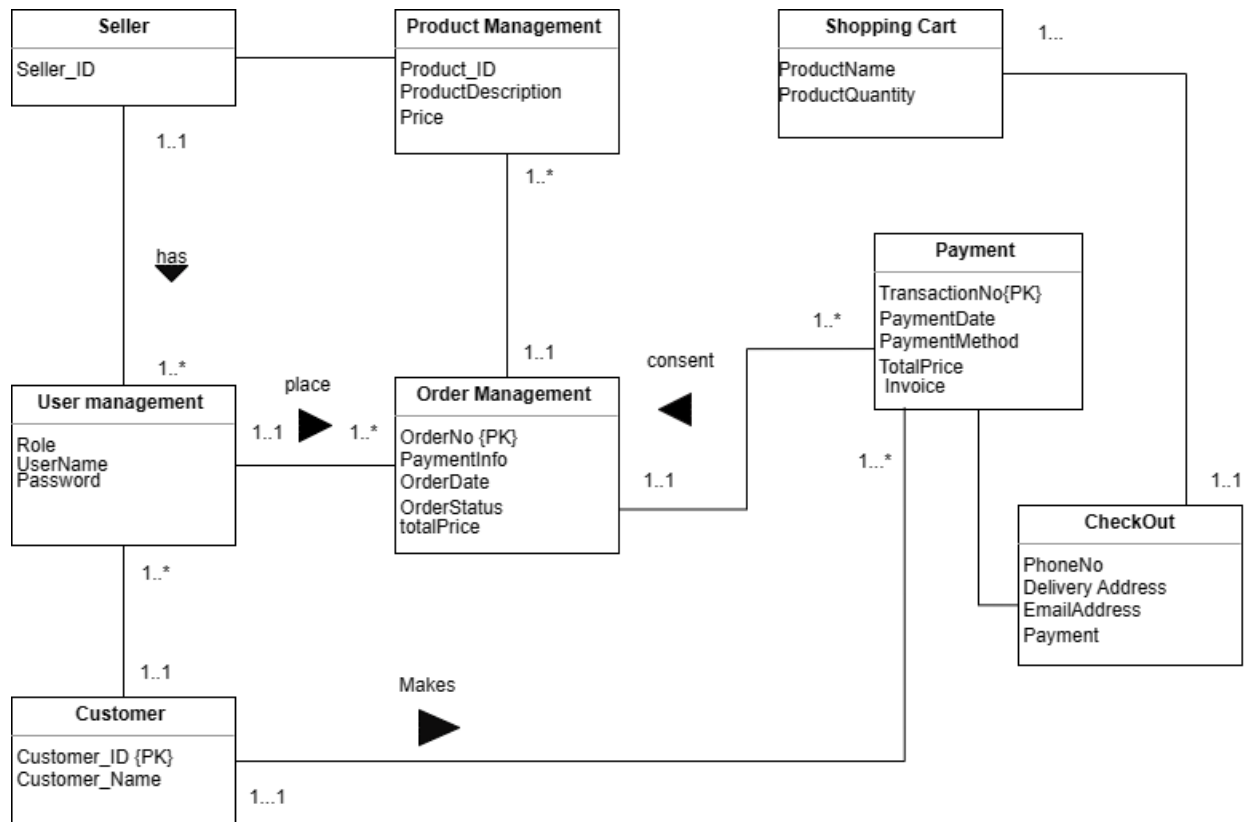
- 1) List details for all products.
- 2) Show all product categories.
- 3) List available products.
- 4) List details of the price of products.
- 5) List all sold-out products.
- 6) Provide statistics and insight for the product.

### **Data Queries for Checkout and Payment**

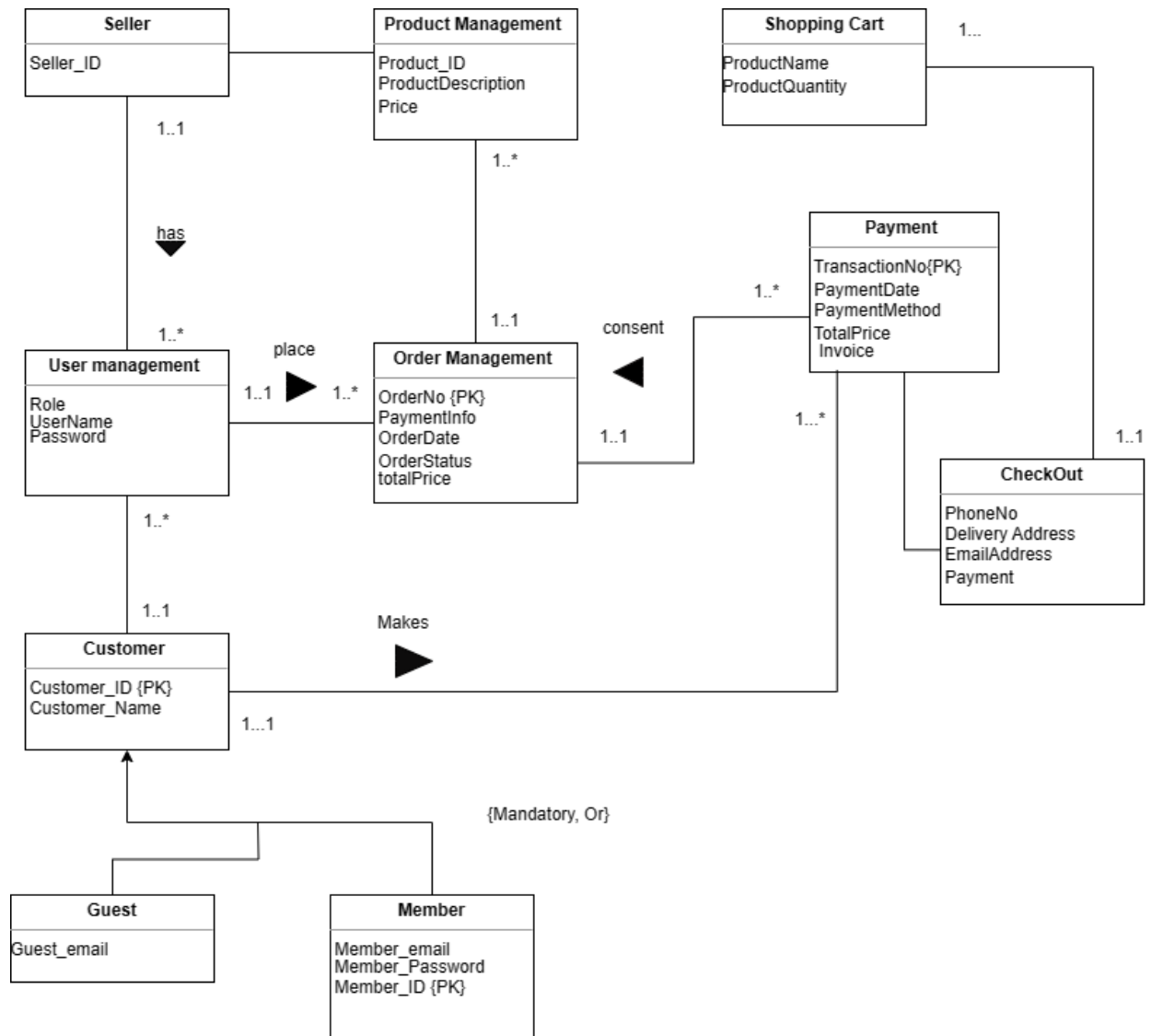
- 1) Retrieve a list of products in a specific category.
- 2) Identify the total number of products in each category.
- 3) List customer details, including name, email, and total amount spent, sorted by the total amount spent.
- 4) Identify the total number of customers and the sum of their purchase amounts.
- 5) List products with low stock levels or below a specified threshold.
- 6) Display customer reviews for a particular product, sorted by date.
- 7) Retrieve details of orders placed on a specific date or within a date range.
- 8) Identify the top-selling products based on the quantity sold.
- 9) List customers who have not made a purchase within a specified timeframe.
- 10) Retrieve the total revenue for a given period.
- 11) Display the most recent orders, including order ID, customer details, and order date.
- 12) Identify products that are frequently bought together.

## 4.0 Database Conceptual Design

### 4.1 Conceptual ERD



## 4.2 Enhanced EERD



## 5.0 Data dictionary

Entity Name	Attributes	Description	Data Type & Length	Nulls	Multivalued
User management	UserName {PK}	Uniquely identifies the name of the user.	VARCHAR(40)	NO	NO
	Password	Password of the user.	VARCHAR(15)	NO	NO
Seller	Seller_ID	Seller name.	VARCHAR(40)	NO	NO
Product Management	ProductID	Holds product names.	VARCHAR(40)	NO	NO
	Product Description	The description of the product.	VARCHAR(100)	NO	NO
	Price	Price of the product.	VARCHAR(10)	NO	NO
Order Management	OrderNo {PK}	Uniquely identifies the order number.	VARCHAR(15)	NO	NO
	PaymentInfo	Detail of the payment.	VARCHAR(15)	NO	NO
	OrderDate	Date of the order.	Date	NO	NO
	OrderStatus	Status of the order.	VARCHAR(15)	NO	NO
	totalPrice	Total price of the ordered item.	VARCHAR(10)	NO	NO
Shopping Cart	ProductName	Name of the product.	VARCHAR(40)	NO	NO
	ProductQuantity	Quantity of the product.	INTEGER	NO	YES

Payment	TransactionNO {PK}	Uniquely identifies the transaction number.	INTEGER	NO	NO
	PaymentDate	Date of the payment.	Date	YES	NO
	PaymentMethod	Method of payment.	VARCHAR(10)	NO	NO
	Invoice	written description for the payment	VARCHAR(10)	NO	NO
	TotalPrice	Total price of the ordered item.	INTEGER(6)	NO	NO
CheckOut	PhoneNO	Phone number.	INTEGER	NO	NO
	ShippingAddress	Address of the user.	VARCHAR(40)	NO	YES
	Payment	Status of the payment.	VARCHAR(15)	NO	YES
Customer	Customer_ID	An identification for the customer	INTEGER(10)	NO	NO
	Customer_Name	personal call name for the customer	VARCHAR(40)	NO	NO
Guest	Guest_Email	An active email address for the guest	VARCHAR(15)	NO	NO
Member	Member_email	An active member email address	VARCHAR(15)	NO	NO
	Member_Password	A password for the member account	VARCHAR(15)	NO	NO

	Member_ID {PK}	A unique Identification for the member	INTEGER(10)	NO	NO
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## 6.0 Summary

The project tackles a prevalent issue for Universiti Teknologi Malaysia (UTM) students who run small companies on campus: a lack of an effective platform for advertising their ventures. Students currently rely on fragmented contact via WhatsApp or Telegram groups, which they find time-consuming and inefficient. A collaborative team of developers, system analysts, and small business owners is working on developing a comprehensive platform for UTM's small business community to address this issue.

E-commerce features, marketing tools, consumer engagement options, and analytics will all be available on the platform. The website intends to streamline outreach activities by centralizing company promotion, saving students time and resources while offering a convenient marketplace for the UTM community. The project's goal is to encourage creativity, assist local businesses, and provide a user-friendly solution targeted to the specific needs of small business owners on the UTM campus.