Research Article

Smart Order Tracker: Enhancing Bakery Operations with VBA

Suhaila Bahrom[1,2]

[1] Universiti Malaysia Pahang Al-Sultan Abdullah; suhaila_b@iium.edu.my; 0009-0002-2172-9282

[2] International Islamic University Malaysia; suhaila_b@iium.edu.my; 0009-0002-2172-9282

Correspondence: suhaila_b@iium.edu.my; 0148405251.

Abstract: *This project introduces an innovative graphical user interface (GUI)-based order tracking system for home bakery owners, developed using VBA. The GUI simplifies the order process, enabling efficient input, management, and tracking of customer orders. Designed with user-friendliness, it allows users to enter order details and automatically update records quickly. The system ensures accurate record-keeping and streamlines order processing, significantly reducing manual errors and enhancing operational efficiency. By integrating this automated solution, users can manage orders, track sales trends, and improve customer service to drive business growth and sustainability.*

Keywords: VBA; efficiency; GUI.

1. INTRODUCTION

In a bakery's dynamic environment, where customer preferences and demands fluctuate daily, efficient order management is crucial. Traditional order tracking methods can be inefficient and error-prone, resulting in dissatisfied customers and missed sales. To address these challenges, a Smart Order Tracker using Visual Basic for Applications (VBA) can revolutionize bakery operations. This article discusses the creation, features, and benefits of using VBA to implement a Smart Order Tracker for bakeries.

Visual Basic for Applications (VBA) is an accessible and powerful tool for automating tasks within Microsoft Office applications, particularly Excel. Small business owners can use VBA to create customized solutions tailored to their needs without requiring extensive programming skills. The Smart Order Tracker leverages this capability to offer a cost-effective, customizable, and user-friendly system. This system allows bakery owners to manage orders more efficiently, minimize errors, and improve the overall customer experience, supporting business growth and sustainability (Tsai & Wardell, 2006a; Wang & Shen, 2014).

2. METHOD & MATERIAL

The smart order tracker was developed using VBA within Microsoft Excel, chosen for its accessibility and the familiarity many small business owners have with it. The system's development focused on creating a user-friendly graphical user interface (GUI) to facilitate seamless data entry and

order management. The GUI was designed to be intuitive, allowing users to quickly input order details, update existing records, and generate reports (Tsai & Wardell, 2006b). The order tracking system's backend is powered by an Excel worksheet that functions as a database, storing all relevant order information such as customer details, order items, quantities, prices, and delivery dates. VBA scripts automate the data entry, ensuring the information is accurately captured, validated, and stored, reducing human error risk.

Additionally, the VBA scripts incorporated various validation rules to ensure data integrity, such as mandatory fields, numeric-only entries for quantities and prices, and date validation for delivery timelines. To enhance usability, dropdown menus and form controls were implemented to streamline the selection of standard options like product categories, pickup time, and quantities to minimize manual input. The system also included automated error notifications and confirmation messages to guide users through the data entry process. The flowchart in Figure 1 illustrates the development process of the Smart Order Tracker.

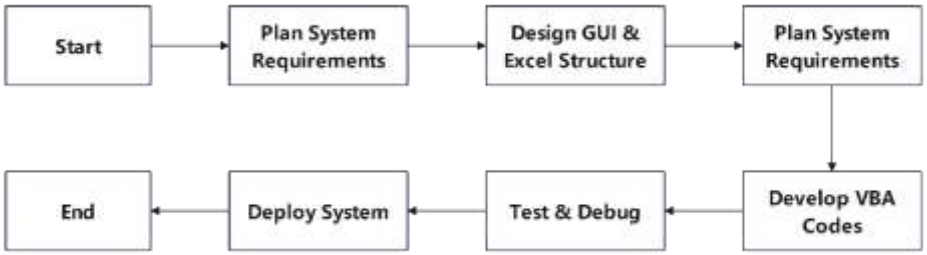

Figure 1. Smart Order Tracker Development Process

The flowchart depicts a systematic system development process using VBA and Excel. It begins with identifying and planning system requirements, which ensures a clear understanding of the project's objectives and user needs. The design phase then involves creating the graphical user interface (GUI) and structuring Excel to meet the system's functional and data flow requirements. After refining and confirming the system's needs, VBA code is developed to bring the system's logic to life. Once the development is complete, the system undergoes rigorous testing and debugging to ensure it functions as intended. Finally, after successful validation, the system is deployed for use, marking the completion of the process. Each step ensures that the development is aligned with user needs, system performance, and operational functionality. The interface of Smart Order Tracker is shown in Figure 2.

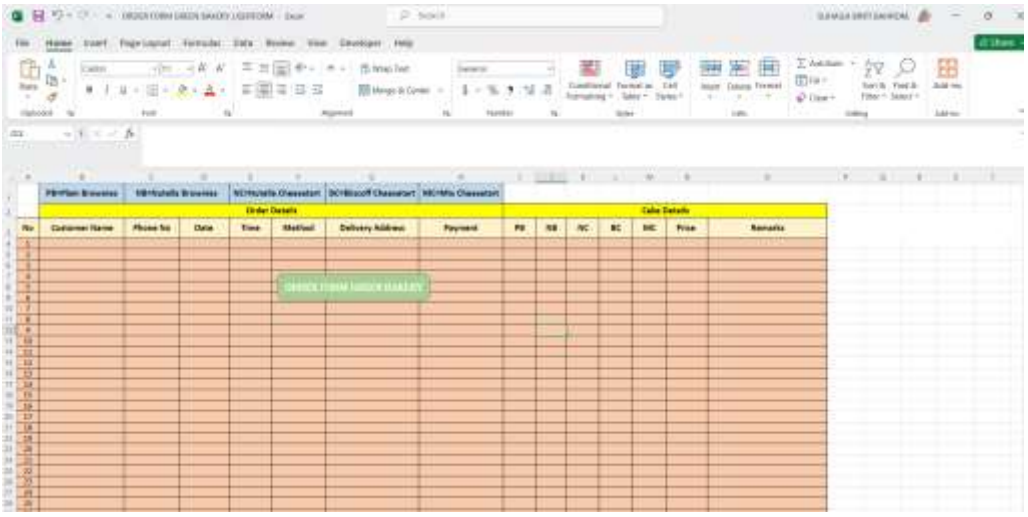

Figure 2. Smart Order Tracker Interface

The interface of the smart order tracker in Figure 2 is designed with flexibility in mind, allowing it to be customized to meet the specific needs of bakery owners. Bakery operations often involve handling varying order volumes, managing multiple product types, and tracking deadlines efficiently. As such, the graphical user interface (GUI) can be tailored to reflect these unique operational requirements. For example, the order management section may include customizable fields for tracking order status, delivery dates, and specific customer preferences. The product listing can be adjusted to accommodate a wide range of baked goods, with options for adding, removing, or modifying products as needed. This flexibility ensures that the Smart Order Tracker not only simplifies daily operations but also scales and adapts to the evolving needs of different bakery businesses, optimizing workflows and enhancing customer satisfaction. Figure 3 illustrates the smart order tracker userform, a user-friendly interface designed to streamline order management for bakery owners. The userform serves as the central hub where users can input, view, and track customer orders efficiently. It includes fields for capturing essential details such as customer names, order items, quantities, delivery dates, and payment status.

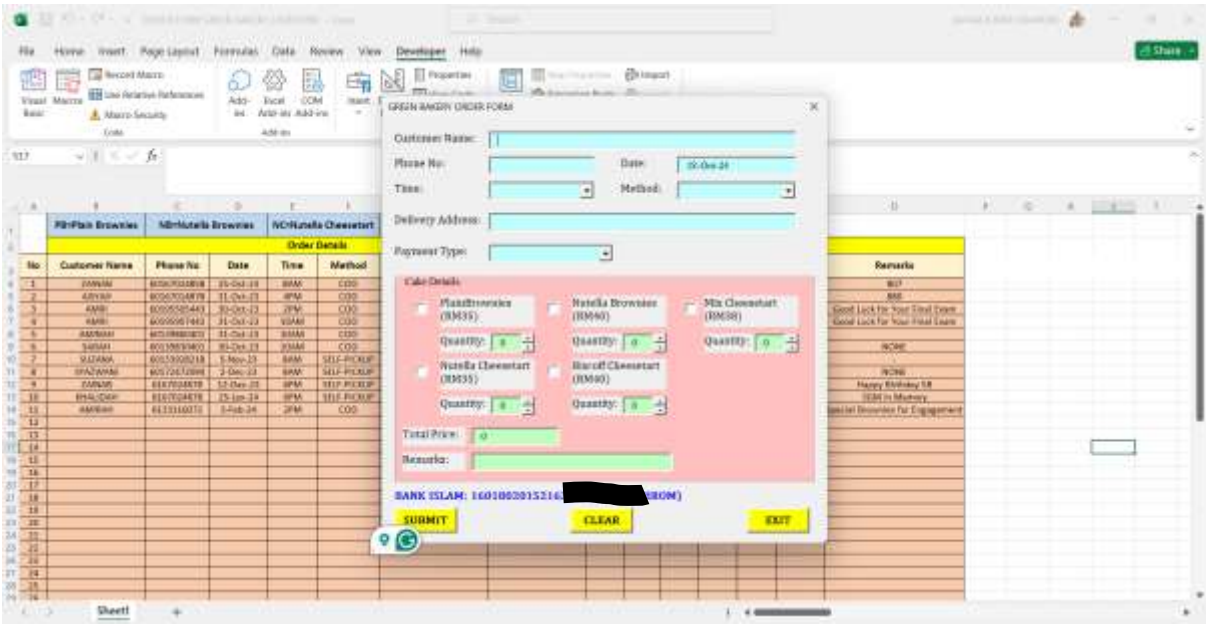

Figure 3. Smart Order Tracker UserForm

Figure 4 showcases the smart order tracker coding, which represents the underlying VBA code that powers the functionality of the smart order tracker. This code is responsible for automating various tasks such as order data entry, validation, and real-time updates within the userform. It handles complex processes like updating inventory, calculating totals, managing order statuses, and generating alerts for deadlines or low stock levels. The code also includes error-handling mechanisms to ensure that the system operates smoothly even if unexpected issues arise.

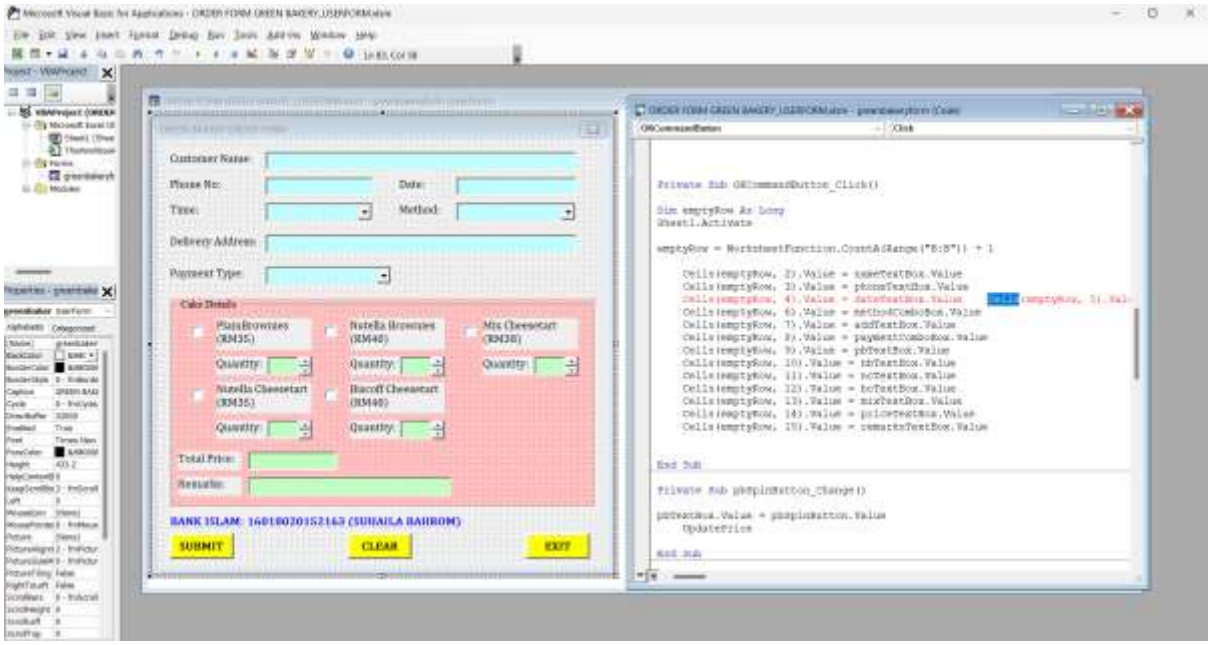

Figure 4. Smart Order Tracker Coding

4. DISCUSSION

Automating order entry and tracking significantly reduces the manual effort in managing orders, allowing bakery staff to focus on preparing and delivering high-quality products (Sipos & Sweeney, 2003). The Smart Order Tracker streamlines operations by providing a systematic approach to handling orders, which leads to faster processing times and minimizes the likelihood of errors. This increased efficiency enhances the workflow and ensures that resources are utilized optimally (Rohaeti et al., 2019). Accurate and timely order fulfilment is crucial for maintaining high customer satisfaction levels. The Smart Order Tracker ensures that customers receive their orders promptly and correctly, which helps build trust and reliability. By having a robust system to address issues quickly, bakeries can foster positive customer experiences and encourage repeat business, thereby enhancing customer loyalty and satisfaction.

5. CONCLUSION

The Smart Order Tracker is a powerful tool for small home-based bakeries looking to improve their order management processes. By leveraging the capabilities of VBA, the system provides an efficient, accurate, and user-friendly solution that enhances operational efficiency, reduces errors, and supports business growth. While the system offers significant benefits, future research could explore ways to address its limitations, such as integrating the system with online ordering platforms or developing mobile applications to expand its capabilities and accessibility further. Such advancements would help small bakeries stay competitive in an increasingly digital marketplace.

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