



Web-Based Product Printing Order Information System with Interactive Design Editor

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ABSTRACT

The rapid advancement of information technology has accelerated digitalization in the printing industry. CV. Mega Tama Prima faces challenges with its manual WhatsApp-based ordering process, leading to operational inefficiencies and miscommunication risks. This study designs a web-based ordering information system integrated with an interactive design editor, enabling customers to place orders and design printed products online while assisting administrators in organized order management. Development follows the waterfall methodology through requirement analysis, system design, implementation, blackbox testing, and maintenance stages. Results show the system significantly improves ordering efficiency, reduces communication errors, and broadens market reach for customers outside the local area. All core features including registration, login, design editor, and order management have been tested and function properly. The system successfully digitizes the ordering workflow and provides customers greater control in product design. Future development recommendations include expanding product range, incorporating automated notifications, enabling real-time order tracking, and enhancing customer-administrator communication.

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1. Introduction

The rapid advancement of information technology has brought significant changes to modern society, particularly in terms of service speed and efficiency, where people have become accustomed to the convenience offered by digital technology for shopping, communicating, and ordering products or services through handheld devices. The printing industry is no exception to this digital transformation, as it is also required to adapt to the digital era where customers now expect all ordering processes to be conducted from home with only devices and internet connectivity, rather than visiting printing shops directly as was previously required.

In today's digital era, information technology has become the backbone of business administration, including at the small and medium enterprise level, where business enterprises as service providers have the responsibility to provide accurate, fast, and easily accessible information to customers through web-based information systems. Web-based information systems represent a fundamental approach in information technology that

converts manual processes into digital form with specific system access, proving to be one of the most powerful tools for business growth by providing assurance that business operations remain efficient even when customer demand increases significantly.

The theoretical foundation of these systems lies in their ability to automate sensitive processes while maintaining data integrity and security, particularly in printing businesses where customer information, order details, design specifications, and payment records are confidential and must be processed systematically by authorized systems. This automation framework not only improves operational efficiency but also protects the confidentiality, integrity, and availability of business processes, which are essential components of modern information system security frameworks that ensure business credibility and sustainable operations.

Unfortunately, not all printing business operators are capable of following these digital transformation developments, as exemplified by CV. Mega Tama Prima, a printing company and office stationery retailer established in 2023, where the ordering process is still conducted manually through WhatsApp. This manual system requires every customer who wants to print invitations, business cards, or calendars to send their designs, discuss prices, and wait for responses from administrators one by one, creating a process that is increasingly inefficient as customer numbers grow or when dealing with clients from outside the city (Rinai & Said, 2021). This condition not only burdens staff work capacity but also limits the company's ability to serve more customers simultaneously.

Such manual ordering systems are highly vulnerable to various operational issues including data loss, miscommunication, order errors, and processing delays, which can result in important data such as customer orders, design files, and transaction records being easily lost or processed incorrectly, potentially causing significant losses in both operational efficiency and customer trust in the business system. (Handrianto & Sanjaya, 2020). This demonstrates that digital transformation is not merely about following technological trends, but is also an urgent necessity to maintain business operational sustainability.

To address these operational challenges, this research proposes the development of a Web-Based Product Ordering Information System with Interactive Design Editor as a comprehensive digital solution specifically designed for printing industry enterprises. This system addresses operational inefficiencies by providing automated order processing, real-time transaction reporting, inventory management, and customer relationship management features. Unlike previous research, the system developed in this study features an interactive design editor that can be used directly by customers. Customers can select from available design templates and modify design elements according to their personal preferences before submitting their orders. Additionally, administrators can add, edit, and delete design templates through a dedicated editor page, ensuring that the collection of templates can always be updated according to market needs. This system is superior because it not only automates the ordering process but also offers design customization services that were not available in previous systems. The interactive design editor allows customers to engage more in the design process, which can enhance customer satisfaction and loyalty towards the services offered by the printing company.

The web-based architecture ensures accessibility across various devices such as computers, tablets, and smartphones, allowing both customers and business owners to interact with the system anytime and anywhere, effectively transforming traditional

manual workflows into structured, automated, and reliable digital processes that maintain data security and operational integrity (Arafat et al., 2022). The proper selection of technology ensures that the system can be implemented at an affordable cost while still providing optimal performance for small to medium-scale business needs.

This research was specifically conducted on the information system of CV. Mega Tama Prima, which is beginning to adopt digital systems for order management and customer services, representing a company that has not previously implemented web-based technology in its order processing workflow, thus providing significant potential for operational improvement through proper digital integration. The main contributions of this research include designing and implementing a web-based ordering system with an interactive design editor specifically for printing businesses, evaluating the impact of system implementation on operational efficiency after digital integration, and providing a business digitization implementation model that can be replicated by other small and medium enterprises as part of the national business digitization program. By implementing this comprehensive system, the research aims not only to improve technical efficiency at CV. Mega Tama Prima but also to provide a practical example of technology implementation that can be adapted by other printing businesses, thereby supporting government-launched business digitization programs while encouraging broader awareness of the importance of operational efficiency in today's information age, ultimately contributing to the digital transformation of Indonesia's small and medium enterprise sector.

2. Method

In this research, the author chose the waterfall method as the development methodology for the CV. Mega Tama Prima print product ordering information system because this system has clear and well-defined requirements from the beginning with two main actors, namely customers and administrators, as well as relatively simple and linear business process flows. The system complexity with features such as design template editor, ordering system, and admin management does not require significant requirement changes during development, so the waterfall method approach can be applied effectively.

Data Collection Techniques

Data collection techniques are systematic methods for addressing a problem. This research will go through several stages. The stages used in this research are as follows:

1. **Direct Observation** Conducting direct observation at the object of discussion location, namely at CV. Mega Tama Prima located at Makmur Regency Jl. Makmur Block B18 to understand the location and problems occurring related to printed product ordering.
2. **Interview** This technique involves direct face-to-face meetings with the owner of CV. Mega Tama Prima to obtain explanations of previously unclear problems regarding product ordering and to ensure that the collected data is truly accurate. The following are the interview questions posed: a. What problems are related to printed product ordering at CV. Mega Tama Prima? b. What printed products

- are offered by CV. Mega Tama Prima? c. How does CV. Mega Tama Prima usually handle problems that occur? d. Is there already a printed product ordering website at CV. Mega Tama Prima?
3. **Data Sampling** Researching and selecting available data that is appropriate to the chosen field as supporting documents, namely printed product data.
 4. **Library Research** At this stage, the author cites several journals related to printing product ordering.

ANALYSIS AND DESIGN

Analysis of Current Running System

CV. Mega Tama Prima currently operates its business processes conventionally by relying on direct face-to-face interactions and communication through WhatsApp for consultation on printed product designs such as wedding invitations, calendars, and business cards. This manual approach is not aligned with technological developments and consumer expectations in the digital era, which expect ease of access, service speed, and transaction efficiency. The verbal communication system and manual order recording have the potential to cause miscommunication, loss of order information, difficulties in tracking production progress, customer data duplication, as well as obstacles in business analysis and reporting. This condition can limit market reach, increase the risk of order management errors, and negatively impact customer satisfaction and company reputation, thus requiring a web-based printed product ordering information system with an interactive design editor as a solution to improve operational efficiency and business growth.

Current Business Process Flow

To address the problems in the current running business process, a web-based printed product ordering information system with an interactive design editor is proposed, which has two user categories: customers and administrators with different access rights according to operational needs.

1. System Flow for Customers

Customers can access the system through the CV. Mega Tama Prima website by registering and logging in first, then selecting available printing templates (invitations, calendars, business cards) and making design modifications through the interactive editor as desired. After completing the design, customers can place orders through the provided form and receive order confirmation notifications, then access the order history page by entering their email address to view order status which can be "processed", "rejected", or "completed".

2. System Flow for Admin

Admin can log in to the dashboard that provides system management menus, access customer order data in structured table format to update order status, edit order schedules, and check transaction reports that include weekly, monthly, and annual data printing, detailed weekly reports, total transaction graphs, order status, revenue, and overall order data, as well as manage templates through the edit template menu that allows searching by name or category. Admin has full

access rights to add new templates through the design editor, edit existing templates, and delete irrelevant templates, so that the template collection can always be updated according to market needs and customer demand developments.

System Overview

The web-based printed product ordering information system with interactive design editor is a digital solution designed to overcome the limitations of CV. Mega Tama Prima's conventional business processes that still rely on face-to-face interactions and manual communication through WhatsApp. This system presents a digital transformation that enables customers to order printed products such as wedding invitations, calendars, and business cards online with the ease of access, service speed, and transaction efficiency expected by consumers in the digital era.

The system is designed with a two-level user architecture, namely customers and admin, where each has interfaces and functions tailored to specific operational needs. For customers, the system provides a complete shopping experience from registration, design template selection, product customization through interactive editor, to ordering and real-time order status tracking. Meanwhile, for admin, the system provides a comprehensive management dashboard to manage customer orders, update order status and schedules, analyze transaction reports in various formats (weekly, monthly, annual), and manage the available design template collection.

The main advantage of this system lies in the interactive design editor that allows customers to modify and customize templates as desired without requiring special design skills, an integrated reporting system to support business analysis and decision making, and automation of order recording and tracking processes that reduces the risk of miscommunication and data loss. With the implementation of this system, CV. Mega Tama Prima is expected to increase market reach, operational efficiency, customer satisfaction, and competitiveness in the digital printing industry.

Functional Requirements

Functional requirements include services available according to user needs. This system must be able to:

For Customer Users

1. Perform registration by filling out the required personal data form for identity validation
2. Login using data that has been registered during the registration stage
3. Display design templates on the website's main page to view various available template options
4. Select and edit templates using the interactive design editor according to customer preferences
5. Save design results to the user's device after completing customization
6. Fill out the order form with automatic validation to ensure completeness of order data

7. View order history by entering email address to check order status (processed, rejected, or completed)

For Admin Users

1. Perform privileged login with username and password validation that displays error messages if login data is incorrect
2. Manage customer order data: Admin can view, change order status, and edit order schedules according to production conditions
3. Manage design templates: Admin can add, design, search, edit, and delete templates, as well as categorize them based on printed product types
4. Process reports and provide features to print transaction reports (weekly/monthly/annual data, detailed reports, total transaction graphs, order status, revenue, and overall order data) according to the selected time period

Non-Functional Requirements

Non-functional system requirements include software and hardware:

1. Hardware with the following specifications:
 - a. Intel(R) Core(TM) i7-4500U CPU @ 1.80GHz 2.40 GHz
 - b. 8.00 GB RAM (7.87 GB usable)
 - c. 466 GB SSD Samsung SSD 870 EVO 500GB
 - d. Graphics Card NVIDIA GeForce 820M (980 MB), Intel(R) HD Graphics Family (113 MB)
 - e. Mouse
2. Software with the following specifications:
 - a. Operating System Windows 10 Pro
 - b. Appserv
 - c. Visual Studio Code
 - d. Microsoft Word
 - e. Mendeley
 - f. Web Browser

System Design

The development of a web-based print product ordering information system with an interactive design editor is carried out based on the systematic and sequential Waterfall methodology approach. In the system design phase, the focus is on processes that form the basis for overall application development to illustrate how the system will work in terms of data flow, user interface display, and database structure. The system is developed using web-based technology with HTML, CSS, JavaScript, and PHP programming languages, as well as MySQL as the database management system. To support responsive display, CSS media queries or Bootstrap framework are used, enabling access from various devices. The main feature of the system is an interactive design editor using JavaScript (Fabric.js library) that allows users to add design elements such as text, images, colors, and layouts directly through the browser. The system structure is designed by dividing the code into four main parts: user pages for product selection and ordering, design editor pages for composing product designs, admin pages for managing product and order data, and a database for

storing user data, products, transactions, and design files. With the waterfall approach, all stages are arranged sequentially and developed after the design phase is completed.

Database Design

In database design, a Conceptual Data Model (CDM) is created consisting of nine main tables covering ordering, template management, payment, user accounts, and production scheduling. The Physical Data Model (PDM) refines these relationships and includes detailed table structures, field types, and key constraints. The user interface consists of several functional pages where the login page verifies credentials and redirects to the dashboard upon success, the dashboard presents operational summaries such as order quantities, transaction volumes, template history, stock charts, and payments, while the Point of Sales page allows authorized users to process transactions by entering essential purchase details that are automatically calculated to generate final prices and discounts. History and management pages are available for various modules including orders, users, templates, customers, payments, and reports where each page contains standard CRUD functions (Create, Read, Update, Delete) supported by search capabilities and structured layouts.

The database structure consists of an orders table that serves as the main table storing basic information for each incoming order including customer identity (name, email, phone, address), payment method, payment date, total price, and order status with an id field as primary key using integer data type of 11 digits; an order status table to track status changes for each order throughout the production process by recording related order id, current status, and timestamp of status changes; a payment table storing specific financial transaction information related to each order by recording order id and payment amount received; an admin table storing credentials and access information for system administrative users including username and password for authentication; a templates table storing collections of ready-made designs available in the system with identification names, grouping categories, prices, template file locations, and related design files as the basis for interactive design editor features; a user_templates table storing templates that have been modified or created by users with a structure similar to templates but specific to customer creations or modifications using the design editor; an orders table as a comprehensive table storing complete details of each production order including customer information, technical specifications (paper type, quantity), payment method, payment proof, design files, and templates used as complete work orders; a customers table storing regular system user account information including name, username, and password for authentication that allows customers to log in, save designs, and track order history; and an order_schedule table for timeline and production schedule management that tracks each production stage by recording related order id, production stage status, start and completion dates for each stage, and additional notes important for workflow management and providing accurate completion time estimates to customers.

This database system is designed with strong relational relationships where the orders table relates to order status and payment through foreign keys, the orders table connects with order_schedule for production tracking, templates and user_templates

provide design options for orders ensuring data integrity and query efficiency in the print product ordering system operations.

System Implementation

This display represents the main page view of CV.Mega Tama Prima printing website. This display can be seen in the following figure 1:

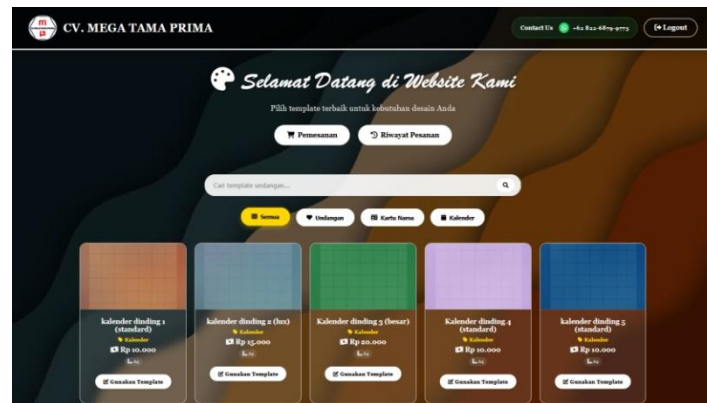


Figure 1. Main Page Display of Printing Website

This display represents the view where customers can redesign available templates into their desired templates. This display can be seen in the following figure 2:

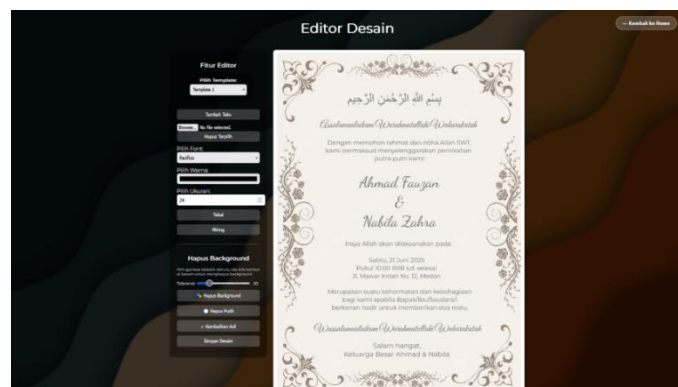


Figure 2. Template Design Editor Page Display

This display represents the view where customers can place orders by completely filling out the order form. This display can be seen in the following figure 3:

Figure 3. Customer Order Page Display

This display represents the view where customers can see their order history by entering their email according to the order data in the search feature, then the customer's order data will immediately appear in the order history table along with the order status. This display can be seen in the following figure 4:

No	Tanggal Pemesanan	Status	Detail	Aksi
1	2023-09-01 10:00	Selesai	2 undangan undangan digital	Detail
2	2023-09-01 10:00	Selesai	2 undangan undangan digital	Detail
3	2023-09-01 10:00	Selesai	2 undangan undangan digital	Detail
4	2023-09-01 10:00	Selesai	2 undangan undangan digital	Detail
5	2023-09-01 10:00	Selesai	2 undangan undangan digital	Detail
6	2023-09-01 10:00	Selesai	2 undangan undangan digital	Detail
7	2023-09-01 10:00	Selesai	2 undangan undangan digital	Detail
8	2023-09-01 10:00	Selesai	2 undangan undangan digital	Detail
9	2023-09-01 10:00	Selesai	2 undangan undangan digital	Detail
10	2023-09-01 10:00	Selesai	2 undangan undangan digital	Detail

Figure 4. Customer Order History Page Display

This display represents the template edit view, on this page admin can update new templates by filling out the available template form. On this page also, admin can perform searches according to template name, and can determine according to template category (invitation, business card, calendar). For available templates, admin can also delete templates and edit templates, when wanting to edit templates admin will be provided with a template edit form. This display can be seen in figure 5:

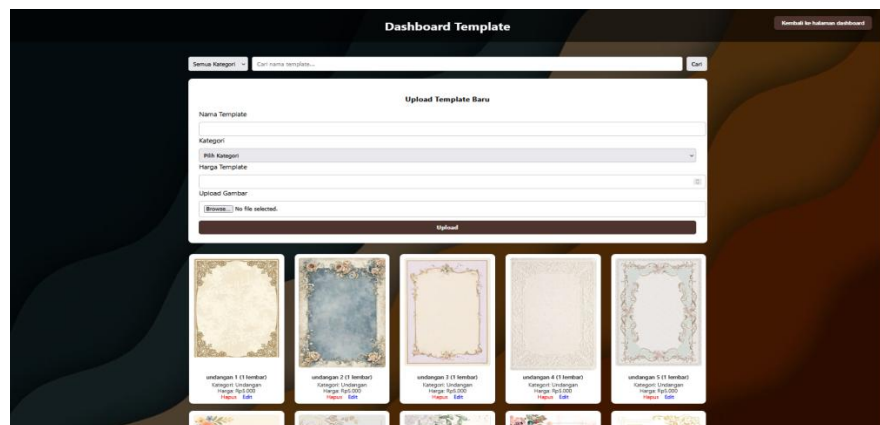


Figure 5. Template Edit Page Display

Test Scenario

In terms of system testing, the black-box testing method is used to ensure each functional component performs as intended. The scenarios tested include website homepage functionality that verifies loading and basic navigation, customer registration that validates form input and new account registration process, customer login that ensures credential authentication and redirection to appropriate dashboard, inter-page navigation that checks menu consistency and navigation links, customer session management that verifies login and logout session handling, website main page that tests content rendering and interface responsiveness, design editor page that validates editing tools, image upload, and template manipulation, order form that ensures order data input, price calculation, and required field validation, order history that checks historical data display and search filters, admin login that verifies administrative access and system security, admin dashboard that tests summary data display and control panel navigation, order management that validates CRUD operations for order management, template management that ensures upload, edit, and delete template functions work optimally, popular template recommendations that check sorting algorithms and trending template display, admin template upload that verifies file upload process and template metadata, admin design editor that tests advanced editing tools for system template modification, and template data update that ensures synchronization of template changes to the database. This structured testing approach helps validate the overall system reliability and usability before deployment.

Test Results

The test results show that the system has been successfully built using the waterfall method, MySQL, and XAMPP with the capability to display print product catalogs such as invitations, business cards, and calendars that allow customers to access and place orders through the website easily. The implemented framework functions optimally with the interactive design editor feature successfully created where admin can design templates that can be saved and accessed by customers, while customers can select available templates then edit designs using drag-and-drop features without requiring special design skills, thus facilitating design creation according to their wishes. Inter-data connections run smoothly and successfully reduce communication errors that often occur in manual ordering processes through WhatsApp with systematic data storage in the database that minimizes the risk of file loss and miscommunication. The website is easy to use with faster and more

practical ordering processes as customers do not need to come to the printing shop with all processes being able to be done online, plus the barcode scan payment feature that facilitates transactions. Search and filter features work well while admin gains convenience in managing business through a dashboard that enables order data management, templates, and sales reports to be easier and more organized with order monitoring and product arrangement anytime. The admin login security system works well with customer authentication features perfectly integrated in the registration and login system, popular template recommendations function optimally, admin template upload workflow is efficient through integration of upload forms with admin design editor that facilitates template management, and real-time synchronization is successful where new templates created by admin are immediately available to customers, and blackbox testing proves that all system functions from homepage, main page, design editor, ordering, to admin dashboard can function according to expectations.

4. Conclusions

This study successfully developed a web-based printed products ordering information system with an interactive design editor for CV. Mega Tama Prima using waterfall methodology with MySQL and XAMPP technologies. The system has proven to function well in displaying printed product catalogs (invitations, business cards, calendars) and providing drag-and-drop design editor features that enable customers to edit templates without special design skills. Blackbox testing results show all system features function as expected, successfully reducing communication errors that frequently occurred in manual ordering processes through WhatsApp, accelerating online ordering processes, and providing convenience for administrators in managing order data, templates, and sales reports through an organized dashboard. For future research, it is recommended to add more types of printing products such as brochures, posters, stickers, and merchandise, implement automatic notification systems via email or SMS, develop real-time order tracking, create inventory management systems to check raw material availability, conduct user satisfaction studies, develop mobile applications, strengthen data security, and integrate various digital payment methods to enhance system functionality and accessibility.

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