E-Business Website Design Using SWOT and PIECES Analysis at Planet Book Store

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Submitted: April 30, 2025; Accepted: April 10, 2026

Abstract

Planet Book Store is a bookstore in Yogyakarta that sells textbooks and fiction and nonfiction books, but it faces increasing competition from other bookstores and online platforms, and its book collection can only be viewed on social media and search engines. This study aims to design an e-business website for Planet Book Store using a combination of SWOT and PIECES analyses. The research was conducted in several stages: problem identification, literature review, data collection, SWOT analysis of internal and external factors, formulation of SO, ST, WO, and WT strategies, PIECES analysis comparing the old and new systems, definition of system requirements, and website design and implementation. The SWOT analysis identified five strengths, three weaknesses, four opportunities, and five threats, which produced strategies such as selling and renting e-books, offering loyalty programs, focusing on specific market segments, and reducing dependence on physical sales and single distributors. The PIECES analysis showed that the old, largely manual system was slow, provided limited information, increased customer costs, was prone to recording errors, and resulted in less optimal service. Based on these findings, a website was developed with registration and login, a book catalog with price filters, a shopping cart, checkout, and contact features. The study concludes that combining SWOT and PIECES provides a systematic basis for translating business strategies and system weaknesses into concrete website features that can expand the store's reach, make book information more complete and accessible, and improve the efficiency of the ordering process.

Keywords: *e-business, website, SWOT analysis, PIECES analysis, Planet Book Store*

1. Introduction

Information technology (IT) is increasingly used by entrepreneurs to increase income and develop their businesses. One of its main applications is e-business, which can be defined as the use of information and communication technology by individuals, groups, or organizations to implement and manage business processes [1]. E-business offers flexibility, integration, efficiency, and the opportunity to increase sales and profits, and it enables businesses to communicate with customers and distribute products and services electronically [2]. In practice, e-business emphasizes the online selling and purchasing of products through websites that connect customers, business owners, and system owners, as seen on platforms such as Bukalapak, Shopee, Blibli, and Amazon [3]. Online shopping has also become part of consumers' everyday behavior, which encourages businesses to provide digital sales channels [4].

Sales play an important role for every company because they convert products into income, and the success of sales efforts can be seen from the resulting sales volume and profit [5]. One company engaged in the book sector is Planet Book Store, a bookstore in Yogyakarta. The success of Planet Book Store in increasing its sales depends strongly on its marketing strategy, because a good marketing strategy influences customers' purchasing decisions [6].

In determining its strategy, a company needs to consider both the internal and external factors that affect its survival. Internally, the company must understand its strengths and weaknesses; externally, it must identify the opportunities and threats it faces, so that it can adapt to its environment and achieve its goals [7]. Planet Book Store faces very tight competition from other bookstores in Yogyakarta and from online bookstores. Therefore, a study is needed to determine

a competitive marketing strategy and an appropriate information system so that the number of customers can continue to increase.

Several previous studies have combined strategic analysis with information system analysis when designing e-business websites for small and medium-sized enterprises. SWOT, PIECES, and PESTEL have been used to develop e-business for a home industry [8], e-business websites have been designed for a batik micro-enterprise [9] and a digital wedding invitation business [10], and web-based information systems have been developed to improve customer service in a tea business [11] and a laundry business [12]. SWOT analysis has also been applied to bookstores [6] and to website-based marketing information systems [13], [14], while the PIECES framework is widely used to analyze system requirements and service quality [15], [16], [17]. However, studies that integrate SWOT strategies with PIECES analysis to derive the features of an e-business website for a bookstore are still limited.

This study therefore aims to design an e-business website for Planet Book Store by combining SWOT analysis, which is used to formulate business strategies, with PIECES analysis, which is used to identify the weaknesses of the current system and the improvements required. The resulting website is intended not only to market products but also to introduce Planet Book Store more widely and to help the administrator manage incoming orders.

2. Theoretical Basis

2.1 E-Business

E-business is a business process that utilizes information systems and electronic technologies, such as computers and the internet, to conduct business activities [1]. Through e-business, companies can connect and access internal and external data more flexibly and efficiently, build closer relationships with suppliers and business partners, and better meet customer needs and expectations [2]. E-business covers the entire chain of business processes, including electronic purchasing, order handling, customer support, and collaboration with business partners. A typical example is online shopping, in which ordering, payment confirmation, and delivery confirmation are all carried out electronically [9], [10].

2.2 Website

A website is a collection of related web pages under one domain that contain information in the form of text, images, video, or other files. A website is hosted on a web server and can be accessed through the internet or a local area network using a URL. Today, websites can be developed not only through programming but also by using content management systems (CMS) and website builders, which provide templates and plugins that allow users to adjust the appearance and functionality of a site to their needs [18]. For e-commerce, the usability of the website, including how easily users can navigate the catalog and find books, strongly affects the user experience [3].

2.3 SWOT Analysis

SWOT analysis is a method for describing conditions and evaluating a problem, project, or business concept based on internal factors (strengths and weaknesses) and external factors (opportunities and threats) [7]. Strengths are positive internal conditions that provide advantages; weaknesses are limitations in resources, skills, or capabilities that hinder performance; opportunities are favorable external situations; and threats are external factors that can disrupt the organization’s desired position. SWOT provides a structured approach for evaluating a company’s internal and external environment and supports informed decision-making [7], [5]. By matching internal and external factors, SWOT produces four types of strategies: SO (using strengths to seize opportunities), ST (using strengths to overcome threats), WO (overcoming weaknesses by exploiting opportunities), and WT (minimizing weaknesses and avoiding threats) [6], [13].

2.4 PIECES Analysis

PIECES is a framework for analyzing an information system from six aspects: Performance, Information, Economy, Control, Efficiency, and Service. Each aspect is used to identify the problems of the current system and to determine the improvements expected from the new system [16]. The framework is widely used to analyze system requirements and to evaluate user satisfaction with information systems and e-commerce applications [15], [17], and it has been combined with SWOT in e-business development for small enterprises [8].

3. Research Method

This study uses a descriptive qualitative approach combined with system design. The research stages are shown in Figure 1.

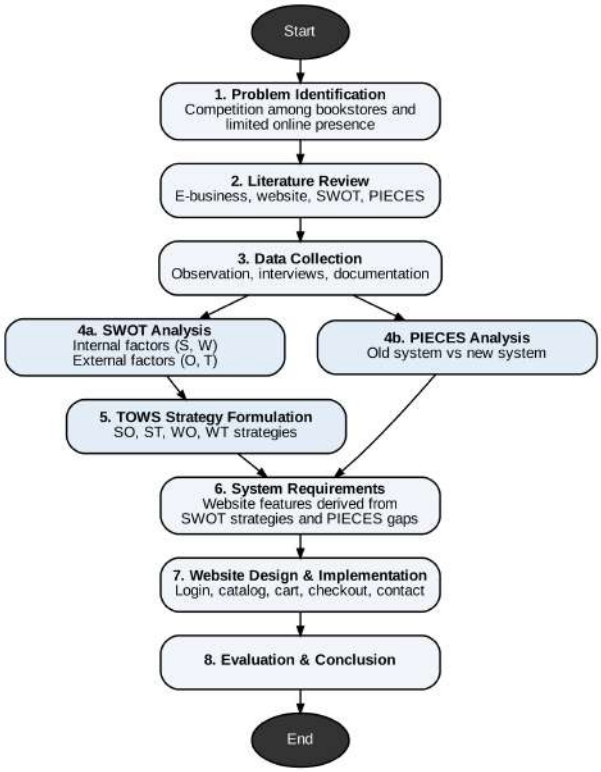


Figure 1. Research Method

The stages in Figure 1 are explained as follows:

1. **Problem identification.** The problems faced by Planet Book Store were identified, namely tight competition with other bookstores and online platforms and the limited availability of information about the book collection, which could only be accessed through social media and search engines.
2. **Literature review.** Theories and previous studies on e-business, websites, SWOT analysis, and PIECES analysis were reviewed to form the theoretical basis of the study.
3. **Data collection.** Data on the store's business processes, products, customers, and competitors were collected through observation, interviews with the store owner and staff, and documentation.
4. **SWOT and PIECES analysis.** The collected data were analyzed in two parallel streams. The SWOT analysis identified the store's internal factors (strengths and weaknesses) and external factors (opportunities and threats). The PIECES analysis compared the old system and the proposed new system in terms of performance, information, economy, control, efficiency, and service.

5. **TOWS strategy formulation.** The internal and external factors were matched to formulate SO, ST, WO, and WT strategies.
6. **System requirements.** The strategies from the SWOT analysis and the gaps identified in the PIECES analysis were translated into the functional requirements of the e-business website.
7. **Website design and implementation.** The website was designed and implemented with features for registration and login, a book catalog, a shopping cart, checkout, and contact information.
8. **Evaluation and conclusion.** The implemented website was reviewed against the formulated strategies and requirements, and conclusions and recommendations were drawn.

4. Results and Discussion

4.1 SWOT Analysis

The internal factors (strengths and weaknesses) and external factors (opportunities and threats) of Planet Book Store identified in this study are presented in Table 1 and Table 2.

Table 1. Internal Factors of Planet Book Store

Code	Internal Factor
S1	Provides a variety of books and genres that can satisfy different buyer interests.
S2	Offers competitive prices and special offers to attract customers.
S3	Provides responsive and helpful customer service to answer buyers' questions and resolve issues.
S4	Focuses on particular market segments, such as rare books, children's books, or textbooks, to create a competitive advantage.
S5	Has a fair and easy-to-understand return policy that increases customer confidence.
W1	Dependence on physical book sales.
W2	Limited store space to display all types of books.
W3	Dependence on book distributors for book supplies.

Table 2. External Factors of Planet Book Store

Code	External Factor
O1	Selling or renting e-books of various genres, from fiction to textbooks.
O2	Becoming a self-publisher to help independent authors publish books in physical or digital formats.
O3	Selling digital textbooks to schools and colleges.
O4	Loyalty programs that offer rewards or discounts to increase customer retention and encourage repeat purchases.
T1	Competition from online bookstores and e-book platforms.
T2	Market instability.
T3	Changes in trends and in people's reading interests.
T4	Changes in government policy.
T5	Changes in the publishing industry, including book prices and distribution methods.

Matching the internal and external factors produces the SO, ST, WO, and WT strategies shown in Table 3. The code in brackets indicates the combination of factors on which each strategy is based.

Table 3. SWOT (TOWS) Strategy Matrix

Type	Strategy
SO	1. Use the diverse book collection to sell or rent e-books and digital textbooks, develop loyalty programs, and act as a self-publisher for independent authors (S1-O1, S1-O2, S1-O3, S1-O4). 2. Combine competitive prices and special offers with loyalty programs and e-book sales or rentals to increase customer retention (S2-O4, S2-O1, S2-O3). 3. Focus on specific segments, such as textbooks, to increase sales of digital textbooks for schools and colleges, supported by a loyalty program (S4-O3, S4-O4).
ST	1. Use sales data to understand sales and inventory trends, track e-book platform trends, and regularly update the book inventory according to popular genres, authors, and topics (S1-T1, S1-T3). 2. Monitor book price changes and sales trends, and focus on books that provide the best value for customers (S2-T5). 3. Cooperate with publishers or authors to gain exclusive access to certain books, and offer e-books, audiobooks, or related products in addition to physical books (S3-T1). 4. Keep the collection in each market segment up to date and monitor market and economic developments that affect customers' purchasing power (S4-T2, S4-T3, S4-T5). 5. Ensure product quality and provide accurate descriptions and images to build a positive reputation and reduce returns (S5-T1). 6. Participate in industry associations and policy advocacy, and diversify the inventory to include niche markets (S4-T4).
WO	1. Reduce dependence on physical book sales through loyalty programs and by acting as a self-publisher for physical and digital books (W1-O4, W1-O2). 2. Overcome limited store space by selling and renting e-books and selling digital textbooks for schools and colleges (W2-O1, W2-O3). 3. Reduce dependence on book distributors by becoming a self-publisher for independent authors (W3-O2).
WT	1. Optimize store space by displaying the latest and best-selling books, follow technological and publishing trends, and cooperate with local publishers and authors (W2-T1, W2-T3, W2-T5). 2. Work with several distributors to reduce dependence on a single supplier, and join publishing industry associations to support more favorable policies (W3-T4, W3-T5). 3. Diversify the product catalog, optimize the online presence, offer book delivery services, and conduct continuous market research (W1-T1, W2-T3, W3-T3, W3-T5). 4. Monitor government policy changes and prepare contingency plans to minimize business risks (W3-T4, W3-T5).

Table 3 shows that most strategies point to the need to strengthen the store's digital channels. Online catalog presentation, digital product sales, loyalty programs, and delivery services all require an e-business website, which becomes the main instrument for implementing the formulated strategies.

4.2 PIECES Analysis

The comparison between the old system and the proposed new system based on the PIECES framework is presented in Table 4.

Table 4. PIECES Analysis of the Old and New Systems

Aspect	Old System	New System
Performance	Data processing takes a relatively long time because many activities, such as writing, duplicating, calculating, and matching data, are carried out manually.	A computer-based system minimizes errors and automates writing, duplicating, calculating, and matching data, which increases processing speed.
Information	Information about the store and its book collection is limited and can only be viewed through social media and search engines.	The website extends the reach of store information and presents the book collection more clearly, accurately, and completely.
Economy	Customers must spend money to visit the store to see which books and stock are available.	Customers can check the book collection and stock availability online without visiting the store.
Control	The large number of paper archives hinders data access, and manual data processing has a high risk of errors.	Web technology makes data easier to control and access, reducing the possibility of errors.
Efficiency	Manual activities and physical storage are inefficient and prone to errors.	Automated recording and digital storage reduce the use of human resources, eliminate physical archives, and make data access faster.
Service	Transactions are slow and cause queues, and staff cannot memorize the entire collection, so available books are sometimes reported as unavailable.	Customers can search for and order books through the website without coming to the store.

4.3 System Requirements

Based on the SWOT strategies and the PIECES analysis, the main requirements of the website are: (1) user registration and login to support customer data management and loyalty programs; (2) an online book catalog with categories and price filters to address the information and service aspects; (3) a shopping cart and checkout to speed up ordering and reduce queues; and (4) a contact page to provide store information and a communication channel with customers.

4.4 Website Implementation

The implementation of the e-business website for Planet Book Store is presented in Figures 2 to 8.

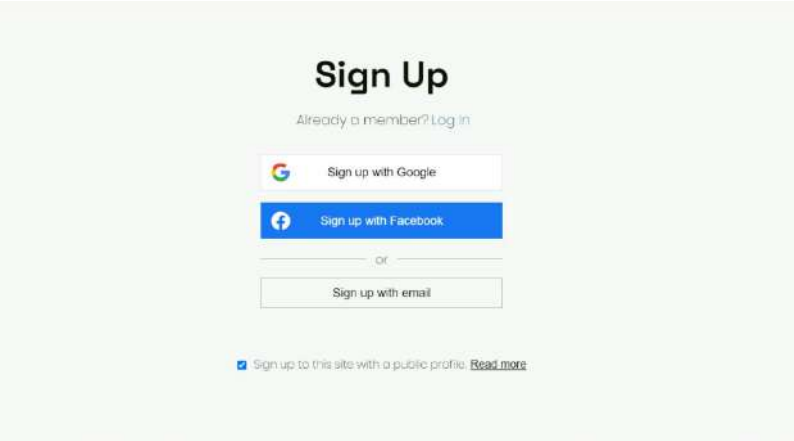


Figure 2. Sign-Up and Login Page

The sign-up and login page (Figure 2) allows customers to register using a Google account, a Facebook account, or an email address. Registered customer data can later be used for loyalty programs and order history.



Figure 3. Home Page

The home page (Figure 3) introduces Planet Book Store and provides navigation to the bookstore, services, about, and contact pages, as well as a search field and shopping cart.

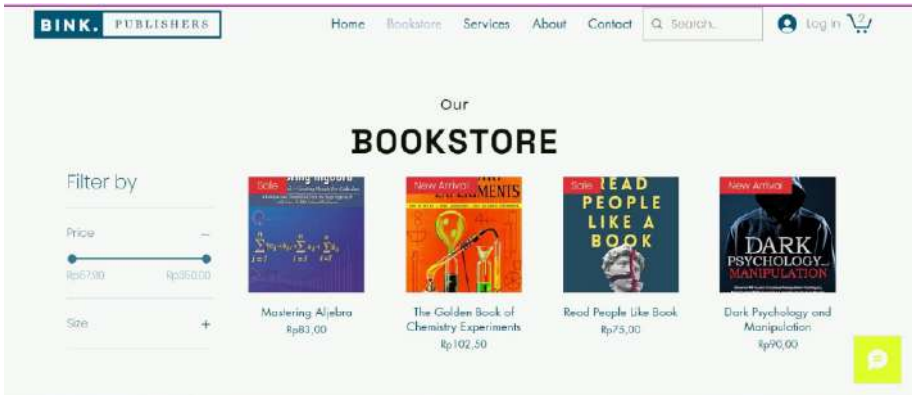
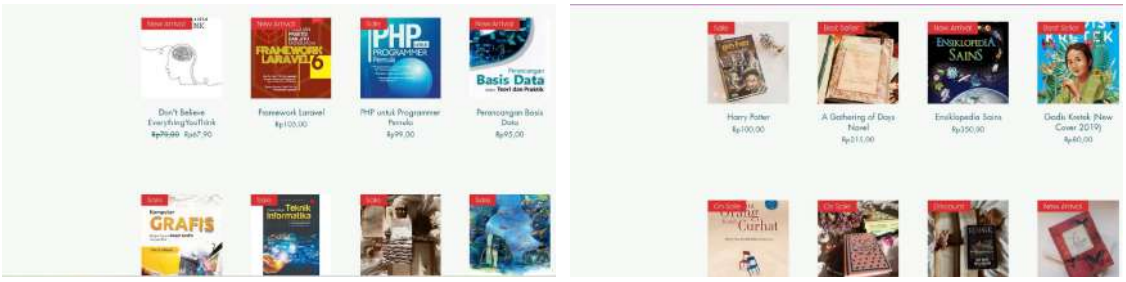


Figure 4. Bookstore Page

The bookstore page (Figure 4) displays the book collection with prices and labels such as sale or new arrival, and provides a price filter to help customers find books within their budget.



(a) **(b)**

Figure 5. Book Catalog

The book catalog (Figure 5) presents textbooks, novels, and nonfiction books, which reflects the strength of the diverse collection (S1) and the focus on specific segments such as textbooks (S4).



Figure 6. Shopping Cart

The shopping cart (Figure 6) displays the selected books, their quantities, and the subtotal before the customer proceeds to the cart page.

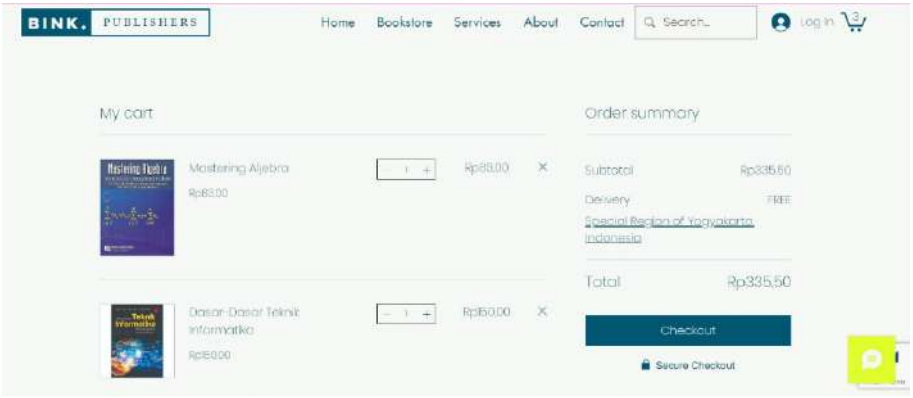
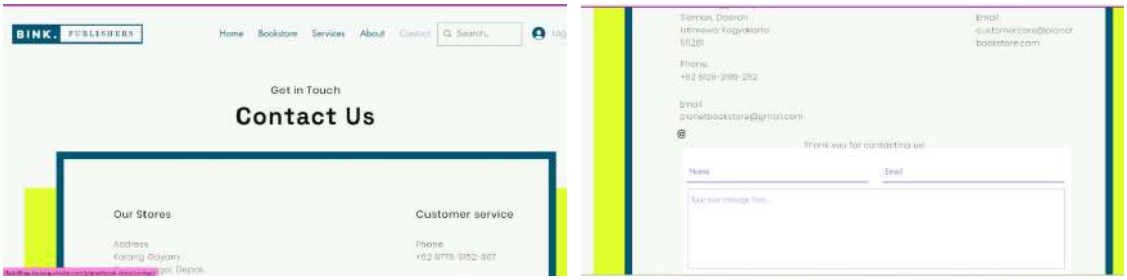


Figure 7. Checkout Page

The checkout page (Figure 7) shows the order summary, including the subtotal, delivery information, and total payment, so that customers can complete their orders without visiting the store.



(a) **(b)**

Figure 8. Contact Page

The contact page (Figure 8) provides the store's address, telephone number, email, and a message form for customer inquiries.

Overall, the implemented features address the problems identified in the PIECES analysis: the online catalog improves information and service, the cart and checkout improve performance and efficiency, and digital customer data support better control. At the same time, the website provides the platform needed to implement the SWOT strategies, particularly strengthening the online presence, offering digital products, and developing loyalty programs.

5. Conclusion

This study designed an e-business website for Planet Book Store using a combination of SWOT and PIECES analysis. The SWOT analysis identified five strengths, three weaknesses, four opportunities, and five threats, which were translated into SO, ST, WO, and WT strategies, including selling and renting e-books, developing loyalty programs, focusing on specific market segments, diversifying distributors, and strengthening the store's online presence. The PIECES analysis showed that the old, largely manual system was slow, provided limited information, increased customer costs, was prone to errors, and resulted in less optimal service.

Based on these findings, a website was developed with registration and login, a book catalog with price filters, a shopping cart, checkout, and contact features. These features make book information more complete and accessible, speed up the ordering process, reduce the need for customers to visit the store, and provide a foundation for implementing the formulated business strategies. The combination of SWOT and PIECES therefore provides a systematic basis for translating business strategies and system weaknesses into concrete website features.

Future work should evaluate the website with actual users, for example through usability testing, and measure its impact on sales and customer satisfaction. Further development may include online payment integration, e-book sales and rentals, a loyalty program module, and search engine optimization to increase the store's visibility.

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