The Role of the Billing Information System (SITAGI) in Improving the Efficiency of Invoice Monitoring
(Case Study: Toko Manis Surakarta)

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Abstract

This study discusses the role of SITAGI in assisting with the monitoring of purchase invoices, using a case study at Toko Manis Surakarta. The main objective of this study is to improve the efficiency of invoice monitoring before the due date. SITAGI was developed using HTML, PHP, MySQL, CSS, and JavaScript programming languages. The purchase invoice data is taken from billing notes and stored in a MySQL database, utilizing the Advanced Encryption Standard (AES) encryption technique.

The results of the study show that the use of SITAGI enhances the efficiency of invoice monitoring and provides benefits for both the owner and suppliers. This information is presented in tables equipped with specific parameters. The owner of Toko Manis Surakarta stated that SITAGI is highly helpful in managing bills efficiently. The conclusion of the study is that the use of an appropriate information system can improve the efficiency of invoice monitoring and offer distinct advantages for the owner.

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1. **Introduction**

The rapid development of information technology has had a significant impact across various sectors, including the management field, which demands greater efficiency. One potential solution is the Billing Information System (SITAGI), designed to

improve the efficiency of monitoring a company's outstanding invoices. At Toko Manis Surakarta, there is a pressing need to monitor invoices quickly and efficiently. Therefore, this study aims to develop a web-based information system using HTML, PHP, CSS, JavaScript, and SQL, with MySQL as the database. The system is intended for key stakeholders such as the owner and financial administrators. The main objectives of this research are to create an effective invoice monitoring system, improve the efficiency of billing oversight, and provide valuable information that enhances the performance of financial administration.

2. Methods

2.1 Research Location

This research was conducted at Toko Manis Surakarta, located at Jl. RE. Martadinata No.10, Sudiroprajan, Jebres District, Surakarta City, Central Java, 57121. The actual location can be seen in Figure 2.1.
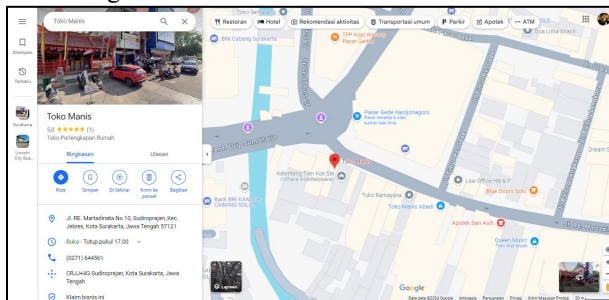

Figure 1. Figure Location Toko Manis Surakarta

2.2 Tools and Materials

2.2.1 Tools

1. Hardware

The development of the application was supported by the use of a laptop, which served as the development environment, enabling code editing, data storage, server-client simulation, and online reference access. The specifications of the device are shown in Table 1.

Table 1. Laptop Specifications

No	Nama	Spesifikasi
1.	Sistem Operasi	Windows 10 Pro
2.	CPU	Intel Core i5-7200U @2.50GHz
3.	GPU 0	Intel HD Graphics 620
4.	GPU 1	AMD Radeon R5 M330
5.	Penyimpanan	SSD 512 GB (NTFS)
6.	RAM (Random Access Memory)	DDR4 20 GB (4 + 16) Dual Channel

2. Software

Software tools were utilized for coding in HTML, CSS, PHP, JavaScript, and SQL, as well as for testing and debugging.

a. Code Editor : Visual Studio Code, Notepad
b. Server & Database : XAMPP (Apache & MySQL), Excel
c. Client Access : Chrome browser

2.2.2 Materials

The research material consisted of billing invoice data collected from Toko Manis Surakarta. These invoices served as the object of system analysis and development.

2.3 Data Collection Techniques

Data were obtained using the following methods:

a. Type of Data: Physical billing invoice documents
b. Source of Data: Files provided to the researcher (admin) during their work at Toko Manis Surakarta
c. Collection Method: Documentation of physical billing records received by the store

2.4 Software Development Method

The Agile methodology was adopted to support flexible and dynamic web development. This method allows quick adaptation to changes and encourages close collaboration with users. The Agile development cycle is illustrated in Figure 2.
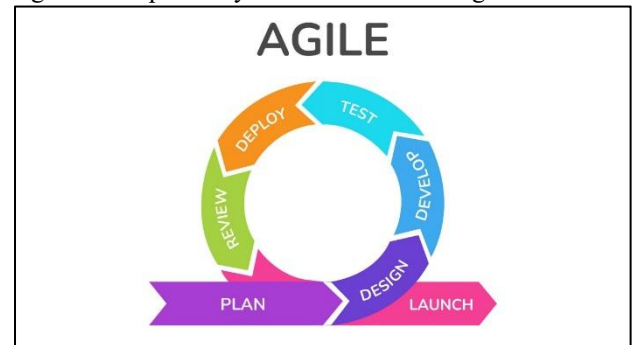

Figure 2. Agile Development Cycle

Agile stages used in this research:

1. **Planning**
   Understanding project goals, identifying requirements, and preparing flexible strategies to achieve the desired results.
2. **Design**
   Focusing on visual development and user interface design.
3. **Development**
   Translating the planned design into functional code, usually divided into sprints.
4. **Testing**
   Ensuring all features work correctly and are free from bugs or errors through continuous testing.
5. **Release**
   Deploying the website for user access, gathering feedback, and making necessary adjustments.
6. **Maintenance**
   Monitoring system performance, addressing issues, and implementing new features or improvements based on user feedback.

2.5   Research Challenges

1. Form Layout for Inputting Billing Data
   - Problem : The form was too long, affecting data accuracy and user experience.
   - Solutions: Redesigned into a two-column layout to improve visibility and input accuracy.

2. Date Input Restricions
   - Problem : No defined input date limits led to potential errors.
   - Solutions: JavaScript was implemented to set input boundaries for date fields.
3. Data Security
   - Problem : Billing codes were easily readable, raising security concerns.
   - Solutions: Data encryption techniques were applied to protect stored billing information.

3.   Results and Discussion
3.1   System Requirements Analysis
3.1.1   Functional Requirements Analysis

This section contains the processes to be carried out in the development or improvement of the system along with the main objectives concluded from the data collection results.

The functional requirements for developing "The Role of the Billing Information System (SITAGI) in Increasing Monitoring Efficiency of Bills (Case Study: Toko Manis Surakarta)" include the following processes:

1. Identifying user requirements
   Aimed at determining the features users need to monitor bills, such as due dates, billing dates, bill amounts, supplier names, and payment methods.
2. Identifying appropriate variables to improve monitoring in order to achieve the desired outcomes.
3. Providing basic features such as billing invoice data input.
4. Providing monitoring features for billing invoices approaching their due dates.

3.1.2   Non-Functional Requirements Analysis

Non-functional requirements include:

1.   System Rules
a. The application is intended for Finance Admin and Owner.
b. All information access requires authentication through the login page.

2.   Security
a. Data access is granted after correct identification and authentication with the database.

b. Sensitive information, such as passwords, is encrypted.

3.   System Usage Procedures
a. Open a browser to access the system.
b. Visit the system's webpage.
c. Log in to access information.
d. Select a menu provided by the system.

4.   Interface
a. Responsive design using CSS.
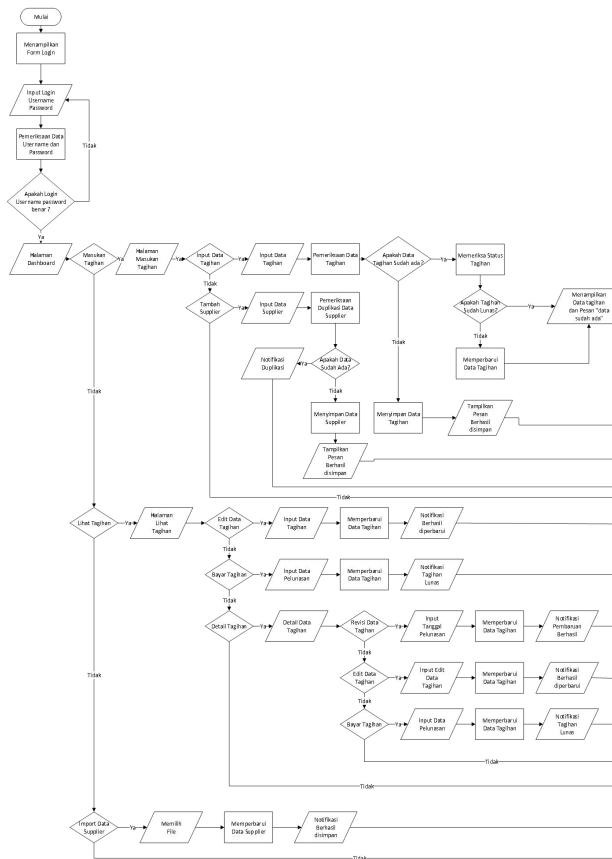
3.2   System Design

The system design is developed using HTML, PHP, CSS, MySQL, and JavaScript programming languages.

1. Identifying user requirements

2. Designing the analysis system

3. Developing the analysis system

4. Testing the analysis system

5. Once the analysis system meets the expected output, it can be released.

6. Maintaining the analysis system to handle potential issues.

3.2.1   System Flowchart

1. System Flowchart
   The flowchart is shown in figure 3.

Figure 3. System Flowchart

3.2.2 Data Design / ERD and Data Dictionary

1. ERD Design
   Figure 4 shows the ERD design.

Figure 4. ERD Design
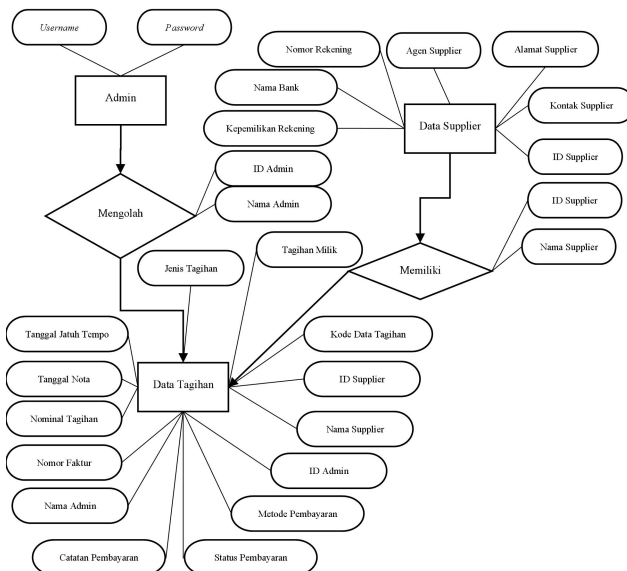
Database Name : tagihan

Required Tables : data_tagihan, data_admin, supplier

Entities : admin, supplier, billing

Relations and attributes:

- data_admin(id_admin, id_role, id_sim_tujuan_admin, role_admin, sim_tujuan_admin, nama_lengkap_admin, nama_panggilan_admin, id_lokasi_admin, lokasi_admin, admin_password, admin_password_v, user_device, tgl_registrasi, status_akun)

- data_tagihan(id_jenis_tagihan, jenis_tagihan, id_tagihan_milik, tagihan_milik, kode_data_tagihan, kode_data_tagihan_enkripsi, id_supplier, nama_supplier, id_admin, nama_admin, nomor_faktur, nominal_tagihan, tgl_tagihan, tgl_jatuh_tempo, tgl_pelunasan_tagihan, tgl_pelunasan_tagihan_revisi, metode_pembayaran, status_pembayaran, catatan, tanggal_input_tagihan, tgl_update)

- supplier(id_supplier_milik, supplier_milik, nama_supplier, id_supplier, alamat_supplier, kota_supplier, no_telp_satu, no_telp_dua, no_telp_tiga, bank_nama_rek, bank_atas_nama, bank_no_rek, tanggal_input_supplier)

3.2.3 Data Flow Diagram (DFD) / Use Case Diagram

A Data Flow Diagram represents the relationship of data flow within the system. Figure 5 and 6 illustrate DFD Level 0 and DFD Level 1.

- data_admin
- data_tagihan
- supplier

- Informasi Data Tagihan
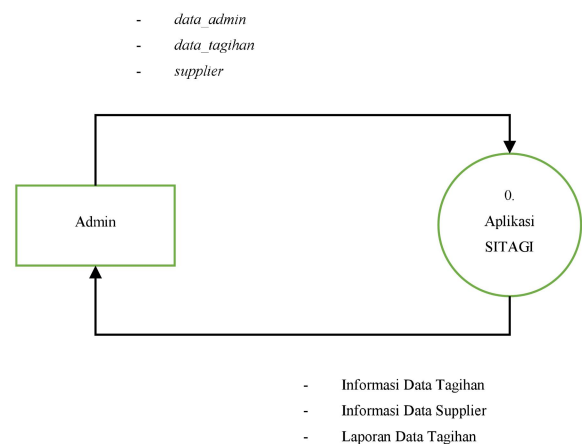- Informasi Data Supplier
- Laporan Data Tagihan

Figure 5. DFD Level 0

In Figure 5, the admin logs in by entering a username and password to access the SITAGI application, input billing data, and display the billing data.
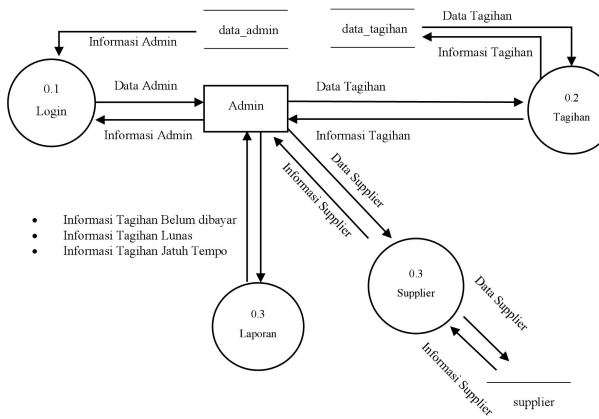
Figure 6. DFD Level 1

In Figure , the admin logs in using a username and password, then starts the process of inputting billing and supplier data. These data are stored in the database and later displayed in the SITAGI web-based application.

3.2.4 HIPO (Hierarchy Input Process Ouput)

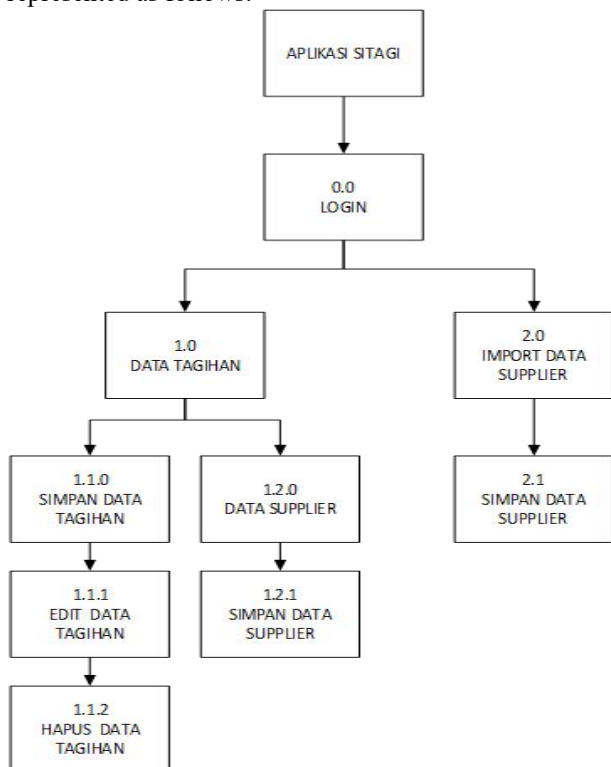HIPO of the SITAGI web-based application is represented as follows:

Figure 7. HIPO of SITAGI Application

3.3 Results and Discussion / System Implementation

The following are the results of the system implementation:

3.3.1 Login Page

The login page provides an input form to enter the username and password along with a login button. Authentication takes place on this page. If the input data is correct, the user will be directed to the menu page. However, if the data is incorrect, an error message will appear and the user will be redirected back to the login page. Figure 8 shows the design result of the login page.

Figure 8. Design Result of the Login Page

3.3.2 Menu Page

The menu page displays a selection of menus that can be accessed by the user. These include *Enter Bill*, *View Bills*, *Import Data*, and a *Logout* button. Figure 9 shows the design result of the menu page.

Figure 9 Design Result of The Menu Page

3.3.3 Enter Invoice Page

The *Enter Bill* page provides a form for inputting billing data. Figure 10 shows the design result of the enter bill page.

Figure 10 Design Result of Enter Invoice Page

3.3.4 View Invoices Page

The *View Bills* page provides features for search, edit, and payment. Figure 4.23 shows the design result of the view bills page.

Figure 11 Design Result of View Invoices Page

3.3.5 Import Data Page

The *Import Data* page provides features and a form for performing data import actions. Figure 4.24 shows the design result of the import data page.

Figure 12 Design Result of Import Data Page

3.4 User Acceptance Test

The SITAGI application user testing was conducted by relevant stakeholders, including David as the finance admin and Karyadi Saputro as the business owner. After the questionnaire was completed, the results are presented in Table 2.

Table 2. Questionnaire Results

No	Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	The SITAGI interface is easy for users to understand.				1	1
2	Navigation in SITAGI is intuitive and not confusing.					2
3	SITAGI's features are sufficient for monitoring billing needs.				1	1
4	SITAGI provides accurate and reliable data.				1	1
5	SITAGI runs quickly without significant technical issues.				1	1
6	SITAGI can handle large amounts of data without performance degradation.				1	1
7	Using SITAGI helps reduce errors in billing management.				1	1
8	SITAGI makes the monitoring process more efficient.					2
9	I am satisfied with SITAGI's performance in supporting my work.				1	1
10	SITAGI is better than the previous system or any alternative previously used.				1	1

Scoring Scale:

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	2	3	4	5

Total Scores:
- **David** → (8 × Agree × 4) + (2 × Strongly Agree × 5) = 42 → 42 / 10 = **4.2**
- **Karyadi** → (10 × Strongly Agree × 5) = 50 → 50 / 10 = **5**
- **Average Score** → (5 + 4.2) = 9.2 → 9.2 / 2 = **4.6**

The questionnaire results indicate that users strongly agree that the use of the SITAGI application is effective for monitoring billing at *Toko Manis Surakarta*, with an average score of **4.6 points**.

4. Conclusions

Based on the research conducted at Toko Manis Surakarta as described in the previous chapters, several conclusions can be drawn as follows:

1. The use of an information system developed with the Agile Development method can assist in the administration of billing monitoring at Toko Manis Surakarta.

2. The use of appropriate and functional features can improve the efficiency of billing monitoring at Toko Manis Surakarta.

3. Users strongly agree that the use of the SITAGI application can enhance the efficiency of billing monitoring, with an average score of 4.6 points.

Suggestions

Based on the research that has been conducted, it is suggested that the SITAGI application should implement a notification system to further increase the efficiency of billing monitoring

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