

Design of Accrual-Based Accounting Information System Using Full Costing Method

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Abstrak

Sistem Informasi Akuntansi (SIA) memegang peranan penting dalam mendukung pengambilan keputusan organisasi melalui penyediaan informasi keuangan yang akurat dan tepat waktu. Penerapan akuntansi berbasis akrual menjadi semakin penting, khususnya bagi organisasi yang melakukan kegiatan produksi, karena mampu menyajikan pengakuan pendapatan dan beban secara lebih andal serta mendukung transparansi pelaporan keuangan. Namun demikian, banyak organisasi masih menggunakan sistem akuntansi manual atau berbasis kas yang menyebabkan ketidakakuratan dalam perhitungan biaya produksi, keterbatasan informasi keuangan, dan lemahnya dukungan terhadap pengambilan keputusan manajerial. Penelitian ini dilatarbelakangi oleh kebutuhan untuk mengintegrasikan prinsip akuntansi akrual dengan metode perhitungan biaya yang komprehensif guna mengatasi permasalahan tersebut. Penelitian ini mengusulkan perancangan dan implementasi Sistem Informasi Akuntansi berbasis akrual yang menerapkan metode Full Costing untuk mengalokasikan seluruh biaya produksi, baik biaya langsung maupun tidak langsung, yang meliputi bahan baku langsung, tenaga kerja langsung, dan biaya overhead pabrik. Kontribusi utama penelitian ini terletak pada integrasi pencatatan transaksi berbasis akrual dan perhitungan Full Costing dalam satu sistem terpadu yang mampu meningkatkan akurasi penentuan biaya dan transparansi keuangan. Sistem yang diusulkan dievaluasi melalui pengujian fungsional dan validasi pengguna untuk menilai efektivitasnya dalam pencatatan transaksi, perhitungan biaya, dan penyusunan laporan keuangan. Hasil evaluasi menunjukkan bahwa sistem mampu meningkatkan konsistensi data, mengurangi kesalahan manual, serta menghasilkan informasi biaya dan keuangan yang lebih komprehensif dibandingkan dengan praktik konvensional. Meskipun demikian, sistem yang dikembangkan masih menggunakan aturan alokasi biaya statis. Penelitian selanjutnya disarankan untuk mengembangkan sistem dengan menerapkan penggerak biaya dinamis, fitur analitik lanjutan, serta integrasi dengan sistem enterprise guna meningkatkan skalabilitas dan dukungan pengambilan keputusan..

Kata kunci— Sistem Informasi Akuntansi, Akuntansi Berbasis Akrual, Full Costing, Akuntansi Biaya, Pelaporan Keuangan.

Abstract

Accounting Information Systems (AIS) play an important role in supporting organizational decision-making by providing accurate and timely financial information. The adoption of accrual-based accounting is particularly essential for organizations engaged in production activities, as it enables more reliable recognition of revenues and expenses and supports transparent financial reporting. However, many organizations still rely on manual or cash-based accounting practices, which often lead to inaccurate cost calculations, incomplete financial information, and limited support for managerial decision-making. This research is motivated by the need to integrate accrual accounting principles with a comprehensive cost calculation approach to overcome these limitations. This study proposes the design and implementation of an accrual-based Accounting Information System that applies the Full

Costing method to allocate both direct and indirect production costs, including direct materials, direct labor, and manufacturing overhead. The main contribution of this research lies in the integration of accrual-based transaction processing and Full Costing calculations within a unified system that supports accurate cost determination and financial transparency. The proposed system was evaluated through functional testing and user validation to assess its effectiveness in transaction recording, cost calculation, and financial reporting. The evaluation results indicate that the system improves data consistency, reduces manual processing errors, and generates more comprehensive cost and financial reports compared to conventional accounting practices. Despite these positive results, the current system implementation relies on static cost allocation rules. Future work will focus on enhancing the system by incorporating dynamic cost drivers, advanced analytical features, and integration with other enterprise systems to improve scalability and decision-support capabilities.

Keywords— Accounting Information System, Accrual Accounting, Full Costing, Cost Accounting, Financial Reporting.

1. INTRODUCTION

Accounting Information Systems (AIS) play a crucial role in supporting organizational decision-making by providing accurate, timely, and relevant financial information. In recent years, the adoption of accrual-based accounting has become increasingly important, particularly for organizations seeking to improve financial transparency, accountability, and performance evaluation. Unlike cash-based accounting, accrual accounting recognizes revenues and expenses when they are incurred, thereby offering a more realistic representation of an organization's financial condition [1]. This approach has been widely recommended in both private and public sector financial management frameworks, as it enables better cost control, resource allocation, and long-term planning [2]. However, the effectiveness of accrual-based accounting heavily depends on the availability of a well-designed accounting information system capable of processing, recording, and reporting financial transactions accurately. Many small and medium-sized enterprises (SMEs) and production-oriented organizations still rely on manual or semi-computerized accounting practices, which often lead to delays, data inconsistencies, and limited analytical capabilities [3]. In addition, the increasing complexity of business processes and competitive pressures demand accounting systems that not only record transactions but also support managerial decision-making through comprehensive cost information. Therefore, the integration of accrual-based accounting principles into a structured and computerized AIS has become a strategic necessity rather than merely an operational option [4].

Despite the recognized advantages of accrual-based AIS, many organizations continue to face significant challenges in implementing such systems, particularly in the context of cost accounting. One of the most common problems lies in the inaccurate determination of product or service costs, which directly affects pricing strategies, profitability analysis, and managerial decisions [5]. In practice, several organizations still calculate production costs by considering only direct costs while ignoring indirect costs, such as overhead, depreciation, and supporting operational expenses. This practice leads to cost distortion and misinformed decision-making [6]. Furthermore, existing accounting systems are often designed without a clear methodological foundation for cost allocation, resulting in inconsistencies between financial reports and actual operational conditions. The lack of system integration between accounting modules, such as general ledger, cost accounting, and inventory management, further exacerbates these issues [7]. As a result, management may encounter difficulties in evaluating operational efficiency, controlling production costs, and identifying areas for improvement. These problems highlight the need for a comprehensive AIS that systematically applies an appropriate costing method

within an accrual-based framework. Without such a system, organizations risk making strategic decisions based on incomplete or inaccurate financial information, which may negatively impact their competitiveness and sustainability [8].

The primary goal of this research is to design and develop an accrual-based accounting information system that applies the Full Costing method to support accurate cost calculation and financial reporting. This study is motivated by the growing demand for integrated accounting systems that can bridge the gap between financial accounting and managerial accounting functions. Full Costing, also known as absorption costing, allocates all production-related costs—both fixed and variable, direct and indirect—to the cost of goods produced [9]. Compared to other costing methods, Full Costing provides a more comprehensive view of total production costs, making it particularly suitable for organizations that require detailed cost information for pricing and profitability analysis [10]. However, the manual application of Full Costing is often complex and time-consuming, especially when dealing with multiple cost components and production activities. This complexity becomes a major barrier for organizations with limited accounting expertise or technological resources. Therefore, there is a strong motivation to embed the Full Costing method into an automated AIS that simplifies cost allocation processes while maintaining accuracy and compliance with accrual accounting principles [11]. By doing so, the system can serve not only as a recording tool but also as a decision-support mechanism that enhances managerial insight into cost structures and operational performance.

To address the identified problems and achieve the research objectives, this study proposes the design of an accrual-based accounting information system that integrates the Full Costing method into its core functionality. The proposed system is designed using a structured system development approach, encompassing requirements analysis, system modeling, database design, and interface implementation. The system is expected to automate the recording of accrual-based transactions, manage cost components systematically, and generate financial and cost reports in real time. The main contribution of this research lies in the integration of accrual accounting principles with a Full Costing-based cost calculation model within a unified information system. This integration provides a practical solution for organizations seeking to improve cost accuracy and financial transparency without excessive complexity. Furthermore, the study contributes to the existing literature by demonstrating how accounting concepts can be effectively translated into system design and implementation. The proposed system is evaluated through functional testing and user validation to ensure that it meets organizational requirements and supports decision-making processes effectively. In conclusion, this research underscores the importance of aligning accounting methodologies with information system design to enhance the reliability and usefulness of financial information. The findings are expected to provide valuable insights for researchers and practitioners in the fields of accounting information systems and cost accounting, while also opening opportunities for future research on system scalability, integration with advanced analytics, and the application of alternative costing methods [12].

2. METHODS

Recent studies on Accounting Information Systems (AIS) emphasize the strategic role of accrual-based systems in enhancing financial transparency and managerial decision-making. Ahmad and Khan [1] and Romney and Steinbart [4] highlighted that accrual-based AIS provides more reliable financial representations than cash-based systems, particularly for performance evaluation and long-term planning. However, these studies mainly focused on organizational impact and governance aspects, with limited discussion on detailed cost calculation mechanisms. In the domain of cost accounting, Horngren et al. [5] and Drury [9] discussed Full Costing as a comprehensive method that allocates both direct and indirect manufacturing costs,

enabling accurate product costing and pricing decisions. Although theoretically robust, their works did not address system-level implementation or automation. Empirical studies by Grande et al. [7] and Al-Htaybat and von Alberti-Alhtaybat [6] examined digital transformation in accounting systems, showing that system integration improves reporting quality and efficiency; nevertheless, they reported challenges related to cost allocation complexity and data consistency. Furthermore, Turner and Weickgenannt [11] demonstrated that AIS effectiveness depends on embedding accounting logic into system design, yet their evaluation relied on general financial reporting outcomes rather than detailed costing accuracy. Overall, prior research indicates that while accrual-based AIS and Full Costing have been widely studied independently, there is a research gap in integrating Full Costing into an accrual-based AIS design and evaluating its effectiveness as a unified system for accurate cost determination and managerial decision support.

2.1 Research Object and Data Sources

The object of this research is an Accounting Information System (AIS) designed to support accrual-based accounting and cost calculation using the Full Costing method. The study focuses on an organizational environment that performs production or service activities requiring accurate cost determination for financial reporting and managerial decision-making. The data used in this research consist of both primary and secondary data. Primary data are obtained through direct observation of existing accounting processes, interviews with accounting staff and management, and documentation of current transaction flows. These data provide insights into business processes, cost components, and system requirements. Secondary data include accounting standards, cost accounting literature, and prior research related to accrual-based AIS and Full Costing methods [4], [5], [9]. The combination of these data sources ensures that the proposed system design reflects real operational conditions while remaining consistent with established accounting principles.

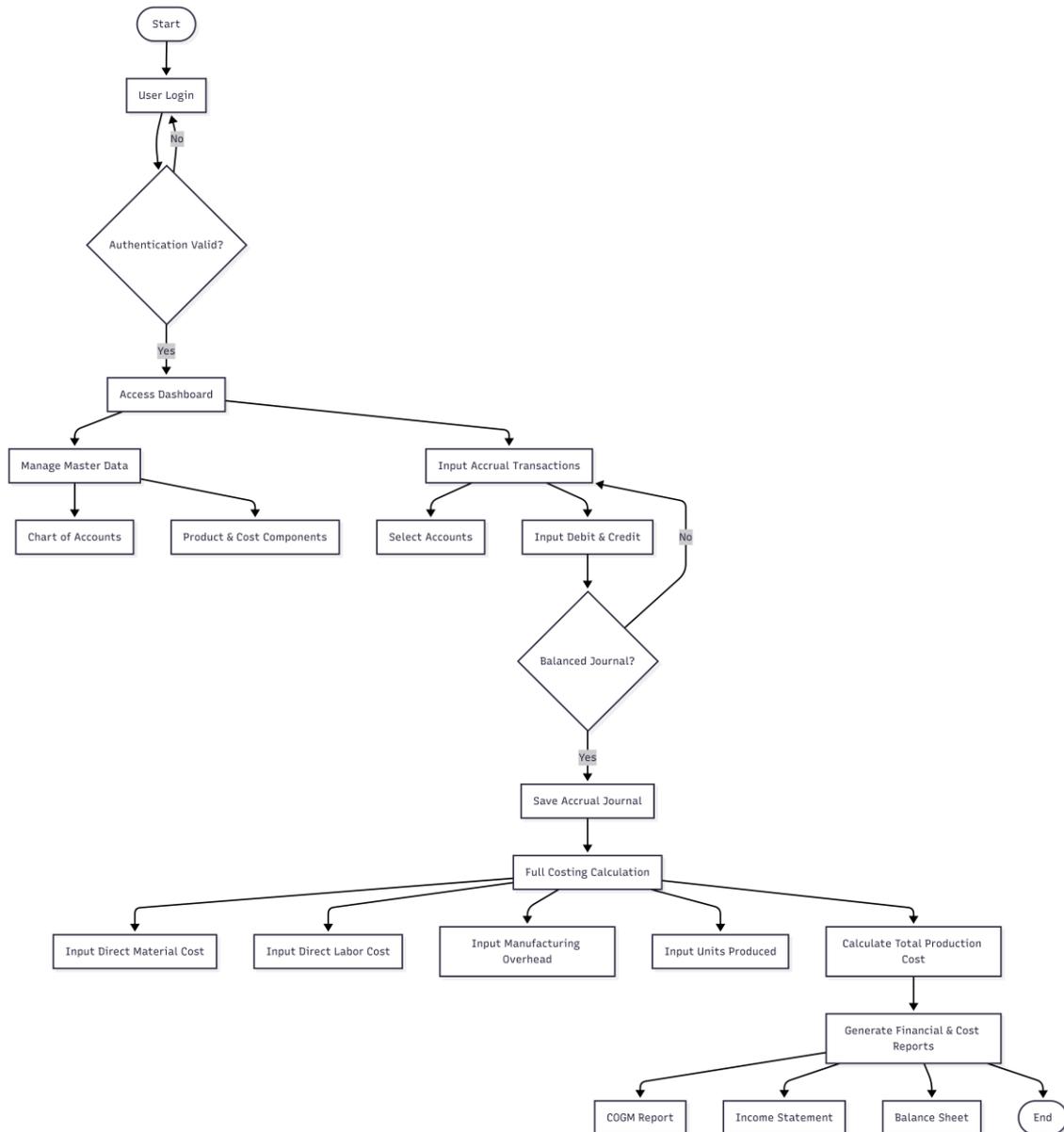


Figure 1. Workflow of the accrual-based accounting information system using the Full Costing method.

The research object of this study is an accrual-based Accounting Information System designed to support transaction processing, cost calculation, and financial reporting using the Full Costing method. The operational workflow of the proposed system is illustrated in Figure 1, which describes the sequence of processes and data flows implemented in the system. As shown in Figure 1, the system begins with a user authentication process to ensure secure and role-based access. Only authorized users are allowed to proceed to the dashboard, which functions as the main control center for accessing accounting and cost management modules.

Figure 1 further illustrates that, after successful authentication, users can manage master data such as the Chart of Accounts and product and cost component data. These master data serve as the primary data sources for accrual-based transaction recording and Full Costing calculations. Accrual transactions are then recorded by selecting appropriate accounts and entering debit and credit values. A balance validation mechanism is applied to ensure that total debit and credit amounts are equal before the transaction is saved, thereby maintaining accounting accuracy and data consistency.

As depicted in Figure 1, once accrual transactions are stored, the system processes production cost data through the Full Costing calculation module. This stage involves inputting direct material costs, direct labor costs, manufacturing overhead costs, and the number of units produced. The system aggregates these data to compute total production costs and subsequently generates integrated financial and cost reports, including the Cost of Goods Manufactured (COGM), income statement, and balance sheet. This workflow demonstrates how transaction data and cost components are systematically processed within the system to produce reliable accrual-based financial information, supporting the research objectives and data sources defined in this study.

2.2 Data Preparation and Analysis

Data preparation in this study involves identifying, classifying, and structuring financial and cost-related data required for accrual-based accounting and Full Costing implementation. Transaction data are analyzed to distinguish between revenue, expenses, assets, and liabilities in accordance with accrual accounting principles. Cost data are further categorized into direct materials, direct labor, and manufacturing overhead. This classification is essential to ensure that all relevant costs are captured and allocated correctly. At this stage, the analysis also examines data flow relationships among accounting modules, such as general ledger, inventory, and cost accounting. The objective of this process is to define clear data structures and relationships that support system integration and minimize inconsistencies, as highlighted in prior AIS studies [7], [11]. The prepared data serve as the foundation for designing the database schema and functional components of the proposed system.

2.3 Proposed Method and System Design

The main methodological approach of this research is system development combined with the application of the Full Costing method within an accrual-based accounting framework. The system is designed following a structured development life cycle, starting from requirements analysis, system modeling, database design, and interface development. Conceptually, the Full Costing method is implemented by allocating all production-related costs to the cost of goods produced. The total production cost (TPC) is calculated using the following formulation [5], [9]:

$$\text{TPC} = \text{DM} + \text{DL} + \text{MO} \quad (1)$$

where DM represents direct material costs, DL denotes direct labor costs, and MO refers to manufacturing overhead costs. These costs are accumulated and recognized on an accrual basis, meaning expenses are recorded when incurred rather than when cash is paid. The system design embeds this costing logic into its processing layer, enabling automatic cost calculation and integration with financial reporting modules. This approach ensures consistency between cost accounting and financial accounting functions within a unified AIS.

2.4 Supporting Techniques and System Enhancement

To improve system reliability and usability, several supporting techniques are applied in the design phase. Data validation rules are incorporated to ensure the completeness and accuracy of transaction inputs. Standardized chart of accounts and cost classification structures are used to reduce ambiguity in data entry and reporting. In addition, the system interface is designed to facilitate user interaction and minimize operational errors. These techniques align with recommendations from prior studies emphasizing that AIS effectiveness depends on embedding accounting logic and control mechanisms into system design [4], [11]. Although this research does not employ advanced computational models, the structured integration of

accounting rules and costing logic serves as a quality enhancement mechanism that improves the accuracy and usefulness of the resulting information.

2.5 System Evaluation and Testing

The evaluation of the proposed system is conducted through functional testing and user validation. Functional testing assesses whether each system module operates according to the specified requirements, including transaction recording, cost calculation, and report generation. User validation involves feedback from accounting personnel to evaluate system usability, accuracy of cost information, and relevance of generated reports for decision-making. The evaluation focuses on verifying that the Full Costing calculations are consistent with accounting theory and that accrual-based reports accurately reflect organizational financial conditions. This evaluation approach is consistent with prior AIS research, which emphasizes practical validation to ensure system effectiveness and managerial relevance [7], [11]. The results of this evaluation provide the basis for analysis and discussion in the subsequent chapter.

3. RESULTS AND DISCUSSION

3.1 System Design Results

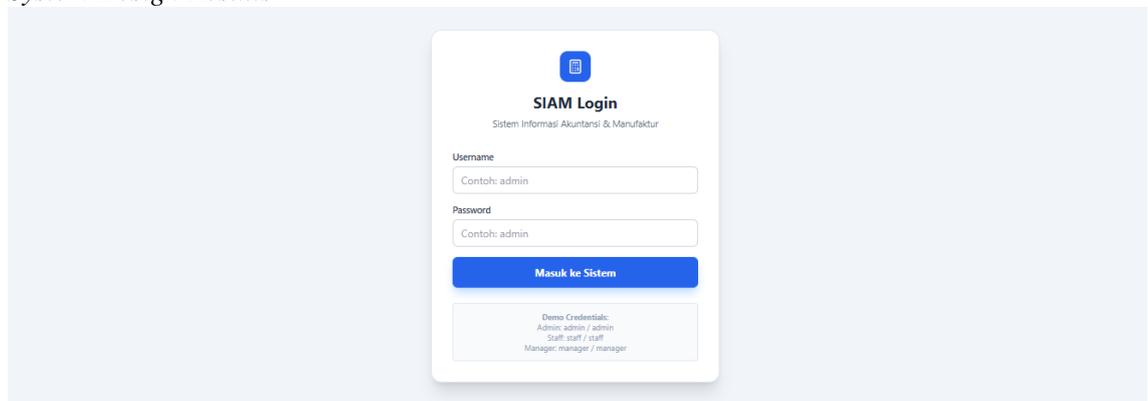


Figure 2. Login interface of the accrual-based accounting information system for authentication and role-based system access.

Figure 2 illustrates the login interface of the proposed Accounting Information System. This interface functions as the main authentication gateway, allowing users to access the system based on predefined roles, such as administrator, accounting staff, and manager. By requiring valid credentials, the login page ensures data security and role-based access control, which are essential for maintaining the integrity and confidentiality of accounting and manufacturing information within the system.

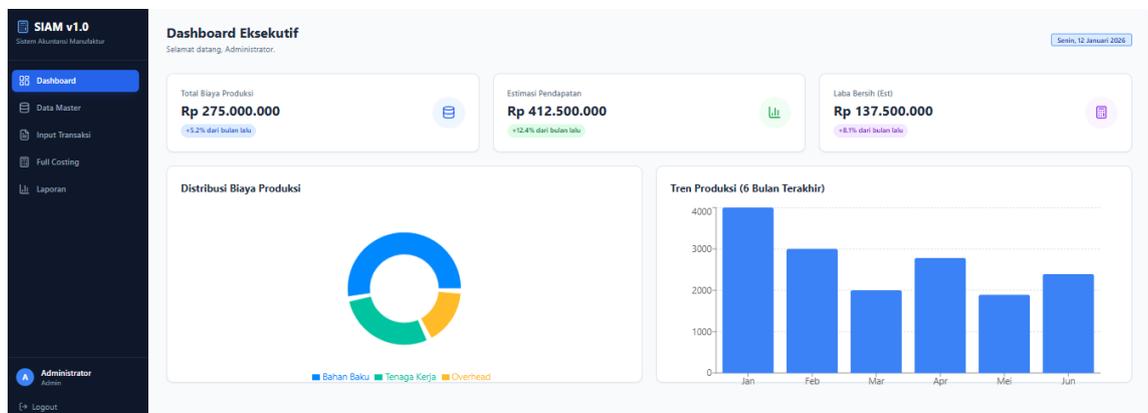


Figure 3. Executive dashboard displaying production cost summary, estimated revenue and profit, cost distribution based on Full Costing, and production trends

Figure 3 presents the executive dashboard of the proposed accrual-based Accounting Information System. The dashboard provides a summarized view of key financial and production indicators, including total production cost, estimated revenue, and estimated net profit. In addition, it visualizes the distribution of production costs based on Full Costing components—direct materials, direct labor, and manufacturing overhead—as well as production trends over the last six months. This dashboard is designed to support managerial decision-making by delivering concise, real-time information that reflects the organization’s financial and operational performance.

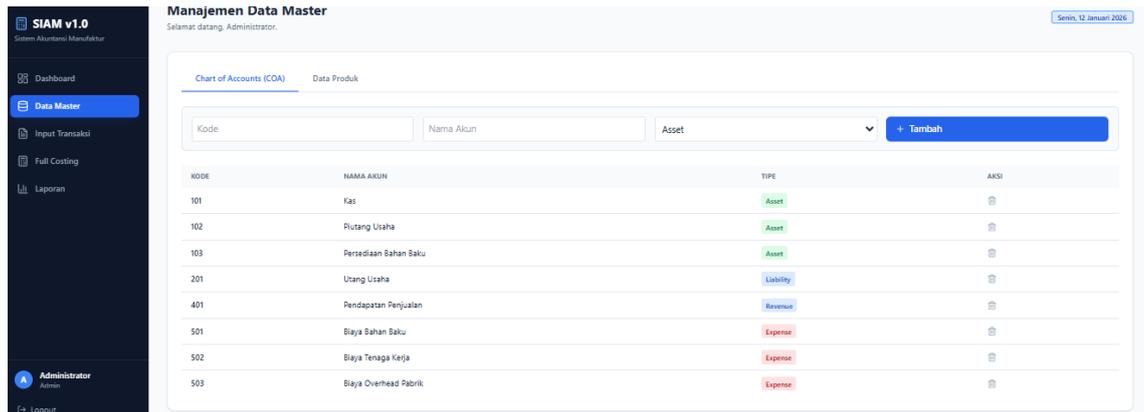


Figure 4. Chart of Accounts management interface used to define and classify accounting accounts in the accrual-based accounting information system.

Figure 4 shows the master data management module of the proposed Accounting Information System, specifically the Chart of Accounts (COA) interface. This module is used to define and manage accounting accounts that serve as the foundation for accrual-based transaction recording and cost calculation. Each account is classified according to its type, such as assets, liabilities, revenues, and expenses, ensuring consistency with accounting standards. The availability of structured master data supports accurate transaction processing, systematic cost allocation, and reliable financial reporting within the system.

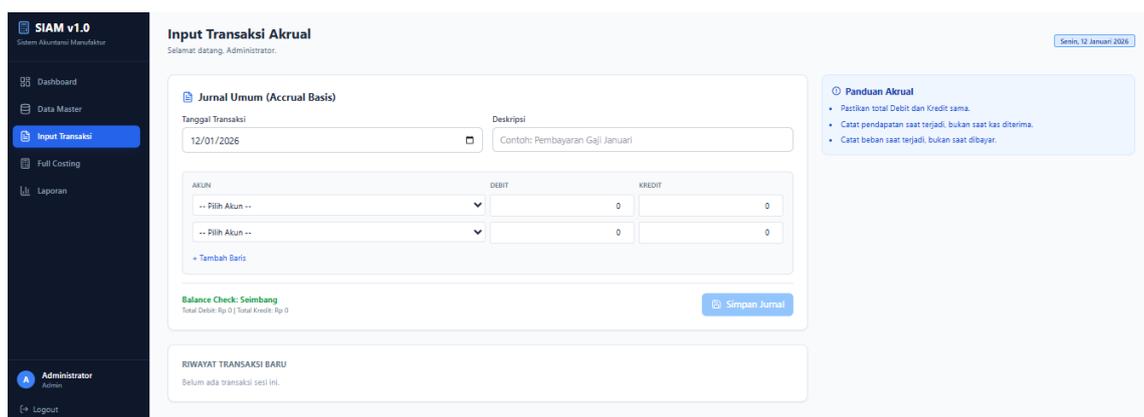


Figure 5. Accrual-based transaction input interface for recording general journal entries with automatic debit–credit balance validation.

Figure 5 illustrates the accrual transaction input module of the proposed Accounting Information System. This module is used to record general journal entries based on the accrual accounting principle, where revenues and expenses are recognized when they occur rather than when cash is received or paid. The interface allows users to input

transaction dates, descriptions, and multiple debit–credit account entries. An automatic balance checking feature ensures that total debit and credit values are equal before the transaction is saved, thereby reducing input errors and maintaining accounting data integrity. This module plays a critical role in ensuring accurate accrual-based recording and serves as the primary data source for subsequent cost calculation and financial reporting processes.

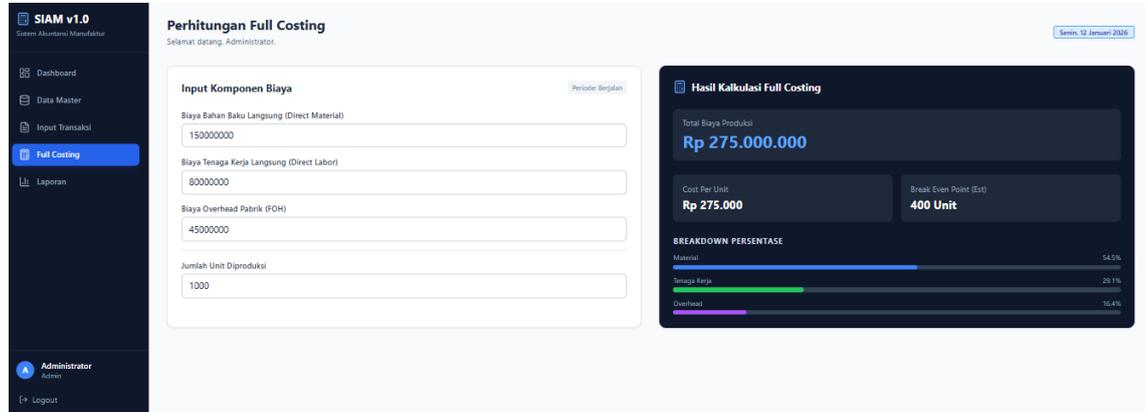


Figure 6. Full Costing calculation module showing production cost components, total production cost, cost per unit, cost breakdown, and estimated break-even point.

Figure 6 depicts the Full Costing calculation module of the proposed accrual-based Accounting Information System. This module enables users to input key production cost components, including direct material costs, direct labor costs, and manufacturing overhead costs, along with the number of units produced within a specific accounting period. Based on these inputs, the system automatically calculates the total production cost and cost per unit using the Full Costing method. In addition, the module provides a percentage breakdown of each cost component and an estimated break-even point, supporting cost analysis and managerial decision-making. The automated calculation reduces manual errors and ensures consistency between cost accounting and financial reporting processes.

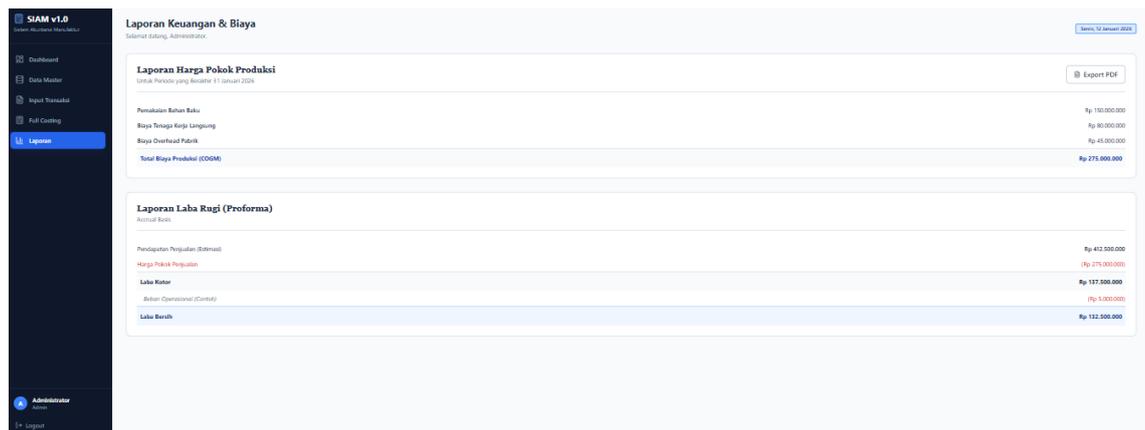


Figure 7. Financial and cost reporting module displaying the Cost of Goods Manufactured and accrual-based income statement generated from Full Costing calculations.

Figure 7 illustrates the financial and cost reporting module of the proposed accrual-based Accounting Information System. This module presents integrated reports generated automatically from accrual-based transaction data and Full Costing calculations. The reports include the Cost of Goods Manufactured (COGM) report, which details the composition of production costs, and a pro forma income statement

prepared on an accrual basis. By consolidating cost and financial information within a single reporting interface, the system enables users to evaluate production efficiency, cost structure, and profitability accurately. The availability of export functionality further supports documentation and managerial analysis.

3.2 Results of Accrual-Based Transaction Processing

The implementation results show that the developed Accounting Information System (AIS) is capable of processing financial transactions based on the accrual accounting principle. Revenues and expenses are recognized at the time they are incurred, regardless of cash inflows or outflows. This mechanism allows the system to record accrued revenues, accrued expenses, and outstanding liabilities accurately. During system testing, transactions related to production activities, operational expenses, and revenue recognition were recorded consistently and produced balanced journal entries. These results indicate that the system successfully addresses the limitations of cash-based accounting practices, which often fail to reflect the actual financial position of an organization. The findings support previous studies stating that accrual-based AIS enhances the reliability and relevance of financial information for managerial and financial reporting purposes [1], [4].

3.3 Results of Full Costing Calculation

The application of the Full Costing method within the system resulted in comprehensive production cost calculations. The system aggregated direct material costs, direct labor costs, and manufacturing overhead costs to determine the total production cost. Test results demonstrate that the inclusion of overhead costs significantly increased the calculated cost of production compared to partial costing approaches. This outcome confirms that Full Costing provides a more accurate representation of total resource consumption in production processes, as emphasized in cost accounting literature [5], [9]. Furthermore, the automated calculation reduced the risk of manual errors and ensured consistency across reporting periods. However, the results also reveal that the precision of Full Costing calculations is highly dependent on the accuracy of overhead classification and allocation, which remains a practical challenge in cost accounting implementation

3.4 Results of Financial Reporting Integration

The system successfully generated accrual-based financial reports, including the Cost of Goods Manufactured, Income Statement, and Balance Sheet. These reports were produced automatically using integrated transaction and cost data stored in the system database. The results show that financial statements generated by the system were internally consistent and aligned with accounting standards. This integration reduced discrepancies commonly found in manually prepared reports and enabled management to analyze financial performance in a more structured manner. Compared to earlier AIS implementations that primarily focused on general ledger reporting [7], the proposed system demonstrates improved analytical capability by linking financial outcomes directly to production cost structures. This integration enhances the system's role as a decision-support tool rather than merely a transaction-recording system.

3.5 System Evaluation Results

System evaluation was conducted through functional testing and user validation. Functional testing confirmed that all core modules operated according to predefined requirements, including transaction recording, cost calculation, and report generation. User validation results indicated that the system improved processing efficiency and reduced the time required to prepare cost and financial reports. Users also reported increased

consistency and accuracy in accounting data compared to previous manual or semi-computerized practices. These findings align with prior research emphasizing that well-designed AIS improves operational efficiency and data reliability [11]. Nevertheless, the evaluation did not include extensive quantitative performance measurements, which limits the ability to assess system scalability and processing efficiency under larger data volumes.

3.6 Discussion and Comparison with Previous Studies

From a comparative perspective, the results of this study extend previous research on accrual-based AIS and Full Costing by integrating both concepts into a unified system. Earlier studies tended to examine accrual accounting and cost accounting separately, without addressing their practical integration within an information system environment [6], [7]. The proposed system demonstrates that embedding Full Costing logic into an accrual-based AIS enhances cost accuracy and financial transparency simultaneously. Despite these strengths, the system still relies on static cost allocation rules and does not incorporate advanced analytical features. Compared to recent studies on digitally transformed AIS, which emphasize automation and analytics, this limitation highlights a research gap and provides opportunities for future enhancement. Overall, the results confirm that the proposed system effectively achieves the research objectives and contributes to the development of accounting information systems that support both financial reporting and managerial decision-making.

4. CONCLUSIONS

This research has designed and implemented an accrual-based Accounting Information System that integrates the Full Costing method to improve the accuracy of production cost calculation and financial reporting. The study addressed common limitations of manual and cash-based accounting practices, particularly inaccuracies in cost determination and inconsistencies in financial information. The results demonstrate that the proposed system is able to record transactions based on the accrual principle, systematically allocate direct and indirect production costs, and automatically generate integrated financial and cost reports. Consequently, the system provides more reliable information on production costs, cost of goods manufactured, and profitability, which is essential for managerial decision-making.

From the evaluation results, the system shows improved efficiency and consistency in accounting processes by reducing manual calculations and minimizing input errors. The implementation of the Full Costing method enables a comprehensive representation of resource consumption, allowing management to analyze cost structures more accurately and support pricing and performance evaluation. Although the system successfully meets the research objectives, several limitations remain. The current implementation relies on static cost allocation rules and does not yet support advanced cost drivers or predictive analysis. Future work may focus on enhancing the system by incorporating dynamic cost allocation techniques, comparative analysis with alternative costing methods, and integration with inventory automation or enterprise resource planning systems. Further evaluation using quantitative performance metrics and larger datasets is also recommended to assess system scalability and robustness in more complex organizational environments..

5. SUGGESTIONS

Future research may extend this study by enhancing the proposed accrual-based Accounting Information System with more advanced and dynamic cost allocation mechanisms. The integration of activity-based costing or other cost driver-oriented approaches could be explored to improve the accuracy of overhead allocation and provide deeper insights into cost behavior. In addition, incorporating advanced analytical and predictive features, such as trend analysis and forecasting, may strengthen the system's capability to support strategic decision-

making. Further studies are also recommended to evaluate system performance using larger and more diverse datasets, as well as to assess scalability and interoperability with enterprise resource planning and inventory management systems. Moreover, comparative analyses between different costing methods within an integrated AIS environment would provide valuable contributions to both academic research and practical applications.

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