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Accrual-Based Accounting Information System with Cost Control Approach

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Abstrak

Perkembangan teknologi informasi mendorong organisasi untuk mengadopsi Sistem Informasi Akuntansi (SIA) guna meningkatkan akurasi dan ketepatan waktu informasi keuangan dalam mendukung pengambilan keputusan manajerial. Namun, banyak organisasi masih menggunakan praktik akuntansi berbasis kas atau semi-manual yang menyebabkan keterbatasan dalam pengendalian biaya dan kurang merepresentasikan kinerja keuangan secara akurat. Kondisi ini melatarbelakangi kebutuhan akan SIA berbasis akrual yang tidak hanya mampu mencatat transaksi secara tepat, tetapi juga terintegrasi dengan mekanisme cost control. Penelitian ini bertujuan untuk merancang dan mengimplementasikan Sistem Informasi Akuntansi berbasis akrual dengan pendekatan pengendalian biaya yang mendukung pencatatan transaksi, klasifikasi biaya, dan evaluasi manajerial. Kontribusi utama penelitian ini adalah integrasi prinsip akuntansi berbasis akrual dengan fitur cost control secara sistematis, seperti penetapan cost center, analisis anggaran terhadap realisasi, serta penyajian dashboard manajerial dalam satu sistem terpadu. Evaluasi sistem dilakukan melalui pengujian fungsional dan simulasi transaksi untuk menilai akurasi, konsistensi, dan keandalan proses akuntansi serta laporan pengendalian biaya. Hasil evaluasi menunjukkan bahwa sistem mampu menjaga keseimbangan akuntansi, menghasilkan laporan keuangan berbasis akrual secara akurat, dan menyediakan informasi pengendalian biaya yang bermanfaat bagi manajemen. Penelitian selanjutnya disarankan untuk mengembangkan analisis varians biaya yang lebih lanjut, peramalan biaya, serta penggunaan data operasional riil guna meningkatkan kemampuan analitis dan penerapan sistem di lingkungan organisasi nyata.

Kata kunci*—Sistem Informasi Akuntansi, Akuntansi Berbasis Akrual, Pengendalian Biaya, Cost Control, Sistem Informasi Manajemen.*

Abstract

The rapid development of information technology has encouraged organizations to adopt Accounting Information Systems (AIS) to improve the accuracy and timeliness of financial information for managerial decision-making. However, many organizations still rely on cash-based or semi-manual accounting practices that limit their ability to monitor costs effectively and reflect financial performance accurately. This condition motivates the need for an accrual-based AIS that not only supports proper revenue and expense recognition but also integrates cost control mechanisms. This research proposes and implements an accrual-based Accounting Information System with a cost control approach designed to support transaction recording, cost classification, and managerial evaluation. The main contribution of this study lies in integrating accrual accounting principles with systematic cost control features, including cost center allocation, budget versus actual analysis, and managerial dashboards within a

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single system. The system is evaluated through functional testing and transaction simulations to assess accuracy, consistency, and reliability of accounting processes and cost reports. The evaluation results indicate that the system successfully maintains accounting balance, generates accurate accrual-based financial statements, and provides meaningful cost control information to support managerial decision-making. As future work, the system can be enhanced by incorporating advanced cost variance analysis, predictive cost forecasting, and the use of real operational data to further improve its analytical capability and applicability in real-world organizational environments.

Keywords— *Accounting Information Systems, Accrual-Based Accounting, Cost Control, Management Information Systems.*

1. INTRODUCTION

The rapid advancement of information technology has significantly transformed the way organizations manage financial information and support managerial decision-making. Accounting Information Systems (AIS) have evolved from simple transaction-recording tools into integrated systems that provide real-time, accurate, and strategic financial insights. One of the most critical developments in this domain is the adoption of accrual-based accounting, which recognizes financial events when they occur rather than when cash transactions take place. Accrual-based accounting offers a more comprehensive representation of an organization's financial position and operational performance, making it particularly relevant for organizations that require accurate cost measurement and financial control [1], [2]. In parallel, increasing competitive pressure, operational complexity, and cost volatility have intensified the need for effective cost control mechanisms. Organizations are now required not only to record financial transactions accurately but also to monitor, analyze, and control costs systematically to ensure sustainability and efficiency. As a result, integrating accrual-based accounting principles with information systems that explicitly support cost control has become an essential requirement for modern organizations [3].

Despite the theoretical advantages of accrual-based accounting, many organizations—especially small and medium-sized enterprises (SMEs) and service-oriented businesses—continue to rely on manual or semi-manual accounting practices. These practices often focus on cash-based recording, fragmented documentation, and delayed reporting, which limit management's ability to evaluate actual operational costs in a timely manner. Such conditions frequently lead to discrepancies between reported financial outcomes and actual resource consumption, making cost overruns difficult to detect and control [4]. Furthermore, existing accounting software solutions are often designed primarily for financial reporting compliance rather than for managerial cost analysis. They tend to emphasize journal automation and financial statements while providing limited analytical support for cost monitoring, variance analysis, and budget control. Consequently, managers face challenges in linking accrual-based financial data with operational cost structures, which weakens the effectiveness of cost control initiatives and strategic decision-making [5].

The primary objective of this research is to design and implement an accrual-based Accounting Information System that explicitly incorporates a cost control approach. The proposed system aims to support accurate transaction recording, systematic cost classification, and real-time financial reporting while enabling management to monitor cost behavior and deviations effectively. This research is motivated by the growing demand for integrated financial systems that bridge the gap between accounting accuracy and managerial control. By embedding cost control mechanisms within an accrual-based AIS, the system is expected to enhance transparency, improve budgeting accuracy, and provide actionable insights for operational efficiency. The proposed solution focuses on developing a web-based AIS

architecture that automates accrual journal entries, links expenses to cost centers, and generates cost-related reports to support managerial evaluation. Unlike conventional AIS implementations that prioritize statutory reporting, this study emphasizes managerial usefulness by aligning accounting processes with cost control objectives [6], [7].

The contribution of this research lies in the integration of accrual-based accounting principles with a structured cost control framework within a single information system. From a theoretical perspective, this study extends existing AIS literature by demonstrating how accrual accounting data can be operationalized for cost control purposes rather than being limited to financial reporting. From a practical standpoint, the developed system provides a reference model for organizations seeking to improve cost management through information technology. The effectiveness of the proposed system is evaluated through functional testing, transaction simulations, and analysis of system outputs, focusing on accuracy, consistency, and usability. Evaluation results demonstrate that the system is capable of maintaining accounting balance, generating reliable cost reports, and supporting managerial decision-making. In conclusion, this study highlights the strategic role of accrual-based Accounting Information Systems in strengthening cost control practices and underscores their potential to enhance organizational efficiency and financial governance in dynamic business environments [8].

2. METHODS

Recent research highlights the growing role of Accounting Information Systems (AIS) in supporting managerial control and organizational performance. Romney and Steinbart [1] and Hall [6] emphasize that accrual-based AIS provides more accurate financial representation than cash-based systems, yet their studies mainly focus on conceptual frameworks and compliance reporting. Granlund and Malmi [3] and Nicolaou [5] empirically demonstrate that digital AIS enhances management control effectiveness, but cost control is treated implicitly and evaluated through broad performance indicators rather than detailed cost analysis. Studies focusing on AIS quality, such as Al-Dalabih [7], confirm its positive impact on cost control and decision-making; however, these works rely on survey-based methods and do not present implemented system artifacts. Susanto [4] reports efficiency improvements in SMEs through AIS adoption, but the systems analyzed predominantly apply cash-based accounting practices. More recent system-oriented studies propose accrual-based AIS prototypes for managerial purposes [8], although cost control is positioned as a supporting feature with limited evaluation scenarios. Overall, existing studies reveal a research gap in the design and systematic evaluation of an accrual-based AIS that embeds cost control mechanisms as a core functionality and validates its effectiveness through transaction simulation and functional testing.

2.1 Research Object and Data Sources

The object of this research is an accrual-based Accounting Information System (AIS) designed to support cost control in organizational operations. The study focuses on accounting transaction processes related to revenues, expenses, assets, and liabilities, with particular emphasis on cost-incurring activities. The data used in this research consist of primary data obtained from direct observation and interviews with accounting personnel and management, as well as secondary data derived from accounting documents, standard operating procedures, and relevant accounting standards. Transaction data include purchase records, expense invoices, depreciation schedules, and cost allocation records that represent typical operational activities. These data are used as the basis for system design, transaction simulation, and evaluation. The adoption of accrual accounting principles follows established accounting standards and prior AIS research [1], [6].

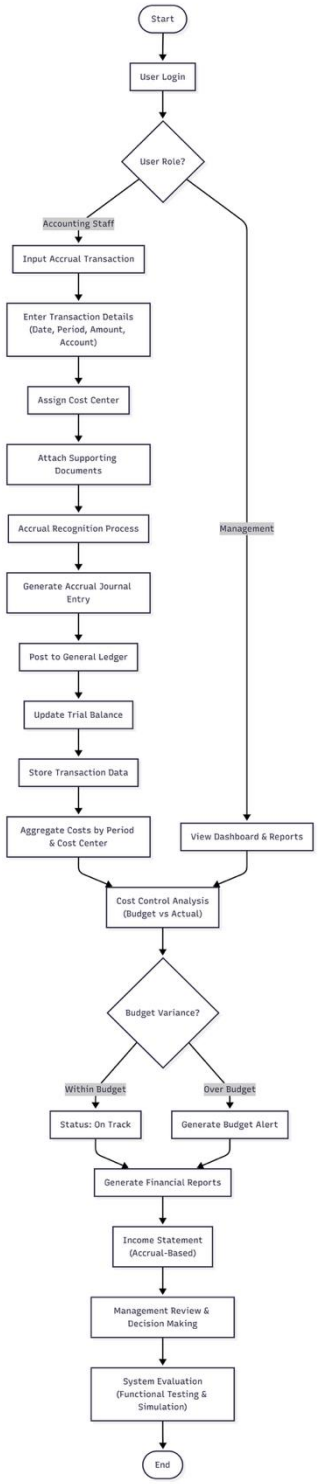

Figure 1. *Flowchart of the accrual-based accounting information system with a cost control approach.*

The research object described in this study is further illustrated through the system flowchart, which represents the operational workflow of the proposed accrual-based Accounting Information System. The flowchart demonstrates how accounting transaction data, collected from primary and secondary data sources, are processed within the system. The process begins with user authentication and role identification, distinguishing between accounting staff and management users. Accounting staff utilize the system to input accrual-based transactions

derived from source documents such as invoices, purchase records, and depreciation schedules. These data are then processed through accrual recognition, journal generation, general ledger posting, and trial balance updates, ensuring compliance with accrual accounting principles. Subsequently, transaction data are aggregated by accounting period and cost center to support cost control analysis. Management users access the processed data through dashboards and reports to evaluate budget versus actual performance. The flowchart also shows how budget variance outcomes influence reporting and managerial decision-making. This workflow confirms that the research object is not limited to static accounting records, but encompasses an integrated information system that transforms raw accounting data into managerial insights for cost control and performance evaluation.

2.2 Data Preparation and Analysis Process

Prior to system development, the collected data are analyzed to identify transaction types, cost structures, and information requirements for cost control. This process involves classifying transactions into revenue, expense, asset, and liability categories, and mapping each expense to its corresponding cost center. Data preparation also includes defining chart of accounts, cost elements, and accrual recognition rules to ensure consistency and completeness. The analysis phase aims to align accounting data with managerial needs, particularly for monitoring cost behavior and identifying variances between planned and actual costs. This structured preparation ensures that the implemented system can generate reliable accrual-based reports and support cost analysis, as suggested in previous AIS and management control studies [3], [5].

2.3 Proposed Method and System Approach

The primary method employed in this research is a system development and implementation approach, emphasizing the integration of accrual-based accounting with cost control mechanisms. Conceptually, the system processes financial transactions by recognizing revenues and expenses at the time they are incurred, not when cash flows occur. Each transaction is automatically transformed into accrual journal entries and posted to the general ledger. Cost control is implemented by associating expenses with predefined cost centers and accounting periods. The fundamental accounting equation applied in the system is expressed as:

$$Assets = Liabilities + Equity \qquad (1)$$

and expense recognition follows the accrual principle:

$$Expense_{period} = Cost_{incurred} \text{ regardless of cash payment} \qquad (2)$$

This approach ensures accurate financial representation while enabling systematic cost tracking. The system architecture is designed to support real-time reporting and managerial analysis, extending prior conceptual AIS frameworks into a functional system artifact [6], [8].

2.4 Supporting Techniques for Cost Control

To enhance the effectiveness of cost control, the system incorporates supporting techniques such as cost classification, periodic cost aggregation, and variance identification. Costs are grouped based on type and responsibility centers, enabling management to compare actual costs against predefined budgets or historical benchmarks. Variance analysis is conceptually applied by calculating the difference between planned and realized costs within a given period, allowing early detection of inefficiencies. These techniques are embedded within the AIS workflow to ensure that cost control is not treated as a separate process but as an integral system function. This integration addresses limitations identified in prior studies where cost control was only partially supported by AIS implementations [7].

2.5 System Evaluation and Testing

The evaluation of the proposed system is conducted through functional testing and transaction simulation. Functional testing verifies that each system module operates according to the defined requirements, including journal generation, ledger updates, and report production. Transaction simulation involves inputting representative accounting transactions to assess system accuracy, consistency, and balance, ensuring that total debits always equal total credits. In addition, system outputs are reviewed to evaluate the clarity and usefulness of cost-related reports for managerial decision-making. This evaluation approach aligns with prior AIS evaluation practices and demonstrates the system's capability to support accrual accounting and cost control objectives effectively [5], [8].

3. RESULTS AND DISCUSSION

3.1 System Design Results

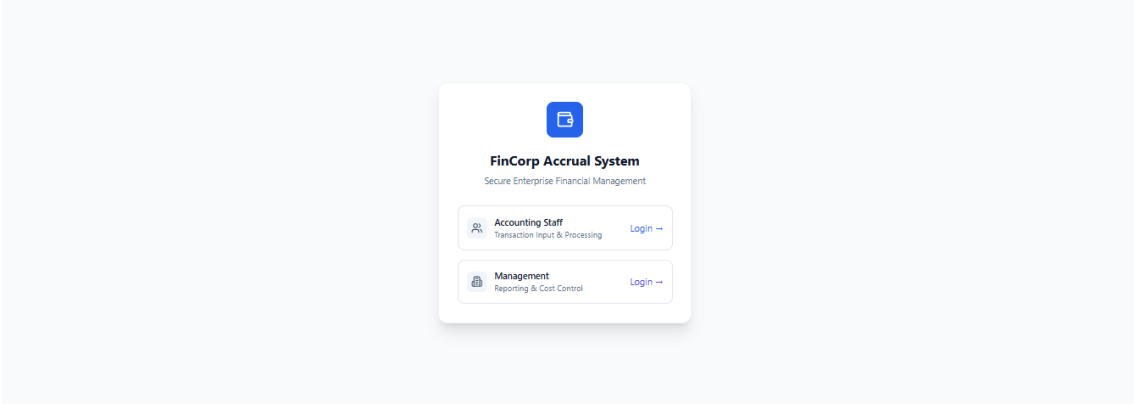

Figure 2. *Login and role-based access interface of the accrual-based accounting information system.*

Figure 2 illustrates the login and role selection interface of the proposed accrual-based Accounting Information System. The interface is designed using a role-based access control concept, allowing users to enter the system according to their responsibilities. Two primary roles are provided: *Accounting Staff* and *Management*. The Accounting Staff role focuses on transaction input and processing, ensuring that accrual-based financial data are recorded accurately and consistently. In contrast, the Management role is dedicated to reporting and cost control functions, enabling users to monitor financial performance and analyze cost behavior. This separation of roles enhances system security, supports task specialization, and improves usability by presenting features that are relevant to each user category. Overall, the interface reflects a user-centered design approach that aligns accounting operations with managerial decision-making needs.

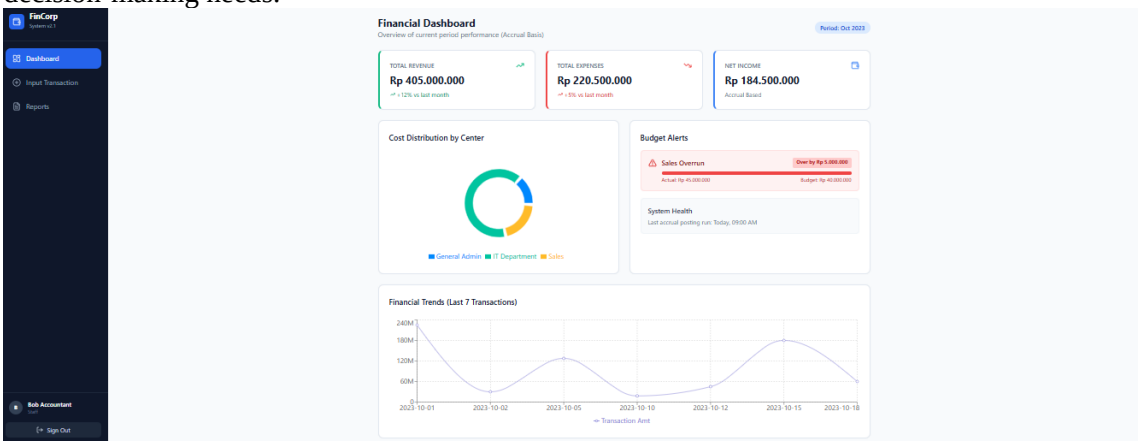

Figure 3. *Financial dashboard displaying accrual-based performance indicators and cost control information.*

The dashboard shown in Figure 3 represents the main financial overview interface of the accrual-based Accounting Information System designed to support cost control. This interface presents key financial indicators for the selected accounting period, including total revenue, total expenses, and net income calculated on an accrual basis, allowing management to assess overall financial performance at a glance. In addition, the dashboard visualizes cost distribution by cost center, enabling users to identify which organizational units contribute most to operational costs. Budget alerts are prominently displayed to notify management of cost overruns, thereby supporting timely corrective actions. The inclusion of financial trend charts further assists users in analyzing transaction patterns over time. Overall, the dashboard integrates accrual-based financial reporting with cost monitoring features, enhancing transparency and managerial decision-making.

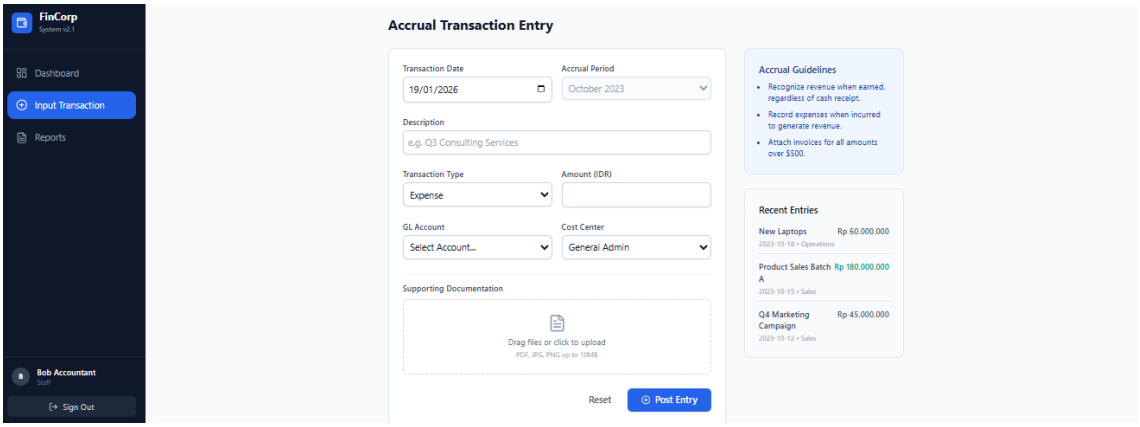

Figure 4. *Accrual-based transaction entry interface with cost center assignment and supporting documentation features.*

Figure 4 presents the accrual transaction entry interface of the proposed Accounting Information System. This interface is designed to support accurate accrual-based recording by allowing users to specify both the transaction date and the accrual period, ensuring that revenues and expenses are recognized in the appropriate accounting period regardless of cash movement. The form captures essential transaction attributes, including transaction type, amount, general ledger account, and cost center, which enables systematic cost classification and subsequent cost control analysis. Supporting documentation can be attached to enhance data validity and auditability. In addition, accrual guidelines and recent transaction summaries are displayed to assist users in applying correct accounting treatment and to reduce input errors. Overall, the interface promotes consistency, accuracy, and transparency in accrual-based transaction processing.

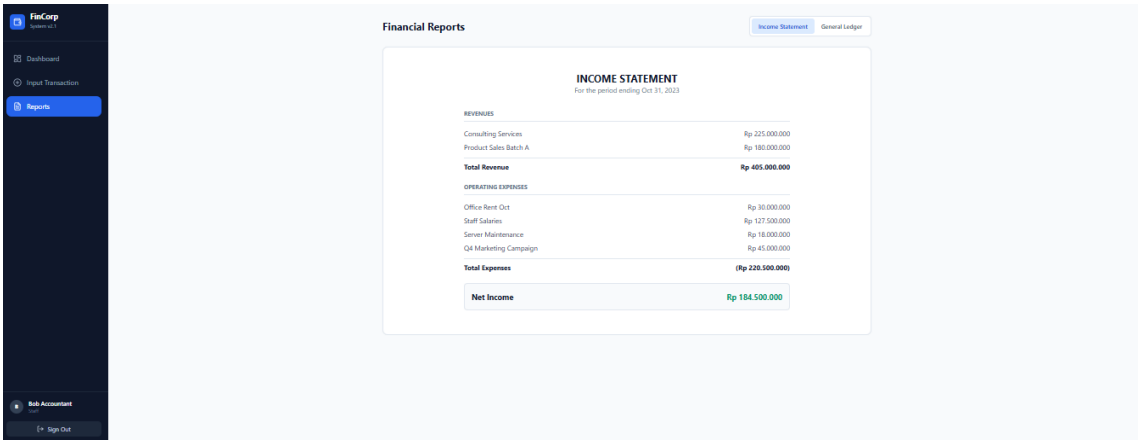

Figure 5. *Accrual-based income statement generated by the accounting information system.*

Figure 5 shows the financial reporting interface of the accrual-based Accounting Information System, specifically displaying the Income Statement for a selected accounting period. The report is generated automatically based on accrual-recognized transactions, ensuring that revenues and expenses are presented in the period in which they are earned or incurred, rather than when cash is received or paid. The interface provides a clear breakdown of revenue sources and operating expenses, followed by the calculation of total revenue, total expenses, and net income. This structured presentation enhances transparency and supports managerial evaluation of financial performance and cost efficiency. By integrating accrual-based reporting within the system, the interface enables management to assess profitability accurately and use the information as a basis for cost control and strategic decision-making.

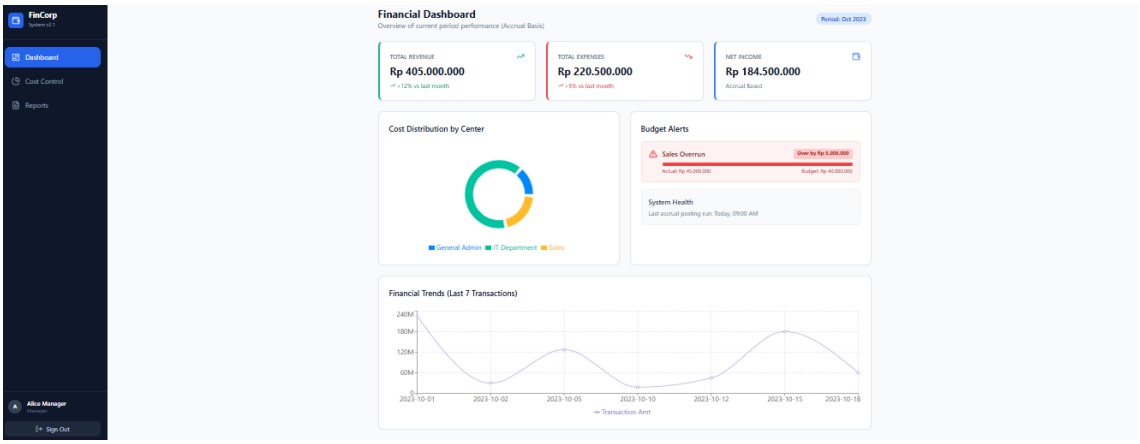

Figure 6. *Management dashboard interface emphasizing accrual-based performance monitoring and cost control analysis.*

Figure 6 illustrates the management dashboard interface, which is specifically designed to support managerial oversight and cost control, distinguishing it from the operational dashboard used by accounting staff. Unlike the staff-oriented interface that focuses on transaction input and processing, the management interface emphasizes summary-level information and analytical insights. Key accrual-based performance indicators such as total revenue, total expenses, and net income are presented prominently to enable quick evaluation of financial performance. In addition, this interface highlights cost distribution by cost center, budget alert notifications, and financial trend analysis, allowing management to identify cost overruns, inefficiencies, and emerging patterns in operational spending. The presence of budget deviation alerts and system health indicators further supports proactive decision-making. Overall, this

management-focused UI reinforces the system's role as a decision-support tool by prioritizing strategic cost control and financial monitoring rather than detailed transaction handling.

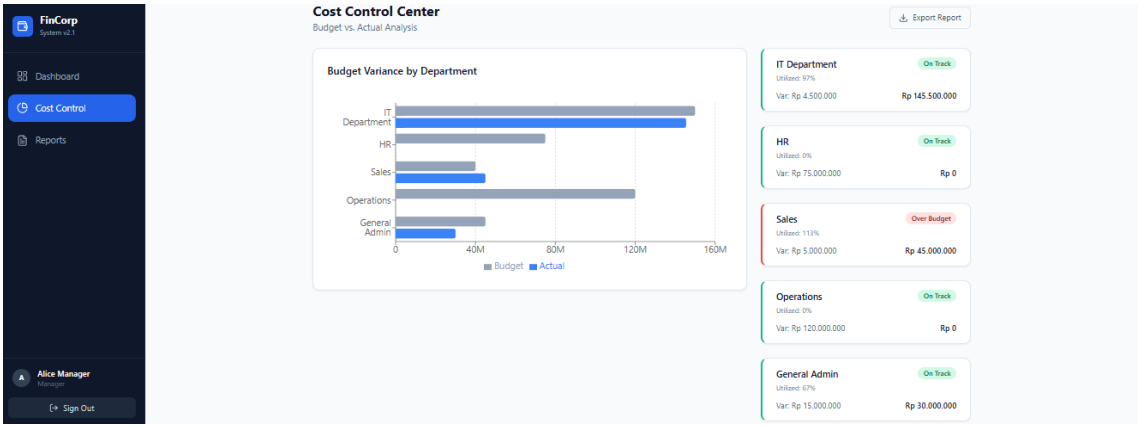

Figure 7. *Cost control center interface showing budget versus actual analysis by department.*

Figure 7 presents the Cost Control Center interface, which is a dedicated management feature for analyzing budget versus actual expenditures across organizational departments. This interface visualizes budget variance using comparative bar charts, enabling management to quickly identify departments that are on track or exceeding allocated budgets. Each department is accompanied by key indicators such as budget utilization percentage, variance value, and status labels (e.g., *On Track* or *Over Budget*), which support rapid interpretation of cost performance. By integrating accrual-based expense data with budget information, this interface allows management to monitor cost deviations in real time and take corrective actions when necessary. Compared to operational accounting views, this interface emphasizes analytical insight and strategic cost control, reinforcing the system's role as a managerial decision-support tool.

Figure 8. *Management-oriented accrual-based income statement report generated by the system.*

Figure 8 illustrates the financial reporting interface for management users, displaying an accrual-based income statement generated by the system. Unlike the accounting staff view that emphasizes data entry and transaction processing, this interface is designed to support managerial evaluation and decision-making by presenting summarized and structured financial information. Revenues and operating expenses are classified clearly, and totals are automatically calculated based on accrual-recognized transactions for the selected reporting period. The prominent display of net

income enables management to assess organizational profitability efficiently, while the consistency of report formatting enhances readability and comparability across periods. This interface demonstrates how accrual-based accounting data can be transformed into meaningful financial reports that support cost control and strategic planning.

3.2 System Implementation Results

The proposed accrual-based Accounting Information System was successfully implemented as a web-based application integrating transaction processing, journal automation, and cost control functionalities. The system enables users to record financial transactions related to revenues, expenses, assets, and liabilities, which are automatically transformed into accrual journal entries and posted to the general ledger. Each expense transaction is systematically linked to predefined cost centers and accounting periods, allowing cost data to be structured and traceable. The implementation demonstrates that accrual accounting principles can be operationalized effectively within an information system to support both financial reporting and managerial control. Compared to conventional accounting systems that emphasize cash-based recording, the implemented system provides more accurate temporal representation of costs and obligations, which is essential for effective cost control.

3.3 Functional Testing Results

The functional validity of the system was assessed through a series of transaction simulations focusing on the automated accrual engine. During the testing phase, multiple journal entries were posted to observe real-time updates of the general ledger and trial balance. The results show that the system consistently maintained accounting equilibrium, where total debits were equal to total credits in all test scenarios. This confirms the correctness of the accrual journal generation and posting mechanisms. In addition, the system successfully generated periodic financial reports, including income statements and cost summaries, based on accrual data. These results indicate that the core accounting functions operate reliably and conform to fundamental accounting principles, supporting findings from prior AIS implementation studies [1], [6].

3.4 Cost Control Analysis Results

The integration of cost control mechanisms within the accrual-based AIS enabled systematic monitoring of operational costs. Costs were aggregated based on cost centers and accounting periods, allowing management to identify cost patterns and deviations. The system-generated cost reports revealed differences between planned and realized expenses, facilitating early detection of potential inefficiencies. This result demonstrates that embedding cost control within the AIS enhances managerial visibility over cost behavior, addressing limitations reported in previous studies where cost control was treated as an external or secondary process [5], [7]. By aligning accrual accounting data with cost center structures, the system supports more informed managerial decision-making related to budgeting and resource allocation.

3.5 Discussion of System Effectiveness

The results indicate that the proposed system effectively bridges the gap between accrual-based accounting and cost control practices. Unlike prior AIS solutions that primarily focus on compliance reporting, this system emphasizes managerial usefulness by providing timely and structured cost information. The successful automation of accrual journal entries reduces manual recording errors and improves data consistency. Furthermore, the cost control features embedded in the system enhance transparency and accountability, supporting management control objectives as highlighted in earlier research [3], [8]. However, the evaluation was conducted using simulated transaction data, which

may not fully capture the complexity of real-world operations. Future research may extend the evaluation using longitudinal data and comparative performance metrics.

3.6 Implications and Research Gap Discussion

The findings of this study contribute to the AIS literature by demonstrating a practical implementation of an accrual-based system that integrates cost control as a core functionality. The results confirm that such integration improves the usefulness of accounting information for managerial purposes, not merely for financial reporting. Compared to prior studies that relied on surveys or conceptual models, this research provides empirical evidence through system testing and transaction simulation. Nevertheless, opportunities remain for further enhancement, including advanced cost variance analysis and predictive cost analytics. These findings highlight a remaining research gap in extending accrual-based AIS toward intelligent cost management systems, which can serve as a direction for future studies.

4. CONCLUSIONS

This research has presented the design and implementation of an accrual-based Accounting Information System integrated with a cost control approach to support managerial decision-making. The system was developed to address limitations of conventional accounting practices by ensuring that revenues and expenses are recognized in the appropriate accounting periods and systematically linked to cost centers. The results of system implementation and functional testing demonstrate that the proposed system is capable of generating accurate accrual journal entries, maintaining accounting balance, and producing reliable financial and cost control reports. The management-oriented interfaces, including dashboards, cost control analysis, and accrual-based financial statements, further enhance transparency and provide timely insights into cost behavior and organizational performance.

Despite its effectiveness, this study has several limitations that open opportunities for future research and system improvement. Future work may focus on extending the cost control module with more advanced variance analysis, predictive cost forecasting, and integration with budgeting and planning systems. In addition, the system can be enhanced by incorporating real-world longitudinal data and comparative performance evaluations to assess its impact on operational efficiency over time. The integration of intelligent analytics or decision support techniques, such as anomaly detection or trend prediction, may further strengthen the role of accrual-based Accounting Information Systems in supporting strategic financial management and cost control.

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