

## Boosting Efficiency: Integrating Inventory Apps in Accounting Information Systems

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### Abstract

This research explored the implications of computer-based Accounting Information Systems (AIS) in the realm of inventory transactions, aiming to enhance business efficiency through the integration of business processes within companies. While prior research had primarily focused on transitioning from manual to computerized systems, this study shifted the focus towards comprehensive integration, addressing inefficiencies such as transaction redundancies, manual handovers, and potential data inaccuracies. Employing the Software Development Life Cycle (SDLC), the research methodology emphasized analysis, design, and implementation stages. The analysis stage involved identifying gaps in existing literature, while the design stage developed document flowcharts for inventory transactions with and without integration. The implementation stage provided a technical overview of integrating the designed flowcharts using recommended software. The findings revealed that the majority of prior studies endorsed the transition to computerized systems but fell short in addressing business process integration. The proposed integration framework was demonstrated through document flowcharts, showcasing the effectiveness of computer-based AIS in minimizing inefficiencies. The study illustrated a reduction in transaction redundancies and manual handovers, leading to enhanced business efficiency, data accuracy, and consistency. In conclusion, this study advocated for a holistic approach in leveraging technology for accounting practices. It underscored the significance of integrating various functions within businesses, going beyond mere automation. The practical implementation of integration features through off-the-shelf software solutions provided actionable insights for companies seeking to optimize their business processes in the digital era.

**Keywords:** Business Process Integration; Computer-Based Accounting Information Systems (AIS); Inventory Transactions

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## 1. Introduction

In the ever-evolving landscape of business and finance, the integration of technology has revolutionized traditional accounting practices, offering unprecedented efficiency, accuracy, and transparency (Imene & Imhanzenobe, 2020; Thakker & Japee, 2023; Uma, 2023). One of the main objectives of many businesses in adopting this system is to enhance business efficiency (Hla & Teru, 2015; Zhao & Tu, 2021). One area where this transformation is particularly pronounced is in the realm of inventory transaction (M. Bragg, 2005; Zhao & Tu, 2021).

In the previous research, certain authors (e.g., Liong, 2020) still depend on the recommendation of a manual-based system. Conducting inventory transactions manually can be highly inefficient and prone to errors due to the numerous and intricate nature of inventory transactions, often interconnected with other business processes (Fagbemi & Olaoye, 2016; Wynn, 2021). Consequently, other previous literature suggests the conversion from a manual system to a computer-based inventory system, as attempted by authors like Kartinah (2015), Nugroho (2019), Mustofa et al., (2021), Saputra et al. (2023) and (Rahwani & Nugraha, 2016).

However, those authors focused more on transaction recording automation by using ready-to-use accounting software. For example, QuickBooks (Saputra et al., 2023), Zahir Enterprise (Kartinah, 2021), an ERP software (Mustofa et al., 2021), and Accurate (Nugroho, 2019). On the other hand, Rahwani & Nugraha (2016) demonstrated how to develop software for recording inventory transactions to determine the cost of products sold to customers. In their papers, they did not explain the potential for these ready-to-use or tailored software to integrate with other business processes in various departments within the companies used as case studies in their research.

Thus, as a contribution to research, the aim of this paper is to demonstrate how to enhance the efficiency of implementing computer-based accounting information systems (AIS) through the integration of business processes within companies. The integration of business processes within companies can offer various benefits, including reducing transaction redundancies (Swink & Schoenherr, 2014), minimizes manual handovers between departments (Booth, 1996), and maintain data accuracy and consistency across various business functions (Boina et al., 2023).

The next section outlines the steps and procedures employed to achieve that research objective.

## **2. Research Method**

The research for this paper utilized the Software Development Life Cycle (SDLC), a systematic process encompassing planning, creation, testing, deployment, and maintenance of information systems and software applications (Romney & Steinbart, 2020, p. 721). SDLC involves several key steps: planning, analysis, design, implementation, testing, deployment, and maintenance. However, this study specifically focused on three main steps within SDLC: analysis, design, and implementation, aligning with the system development framework proposed by Mulyadi (2016, p. 31).

In the analysis stage, the study explored gaps in the existing literature regarding the benefits of computer-based Accounting Information Systems (AIS) in integrating inventory processes to enhance business efficiency. This involved two procedures: collecting five research papers as samples and analyzing the collected papers. The criteria for selecting samples included (1) using papers from the last eight years (2015-2023), (2) relevance to computer-based AIS for inventory, and (3) utilization of case studies recommending computer-based AIS for Small to Midsize Enterprises (SMEs). In the second procedure of the analysis step, the study identified whether the sample papers recommended business process integration for the companies' inventory transactions.

Moving to the design stage, the study developed document flowcharts for an inventory transaction procedure to compare between inventory AIS with and without computer-based integration. In the third stage, the study briefly implemented inventory AIS with computer-based integration to illustrate the idea by using the software recommended by the authors in their papers.

To summarize, the study incorporated three key steps (analysis, design, and implementation) to achieve the research goal of demonstrating how to enhance the efficiency of implementing computer-based AIS through the integration of business processes within companies, as outlined in the introduction. Those steps will be further detailed in the subsequent section of this paper.

## **3. Results and Discussion**

This section comprises two subsections: results and discussion. As outlined in the preceding section, the study will unfold across three stages—analysis, design, and implementation. The results subsection will delve into the initial step of the analysis stage, specifically the collection of five random research papers pertaining to computer-based AIS for inventory transactions. The discussion subsection will then address the subsequent stages: the second

procedure of the analysis stage, the design stage, and the implementation stage.

### 3.1 Result

The following table presents five research papers as samples for the discussion of computer-based AIS in inventory transactions.

Table 1. Previous Research Papers Related to the Conversion of AIS of Inventory

No	Authors	Previous system	Suggested Software	Company		Targeted conversion goals
				Name	Type	
1	Mustofa et al. (2021)	Manual	ERP app	Tirta Pharmacy	Trading Company	- Easier to input financial transactions
2	Nugroho (2019)	Manual	Accurate	PT Andre Laurent	Trading Company	- Simplifying the entry of transactions - Automatically determining the cost of sold products to customers using the FIFO method.
3	Kartinah (2021)	Manual	Zahir Enterprise	PT. Main Dennis	Trading Company	- Company's activities will be more organized - Increase the quality of financial reports
4	Saputra et al. (2023)	Manual	QuickBooks	Mutiara Park swimming pool	Service/ Trading Company	- Easier to record all transactions - Easier to prepare financial reports
5	Rahwani & Nugraha (2016)	Manual	Tailor Software	UD Makmur	Trading Company	- Simpler to determine the cost of sold products to customers using Average method.

As indicated in Table 1, all system conversions are from manual to computerized systems, either utilizing off-the-shelf software (No. 1 to 4) or by developing inventory-related software (No. 5).

There are variety of software that the authors suggested, but essentially the software is capable of processing inventory transactions. For instance, Saputra et al., (2023) suggested QuickBooks , Kartinah (2021) opted Zahir Enterprise, Mustofa et al. (2021) suggested an ERP software, and Nugroho (2019) selected Accurate. On the other hand, Rahwani & Nugraha (2016) demonstrated how to develop an inventory software.

In summary, Table 1 summarizes the conversion recommendations found in the selected research papers related to computer-based AIS, which advocate the transition from manual to computer systems. The subsequent stages, namely the analysis of findings, design, and implementation stages, will be discussed in the following section.

### 3.2 Discussion

This section comprises three subsections i.e. the analysis of findings, design, and implementation stages. The first subsection discusses whether the sample papers recommended business process integration for the

companies' inventory transactions. The second subsection discusses the study developed document flowcharts for an inventory transaction procedure to compare between inventory AIS with and without computer-based integration. The third subsection will discuss how the recommended software (refer to Table1) can be used to integrate the business processes.

### **Analysis of Findings**

As outlined in the introductory section, the goal of this research is to demonstrate how integrating business processes within organizations via computer-based accounting information systems (AIS) can boost business efficiency.

However, Table 1 reveals that the primary focus of the selected previous literature was not on enhancing efficiency by integrating various functions or procedures within businesses. Instead, the system conversions primarily aimed for simplified entry (e.g., making it easier to record transactions), improving output quality and reliability (e.g. financial reports quality and inventory cards), and automation benefits (e.g., automatically calculating the cost of sold products).

The following subsection will explore the creation of document flowcharts for an inventory transaction procedure, illustrating how the efficiency of computer-based AIS could be improved.

### **Design Stage**

This subsection aims to demonstrate how the efficiency of computer-based AIS could be enhanced by integrating business processes or functions within the company. According to the results of this study (refer to Table 1 in Section 3.1), the predominant type of companies analyzed is trading companies, which are business entities primarily involved in buying and selling goods and products. Therefore, the study designed document flowcharts based on the typical purchasing AIS used in trading companies.

Two kinds of document flowcharts are designed to illustrate the difference between computer-based inventory AIS with integration and without integration.

#### **a. Computer-based Inventory AIS without Integration**

The document flowchart below (Figure 1) depicts the common business process for goods purchasing. That flowchart illustrates the utilization of the recommended software by the authors mentioned in Table 1. Although these authors endorse the use of such software, their primary focus is not on

business integration. Consequently, as indicated Figure 1, these software solutions function more as inventory applications utilized by the warehouse department, emphasizing simplified entry and automation in calculating the cost of sold products.

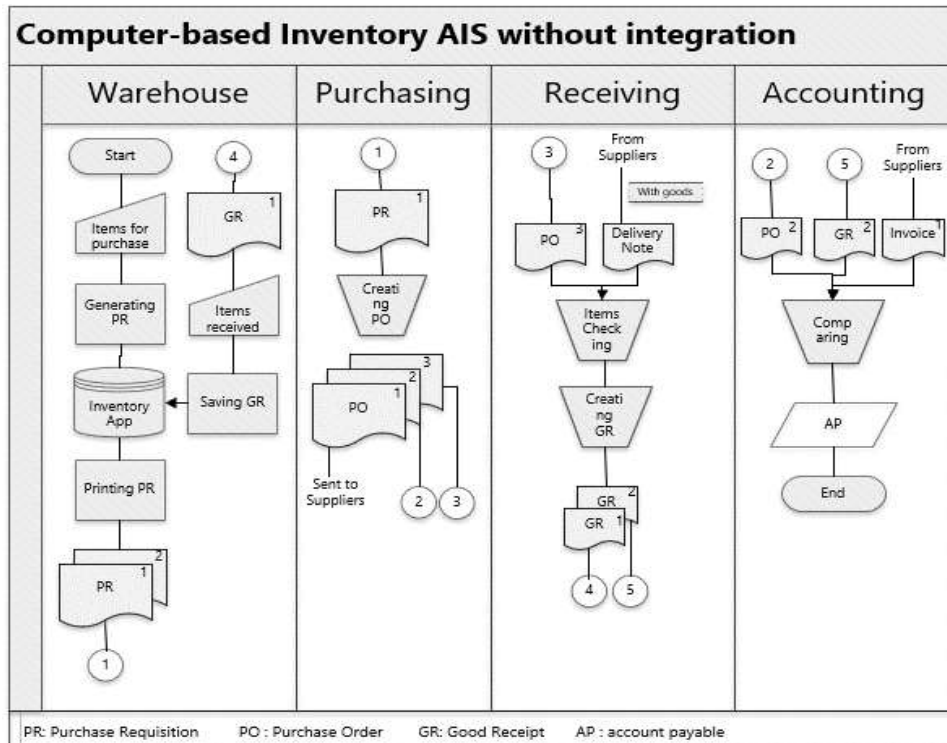


Figure 1: Computer-based Inventory AIS without Cross Functional Integration

As explained in the introduction section, the implementation of SIA without integrating other business functions (see Figure 1) may result in three types of inefficiencies for companies (refer to Table 1): transaction redundancies (Swink & Schoenherr, 2014), a relatively high number of manual handovers between departments (Booth, 1996), and the potential for data inaccuracy and inconsistency across various business functions (Boina et al., 2023).

Regarding transaction redundancies, the document flowchart in Figure 1 shows that the purchase requisition (PR) entered by the warehouse department into the application needs to be re-entered by the purchasing department to generate the purchase order document (PO). Another example is the receiving department having to re-enter the PO data to create the goods receipt (GR) document.

In the context of manual handovers across departments, the document flowchart in Figure 1 illustrates that even though companies utilize computer software in their AIS, the lack of integration in related business processes leads to manual handovers across departments. For instance, the Purchase Requisition (PR) needs to be manually handed over from the warehouse to the purchasing department, manually handed over from purchasing to accounting and receiving departments for the Purchase Order (PO), and handed over from receiving departments to accounting and warehouse departments for the Goods Receipt. Therefore, the illustration of unintegrated computer-based AIS presented by Figure 1 confirms the occurrence of manual handovers across departments within a company, consistent with the findings discussed in previous literature, such as Booth (1996).

Since manual re-entry of transactions across departments continues to occur, there is an elevated risk of manual errors, which in turn increases the potential for data inaccuracy and inconsistency across various business functions, as elucidated by Boina et al. (2023).

#### b. Computer-based Inventory AIS with Integration

Like the document flowchart in Figure 1, the document flowchart presented in Figure 2 below also depicts the common business process for goods purchasing, but with computer-based cross-functional integration.

As depicted in Figure 2, integrating business processes across departments would enhance business efficiency by minimizing the shortcomings associated with implementing the Inventory AIS without computer-based integration, as explained in subsection a. above.

As shown in Figure 2, transaction redundancies were minimized due to computer-based integration. For example, the purchasing department did not need to re-enter items to be ordered because the item details had already been entered by the warehouse department when they input the items for Purchase Request (PR). The same applies when the receiving department wants to enter item details for creating a Good Receipt (GR); they do not need to input the item details again, as the items had been entered when the warehouse department created the PR. By minimizing these transaction redundancies across departments within the company, data accuracy and consistency across various business functions would increase, as explained by Boina et al. (2023).

Similarly, the number of manual handovers between departments has significantly reduced. For instance, the warehouse department no longer

needs to manually hand over the Purchase Request (PR) to the purchasing department. Similarly, the purchasing department does not need to manually hand over the Purchase Order (PO) to the receiving department. Similarly, the receiving department does not need to manually hand over the Goods Receipt (GR) to the accounting and warehouse departments. All these document handovers have been replaced by computers.

Hence, by integrating the business processes in implementing computer-based inventory AIS, those companies (refer to table 1) should be able to boost their business efficiency. Not only will efficiency improve, but data accuracy will also increase.

The next section will discuss the implementation stage of this design of flowchart document (Figure 2) in the next page.



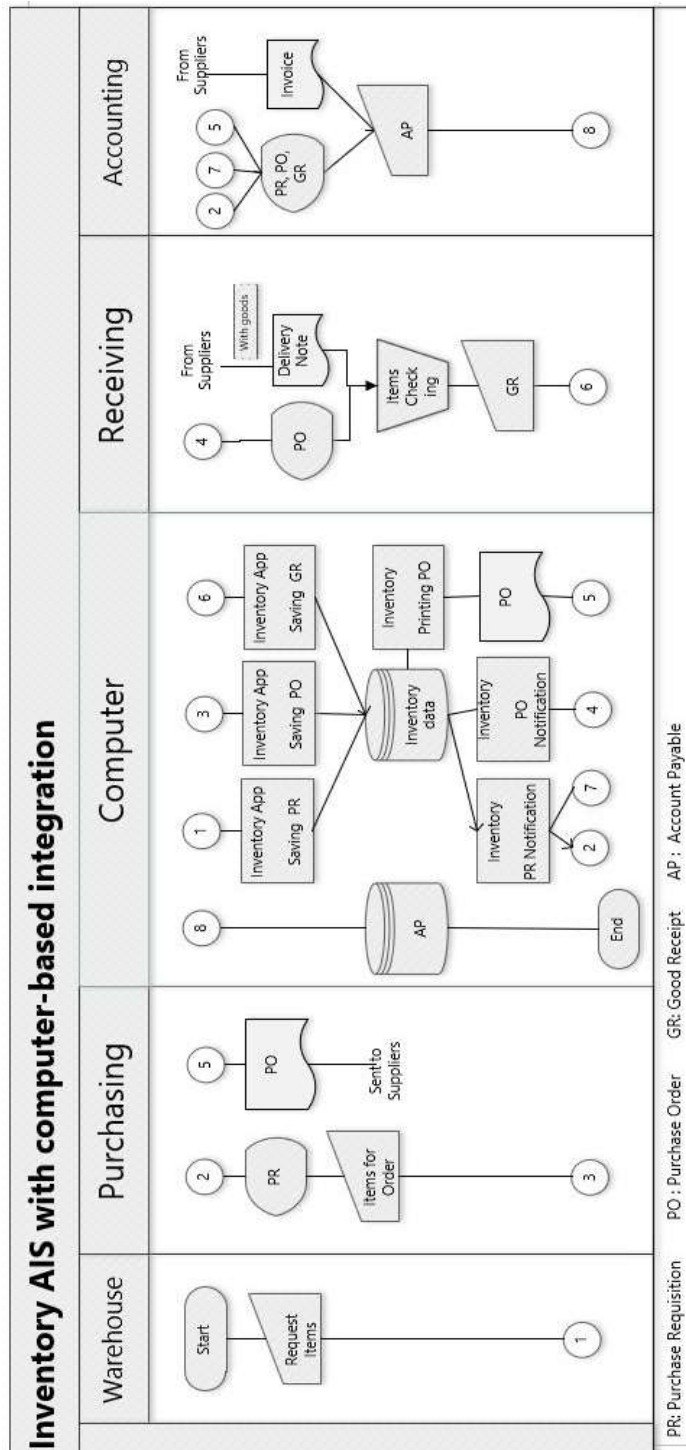


Figure 2. Inventory AIS with computer-based integration

## Implementation Stage

This section provides a general technical overview of how to implement the document flowchart in Figure 2 using the software recommended by the authors (refer to Table 1). As mentioned in result section (section 3.1, p. 156), the recommended software are QuickBooks (Saputra et al., 2023), Zahir Enterprise (Kartinah, 2021), an ERP software (Mustofa et al., 2021), Accurate (Nugroho, 2019), and a tailored app (Rahwani & Nugraha 2016).

In this stage, the discussion is limited to two activities: fitting the business process scenario to the modules provided by the software and determining the roles and users involved in the business process.

The business process scenario needs to be initially designed to identify the number of departments involved in the process and define the necessary roles for its implementation. In this study, the scenario has been illustrated in Figure 2. Typically, accounting software has enough modules to accommodate the common business processes of a company. Figure 3 displays the modules (menus) that every software (in Table 1) has in order to facilitate the business process outlined in Figure 2.



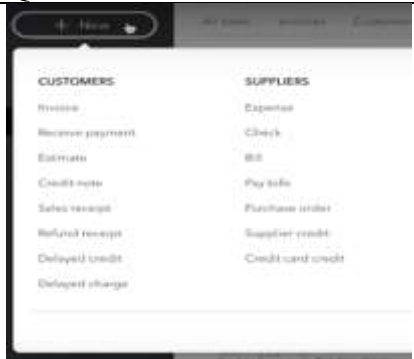
<p><b>Accurate Online</b></p> 	<p><b>Zahir Online</b></p> 
<p><b>QuickBooks Online</b></p> 	<p><b>SAP ERP</b></p> 

Figure 3. Modules Accommodating the Business Processes

The roles and users involved must be determined initially. According to the second flowchart (refer to Figure 2), the necessary roles include the warehouse department, responsible for requesting the purchase; the purchasing department, in charge of ordering the required items; the receiving department, tasked with receiving the ordered items; and the accounting department, responsible for recording AP transactions based on the three-way matching principle.

As depicted in Figure 4, these software solutions share a similar method/menu for creating roles and assigning users to those roles.

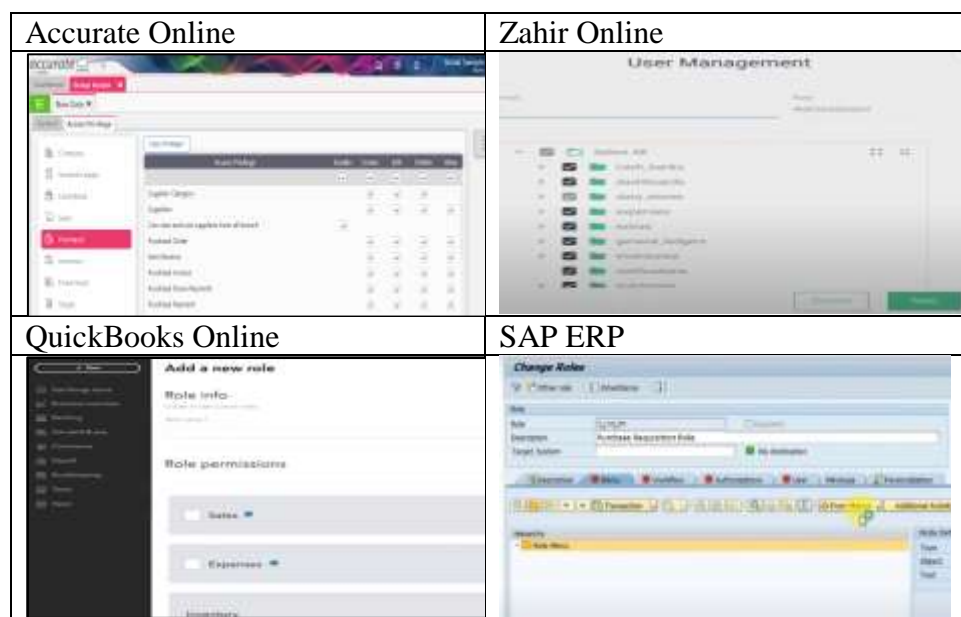


Figure 4. User and Role Management in Various Software

In application development, as demonstrated by Rahwani & Nugraha (2016), the development of such a feature is necessary. Two tables will be required to store the roles and users. The relationship between these tables is many-to-many, signifying that one user may have many roles, and one role can belong to many users.

In summary, integrating business processes in inventory-related transactions can be implemented using various off-the-shelf software solutions. However, if a company has unique business processes, they may need to develop a solution in-house. By leveraging the integration features of the recommended software, companies can enhance their business efficiency.

#### 4. Conclusion

This paper delves into the integration of technology in accounting practices, specifically focusing on computer-based Accounting Information Systems (AIS) in the context of inventory transactions. While previous research has emphasized the transition from manual to computerized systems, the primary focus has been on simplified data entry, improved output quality, and automation benefits. Despite the advancements, the lack of integration in business processes often leads to inefficiencies, including transaction redundancies, manual handovers between departments, and potential data inaccuracies.

As a contribution to the existing literature, this study demonstrates the potential for enhancing the efficiency of computer-based AIS through the integration of business processes within companies. By utilizing the recommended software and implementing cross-functional integration, the study illustrates a notable reduction in transaction redundancies and manual handovers. This integration not only enhances business efficiency but also ensures data accuracy and consistency across various business functions.

In essence, this paper emphasizes the need for a holistic approach in leveraging technology to streamline business processes. As companies transition to computer-based AIS, the integration of functions across departments emerges as a key factor in realizing the full potential of efficiency gains and data accuracy. As the business landscape continues to evolve, the integration of technology in accounting practices remains pivotal for sustainable growth and competitiveness.

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