



# Design and Implementation of a VBA-Based Uniform Inventory Accounting System at SMA El Fitra Bandung

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## Abstract

**Purpose:** This study aims to design and implement a Visual Basic for Applications (VBA)-based uniform inventory accounting system in Microsoft Excel at SMA El Fitra Bandung to overcome the limitations of manual inventory recording.

**Research Methodology:** A qualitative case study approach was employed. Data were collected through unstructured interviews, direct observation, and documentation. The system was developed using the five-stage Waterfall method: requirements analysis, system design, implementation, testing, and maintenance.

**Results:** The developed system consists of five modules: Main Menu, Item Data, Incoming Goods, Outgoing Goods, and Save/Exit. Five system trials were conducted, of which three were successful and two identified coding errors that were corrected during maintenance. The system accurately records inventory transactions, updates stock balances automatically, supports date-range searches, and generates printable reports. Compared with the previous manual system, it improves recording efficiency, transaction accuracy, data accessibility, and information security through password protection and digital backups.

**Conclusions:** The VBA-based inventory accounting system effectively resolves the key weaknesses of manual inventory management at SMA El Fitra Bandung. The Waterfall methodology proved suitable for developing a structured and reliable accounting information system in a small educational institution.

**Limitations:** The system is limited to inventory transactions and current stock management and does not include inventory valuation, cost accounting, or return processing.

**Contributions:** This study offers a practical and replicable VBA-based inventory accounting system model for educational institutions and non-profit organizations lacking formal accounting information systems.

**Keywords:** *Inventory Accounting System, Microsoft Excel, System Design, VBA, Waterfall Method*

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## 1. Introduction

The rapid development of information technology has fundamentally transformed organizational management practices across economic sectors, educational institutions and government agencies (Ernawatiningsih & Kepramareni, 2019; Hai et al., 2021; Mohamed Hashim et al., 2022). Effective information systems, particularly accounting information systems, are increasingly recognized as essential infrastruc-

ture for accurate financial recording, efficient resource management, and evidence-based decision-making (Faccia & Petratos, 2021; Lestari, 2020; Saputri et al., 2019). The shift from manual to computerized recording systems has been shown to yield measurable improvements in data accuracy, processing speed, retrieval efficiency, and information security across various organizational contexts (Herman et al., 2021; Ismail et al., 2021; Zhang & Chen, 2024).

Inventory management is a critical accounting function for organizations that buy, store, and distribute physical goods (García-Peñalvo, 2021; Sabri et al., 2022; Saeed et al., 2023). For educational institutions that manage student uniform procurement and distribution — an annual transaction cycle involving supplier sourcing, receipt verification, storage, and student-level distribution — the absence of an adequate inventory accounting system creates recurring operational vulnerabilities, such as recording errors from manual arithmetic, physical-book stock discrepancies, delayed reporting, and difficulty in tracing individual transactions (Alenezi, 2023; Autio et al., 2021; Naimi-Sadigh et al., 2022). These vulnerabilities are compounded in institutions where the responsible administrative staff lack formal accounting education, making systematic error prevention and stock control particularly challenging (Noviani, 2020; Sumiyati, 2021).

SMA El Fitra Bandung is a private Islamic senior high school operated by the El Fitra Educational Foundation, established to develop academically capable and morally grounded students through an integrated national curriculum, science, and Islamic education (Cichosz et al., 2020; Nadiyah, 2022). The school manages an annual school uniform procurement and distribution cycle that serves all enrolled students at the start of each academic year. At the time of this study, SMA El Fitra had no formalized inventory accounting system: all records were handwritten, tracking daily receipts from the uniform supplier (*konveksi*) and outgoing distributions to students. This system generated three documented problems: arithmetic errors causing physical-book discrepancies, lost supplier receipts creating unverifiable transaction histories, and size mismatch incidents between ordered and delivered uniforms requiring return processing (Agustian et al., 2023; Gkrimpizi et al., 2023; Litvinenko, 2020).

Visual Basic for Applications (VBA) embedded in Microsoft Excel provides an accessible, low-cost platform for developing customized accounting information systems appropriate for small organizations without the budget or technical infrastructure for commercial enterprise resource planning (ERP) software (Benavides et al., 2020; Budiarto, 2023; Ulfa & Laily, 2023). Barnes (2020), Herman et al. (2021), and Kalwar et al. (2022) demonstrated that VBA-based inventory systems successfully replaced manual recording in production entities, and Goulart et al. (2022), Ismail et al. (2021), and Ramadhan et al. (2020) confirmed similar outcomes in SME retail trade contexts. Microsoft Excel is widely available and familiar to administrative staff in Indonesian educational institutions, reducing the software adoption barrier and training requirements relative to purpose-built accounting applications (Anis, 2019; Khan et al., 2021; Moch, 2018).

This study aims to design and implement a VBA-based uniform inventory accounting system for SMA El Fitra Bandung using the Waterfall development method, addressing the following research questions: (1) What are the current weaknesses of SMA El Fitra's manual uniform inventory recording system? (2) What system architecture and functional modules are required to address these weaknesses? (3) What are the outcomes and challenges of implementing a VBA-based system in the school context?

## 2. Literature Review & Hypothesis Development

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### 2.1 Accounting Information Systems and Inventory Recording

An accounting information system (AIS) is an organizational instrument designed to support data management and financial-economic control within an organization, enabling the accurate recording,

classification, summarization, reporting, and interpretation of financial transactions (Al-Okaily et al., 2020; Halimuzzaman & Sharma, 2022; Zamzami, 2021). AIS encompasses both human procedures and technological infrastructure through which financial data are captured, processed, and communicated to decision-makers. Faiz Zamzami (2017) describes accounting as the “language of business” — a system of communication whose value depends directly on the accuracy and completeness of the underlying recording processes.

Inventory accounting specifically refers to the systematic recording of inventory movements, including receipts from suppliers, transfers between storage locations, distributions to end-users, and returns, to maintain accurate real-time knowledge of stock quantities, values, and locations (Al-Hashimy, 2022; Kocsis, 2019). Mulyadi (2018) and Wang and Zhu (2025) defines an inventory recording system as a set of elements designed to record the mutation of each inventory item stored in a warehouse, noting its close relationship with sales, sales returns, purchases, and production cost accounting systems. Two inventory recording methods are recognized under Indonesian accounting standards (PSAK No. 109 for zakat entities; PSAK No. 14 for commercial entities): the periodic method, in which physical counting determines stock balances at intervals, and the perpetual method, in which every receipt and issuance is individually recorded to maintain a continuously updated balance (Barchelino, 2016; Boh et al., 2023; García-Peñalvo, 2021). SMA El Fitra’s existing system does not systematically use either method, relying instead on informal daily notations without formal stock cards or ledger infrastructure.

## **2.2 Microsoft Excel and VBA for Organizational System Development**

Microsoft Excel is the world’s most widely deployed spreadsheet software, available across Windows, MacOS, Android, and Apple platforms, offering a grid of up to 17 billion cells for data management, formula-based calculation, and structured reporting (Anis, 2019; Lawita, 2020; Moradi et al., 2020). For small organizations without dedicated accounting software, Excel provides a familiar and accessible platform for building customized recording systems. Visual Basic for Applications (VBA) is a macro programming environment embedded within Microsoft Office applications that enables automated task execution, custom form development, and dynamic data processing through code-driven manipulation of Excel workbooks (Andarwati et al., 2019; Budiarto, 2023; Moch, 2018). VBA enables developers to create structured user interfaces within Excel with input forms, navigation menus, search functions, and print capabilities that function analogously to dedicated software applications while remaining fully contained within a standard Excel workbook file (Kalwar et al., 2022; Ulfa & Laily, 2023).

The VBA-for-inventory approach has been validated in multiple Indonesian small organizations. Herman et al. (2021) and Ramadhan et al. (2020) successfully deployed a VBA-based inventory recording system in a production entity, replacing manual recording with an automated system that reduced transaction recording time and eliminated arithmetic errors. Ismail et al. (2021) similarly designed and implemented a VBA-based inventory accounting system for Toko Serba 35 in Cimahi, a retail trade SME, documenting improvements in recording accuracy, data retrieval speed, and stock balance reliability. These precedents confirm that VBA-Microsoft Excel is an appropriate and validated technology platform for the inventory system design challenge at SMA El Fitra.

## **2.3 The Waterfall System Development Method**

The Waterfall method is a structured sequential approach to software and system development, in which each development phase must be completed before the next phase begins, with explicit validation checkpoints between the phases (Mulyanto & Salam, 2021). The method’s five canonical stages are as follows: (1) Requirements Analysis — understanding the problem and specifying system needs; (2) System Design — translating requirements into system architecture and interface design; (3) Implementation — coding the system based on design specifications; (4) Testing — verifying system functionality against requirements; and (5) Maintenance — correcting identified defects and supporting ongoing system

operation. The Waterfall method is particularly appropriate for system development in organizational contexts where requirements are well-defined, the user base is small, and the development scope is bounded, as in the case of SMA El Fitra’s inventory recording system.

## 2.4 Prior Empirical Studies

Table 1 summarizes prior studies on inventory system design and implementation in comparable organizational contexts.

Table 1. Summary of Prior Studies on Inventory System Design and Implementation

Author(s) & Year	Setting / Context	Method	Key Finding on Inventory System Design
Herman et al. (2021)	Production entity, inventory recording system	System design, waterfall	VBA Microsoft Excel-based inventory recording system successfully replaced manual recording; system reduced errors and improved recording speed.
Ismail et al. (2021)	Toko Serba 35 Cimahi (retail trade)	System design, qualitative	Computerized inventory accounting system replaced manual recording at SME retail trade store; improved accuracy, speed, and data retrieval.
Saputri et al. (2019)	Surabiku Cafe food ordering system	Web-based system design	Web-based ordering system improved operational efficiency; system reduces errors in order management and provides real-time inventory tracking.
Barchelino (2016)	Commercial trade inventory PSAK No. 14	Analytical, accounting standard review	Inventory recording and valuation methods must comply with PSAK No. 14 (IAS 2); periodic and perpetual systems have different cost implications and reporting consequences.
Mulyanto and Salam (2021)	Online retail store website	System design, waterfall	Waterfall method successfully applied to structured system design for retail operations; requirements analysis preceding design ensures system-user fit.
Candy and Welen (2021)	CV Tribina Jasaindo	Digital system design, diffusion-substitution	Diffusion and substitution of technology approach effectively transferred a new digital system to an organization with prior manual methods; user training is critical for adoption.
Present Study (2022–2024)	SMA El Fitra Bandung—school uniform inventory	Qualitative, waterfall, VBA Microsoft Excel design	VBA-based system designed and piloted; five-stage Waterfall implemented; system achieved 3 of 5 successful trials; improved efficiency, data accessibility, and security; challenges identified in receipt management, size mismatch, and return logistics.

Table 1 summarizes previous studies related to inventory system design and implementation. Prior research consistently demonstrates that computerized inventory systems, particularly those developed using Microsoft Excel and VBA with the Waterfall development approach, improve recording accuracy, operational efficiency, data accessibility, and inventory control. However, limited studies have examined the implementation of such systems in educational institutions managing school uniform inventories. Therefore, this study extends the existing literature by designing and implementing a VBA-based inventory accounting system tailored to the operational needs of SMA El Fitra Bandung. ““

### 3. Methodology

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#### 3.1 Research Design

A qualitative case study design was employed, which is appropriate for a system development study in which the primary research objectives are descriptive (characterizing the current system), prescriptive (designing an improved system), and evaluative (assessing implementation outcomes) rather than hypothesis testing (Hasanah, 2018). This case study focuses on the SMA El Fitra Bandung as the bounded system under investigation. The system development methodology follows the Waterfall model (Mulyanto & Salam, 2021), incorporating elements of Difusi Iptek (technology diffusion) and Substitusi Iptek (technology substitution) as conceptual frameworks for the technology adoption process (Candy & Welen, 2021).

#### 3.2 Data Collection Methods

Three complementary data collection methods were used. Unstructured interviews were conducted with the school's finance and warehouse administrative staff to understand their current recording practices, pain points, and information needs. Direct observation of the physical inventory management environment, including the uniform storage rack system, current notebook recording format, and transaction documentation practices, provided contextual information for the system design. The documentation collection encompassed existing transaction records, supplier receipts (kuitansi), student distribution lists, and the school's annual uniform procurement history. Data analysis followed a qualitative descriptive approach: data reduction (filtering relevant information from collected data), data display (organizing information into systematic categories), and conclusion drawing/verification (interpreting findings to identify system design requirements) (Hasanah, 2018).

#### 3.3 System Development Stages

The five waterfall development stages were implemented sequentially, as described in Table 2.

Table 2. Waterfall System Development Stages Applied at SMA El Fitra

Phase	Stage Name	Activities	Output / Deliverable
1	Requirements Analysis	Identify current manual recording problems; interview finance and administrative staff; collect existing transaction documents (receipts, stock records)	Problem statement; specification of system requirements; inventory flow documentation
2	System Design	Design system architecture; design user interface forms for inventory data, incoming goods, outgoing goods, save, and exit menus; design data flow between modules	System design specification; user interface wireframes; data flow diagram
3	Implementation	Convert design into VBA code in Microsoft Excel; build Main Menu, Item Data, Incoming Goods, Outgoing Goods, Save, and Exit modules; integrate search and print features	Functional VBA-based inventory recording system prototype in Microsoft Excel
4	Testing	Five trial runs with finance and warehouse staff; test incoming goods input, outgoing goods input, search, and stock update automation; identify system failures and coding errors	Test results: 3 successful trials; 2 failed (menu and search coding errors); user feedback and error documentation
5	Maintenance	Correct identified coding errors; provide user training and operating manual; advise on backup procedure and human resource competency for system continuity	Corrected system; trained users; operating documentation; maintenance recommendations

Based on Table 2, the development of the VBA-based inventory accounting system was carried out through five sequential phases of the Waterfall model, beginning with requirements analysis and ending with system maintenance.

## 4. Results and Discussion

### 4.1 Current System Assessment: Problem Identification

An initial investigation at SMA El Fitra Bandung confirmed the absence of any formal inventory accounting system for school uniform management. The current practice consisted entirely of handwritten daily records in student notebooks, maintained by finance and administrative staff without standardized forms, stock cards, or reconciliation procedures. Two recording modes were identified: physical counting (periodik), in which staff physically counted remaining stock at irregular intervals, and book recording (perpetual), which was intended to track movements continuously but was too inconsistent to serve as a reliable stock balance source.

This dual-method gap has produced documented problems that motivate system development. First, recording errors: Manual arithmetic in handwritten notebooks generated frequent calculation mistakes, and the absence of automatic cross-referencing between physical counts and book records created persistent physical-book discrepancies. Second, receipt management failures: supplier receipts (kuitansi serah terima barang) from the uniform manufacturer (konveksi) were frequently misplaced or lost, eliminating the documentary evidence needed to verify incoming quantities and initiate returns of defective or incorrectly sized items. Third, size specification failures: on multiple occasions, the uniforms delivered by the manufacturer did not match the ordered size specifications (garments labeled as small arrived oversized or vice versa), creating return logistics complications. Fourth, distribution mismatches: Some uniforms distributed to students did not match the sizes ordered, requiring post-distribution

corrections with parental consent.

#### 4.2 System Design: Architecture and Module Description

Based on the requirements analysis, the inventory accounting system was designed around five functional modules integrated within a single Microsoft Excel workbook, controlled through a VBA-driven Main Menu interface. Table 3 describes the functions, features, and data integration of each module with the broader system.

Table 3. System Module Architecture: Functions, Features, and Integration

Module	Function	Key Features	Data Integration
Main Menu	Central navigation interface; links to all system modules	Password-protected access; navigation buttons to all submodules; session management	Directs to Item Data, Incoming Goods, Outgoing Goods, Save, and Exit
Item Data	Master inventory registry listing all uniform types and codes	Item ID, item name, current stock, storage location (rack code); search function; total item count display; update-enabled records	Auto-updated by Incoming/Outgoing modules; source data for all other modules
Incoming Goods	Records all uniform receipts from supplier (konveksi)	Transaction ID, date, Item ID, item name, unit, initial stock, incoming quantity; auto-calculation of final stock; date-range search; print function	Auto-updates stock in Item Data module upon input
Outgoing Goods	Records all uniform distributions to students	Transaction ID, date, Item ID, item name, unit, storage rack, initial stock, outgoing quantity; auto-calculation of remaining stock; date-range search; print function	Auto-reduces stock in Item Data module upon input
Save / Exit	Data persistence and session management	Save function stores all session transactions to Excel workbook; Exit function closes application safely	Operates on VBA workbook save mechanism; data persists across sessions

Based on Table 3, the system employs a hub-and-spoke data architecture in which the Item Data module functions as the central inventory registry, which is automatically updated by every transaction recorded in the Incoming Goods and Outgoing Goods modules. This ensures that the current stock balances in the Item Data module always reflect the cumulative net of all recorded receipts and issuances, providing a perpetual inventory system that continuously displays real-time stock without requiring periodic physical counting for basic stock balance information.

The design incorporates three key usability features that were absent from the previous manual system. First, a transaction ID system assigns unique identifiers to each incoming and outgoing transaction, creating a traceable audit trail for every stock movement in the warehouse. Second, the date-range search functionality allows staff to retrieve transaction histories for any specified period, replacing the laborious manual search through handwritten notebooks. Third, print functionality enables the generation of paper-format transaction records and stock reports, supporting the school’s requirement for physical documentation of stock opname and distribution records.

#### 4.3 Implementation: System Build

The system was built using VBA Macro coding within Microsoft Excel, implementing the form designs and data flow architectures specified during the design phase. Each module was coded as a separate VBA UserForm, with event-driven procedures triggered by button clicks (save, search, print, navigate) and field interactions (auto-population of item name from item ID lookup, automatic stock calculation from input quantities). The Main Menu was designed as the system’s entry point, displaying navigation buttons to all submodules and requiring password authentication before granting access to the inventory management functions, a security feature that the manual system could not provide.

The implementation process encountered two significant challenges. First, the automatic stock update logic, which was designed to trigger an Item Data stock recalculation whenever an Incoming or Outgoing Goods transaction was saved, contained a referencing error that, in some configurations, failed to update the correct cell range. Second, the date filtering logic of the search function contained a data type comparison error that prevented the function from returning results when dates were entered in certain formats. Both errors were identified during testing and corrected in the maintenance phase.

#### 4.4 Testing Results

Table 4. System Testing Results: Five Trial Runs at SMA El Fitra

Trial	Activity Tested	Result	Status	Issue Identified
1	Incoming goods input; stock update validation	System correctly recorded incoming goods; Item Data stock updated automatically	Successful	None
2	Outgoing goods input; date-range search	System correctly recorded outgoing goods; stock reduced automatically; search returned correct date-filtered results	Successful	None
3	Full cycle: Incoming + Outgoing + Save + Print	Full recording cycle completed; saved data persisted; print output generated correctly	Successful	None
4	Incoming goods input (Week 3, April)	Stock balance did not update after incoming goods input; system failed to reflect new inventory total	Failed	Coding error in Main Menu module
5	Item search function	Search query did not return expected results; item lookup function unresponsive	Failed	Coding error in search function module

Source: System testing documentation, SMA El Fitra, April 2024.

Based on Table 4, the testing phase yielded three successful and two failed trials in the present study. The three successful trials demonstrated that the system correctly performed its core functions: incoming and outgoing goods recording with automatic stock balance update, and complete recording cycle execution with save and print output. The two failed trials identified specific coding errors, which were subsequently corrected during the maintenance phase. This outcome — a 60% initial success rate with all failures attributable to specific, correctable coding errors rather than design flaws — is consistent with the normal iterative quality assurance process in Waterfall system development and does not indicate fundamental system design inadequacy.

In addition to coding-related test failures, three operational challenges emerged during the testing period that were external to the system itself but relevant to its successful deployment. First, missing supplier receipts: several historical transactions could not be entered into the system because the supporting kwitansi had been lost, creating incomplete data entry for the system's initial stock population. Second, delivery size mismatches: physical verification during stock opname revealed that garments received from the manufacturer did not always match the ordered size specifications, requiring return transactions that the current system version does not formally support. Third, distribution size mismatches: some student-distributed garments required size substitution, creating distribution records that differed from the order records.

#### 4.5 Implementation Outcomes: Before and After Comparison

Table 5. Comparative Performance: Manual System vs. VBA-Based System

Dimension	Before (Manual System)	After (VBA-based System)
Recording Method	Handwritten in notebook; error-prone; time-consuming	Digital form input via VBA interface; automated calculation
Data Accuracy	Frequent arithmetic errors; physical vs. book inventory discrepancies	Automated stock calculations reduce arithmetic errors; real-time stock balance
Data Retrieval	Manual search through handwritten notebooks; slow and error-prone	Search by date range or item ID; immediate results display
Data Security	Paper records susceptible to loss, damage, and unauthorized access	Password-protected system; data stored in Excel workbook; backup possible
Time Efficiency	High time cost for manual calculation, verification, and reporting	Reduced recording and reporting time; automated stock update upon transaction input
Reporting Capability	Manual compilation required; delay in stock opname reporting	Print-ready transaction reports; supports monthly stock opname documentation

Table 5 illustrates the contributions of the system across six operational dimensions. The most significant gains are in data accuracy (elimination of manual arithmetic errors through automated stock calculation), data retrieval speed (replacing notebook searches with immediate database queries), and data security (password protection and digital backup replacing vulnerable paper records). Time efficiency improvements reduce the administrative burden on finance and warehouse staff, enabling them to redirect their time toward verification and quality control activities.

These outcomes are consistent with the findings of [Herman et al. \(2021\)](#), who found that VBA-based inventory systems reduce recording errors and improve speed, and with [Ismail et al. \(2021\)](#) documentation of improved accuracy, retrieval speed, and stock balance reliability in an SME retail context. The present study extends these findings to the context of educational institutions, confirming the transferability of the VBA-Microsoft Excel inventory system approach to non-commercial organizational settings.

#### 4.6 Inventory Procedure under the New System

The formal inventory procedure implemented alongside the VBA system encompasses ten steps: The warehouse department receives a Goods Receipt Letter (*Surat Pengantar Penerimaan Barang*) signed by the supervising manager. The warehouse department verifies the received goods against the letter. If the quantities match, the goods are admitted to the warehouse, the letter is countersigned, and a three-copy receipt is distributed to the supervising manager, warehouse, and sales administration. Goods are stored on shelves according to rack codes on stock cards. The warehouse administration inputs incoming goods data into the system, automatically updating the stock balances in the Item Data module. The administration prepares five copies of the invoice signed by the supervising manager. Based on the invoice, the warehouse verifies stock availability; if available, goods are prepared for student distribution; if unavailable, distribution is deferred, and a replenishment request is raised. The warehouse administration inputs outgoing goods data, automatically reducing the stock in the system. Return transactions trigger a Return Memo from the sales administration to the warehouse. Monthly, the warehouse conducts physical stock opname, and the warehouse administration generates incoming, outgoing, stock opname, return, and stock card reports.

## 5. Conclusions

This study designed and implemented a VBA-based uniform inventory accounting system at SMA El Fitra Bandung using the five-stage Waterfall development methodology. The developed system addresses

the limitations of the previous manual inventory recording process by integrating five functional modules, namely Main Menu, Item Data, Incoming Goods, Outgoing Goods, and Save/Exit. These modules enable automated stock updates, efficient transaction recording, data retrieval, report generation, and password-protected data management within a Microsoft Excel environment. System testing demonstrated that three of the five trial runs were completed successfully, while the remaining two trials identified VBA coding errors related to stock updating and search functions. These issues were resolved during the maintenance stage, confirming the feasibility of the proposed system. Overall, the implementation improved recording accuracy, time efficiency, data accessibility, and data security compared with the previous manual approach. In addition, the study identified several operational challenges related to supplier receipt management, product size verification, and student size matching, indicating that technical improvements should be supported by appropriate administrative procedures. Therefore, schools implementing similar systems should establish standardized documentation practices, strengthen goods verification procedures, and ensure staff possess sufficient VBA programming skills to support long-term system maintenance and sustainability.

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### **Author Contributions**

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NNH contributed to conceptualization, data collection, formal analysis, interpretation of results, methodology, validation, writing the original draft, literature review, editing, and final manuscript review and approval.

### **Conflicts of Interest**

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The authors declare that there is no conflict of interest regarding the publication of this study. This research was conducted independently, and no financial or personal relationships influenced the results or interpretation of the findings.

## References

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- Agustian, K., Pohan, A., Zen, A., Wiwin, W., & Malik, A. J. (2023). Human resource management strategies in achieving competitive advantage in business administration. *Journal of Contemporary Administration and Management (ADMAN)*, 1(2), 108–117. <https://doi.org/10.61100/adman.v1i2.53>
- Alenezi, M. (2023). Digital learning and digital institution in higher education. *Education Sciences*, 13(1), 88. <https://doi.org/10.3390/educsci13010088>
- Al-Hashimy, H. N. H. (2022). The effect of building information modelling (bim) on the accounting information system (ais) of construction firm. *International Journal of Business and Management Invention*, 11(12), 31–39. <https://doi.org/10.35629/8028-11123139>
- Al-Okaily, A., Al-Okaily, M., Shiyab, F., & Masadah, W. (2020). Accounting information system effectiveness from an organizational perspective. *Management Science Letters*, 10(16), 3991–4000. <https://doi.org/10.5267/j.msl.2020.7.010>
- Andarwati, M., Zuhroh, D., & Amrullah, F. (2019). End user satisfaction of accounting information system (ais) mobile based for small medium enterprises (smes): Actual usage and tam approach. *Journal of Development Research*, 3(2), 37–42. <https://doi.org/10.28926/jdr.v3i2.79>
- Anis, H. (2019). *Membangun sistem informasi sdm dengan microsoft excel*. Elex Media Komputindo.
- Autio, E., Mudambi, R., & Yoo, Y. (2021). Digitalization and globalization in a turbulent world: Centrifugal and centripetal forces. *Global Strategy Journal*, 11(1), 3–16. <https://doi.org/10.1002/gsj.1396>
- Barchelino, R. (2016). Analisis penerapan psak no. 14 terhadap metode pencatatan dan penilaian persediaan barang dagangan pada pt. surya wenang indah manado. *Jurnal Riset Ekonomi, Manajemen, Bisnis Dan Akuntansi*, 4(1), 2954.
- Barnes, S. J. (2020). Information management research and practice in the post-covid-19 world. *International Journal of Information Management*, 55, 102175. <https://doi.org/10.1016/j.ijinfomgt.2020.102175>
- Benavides, L. M. C., Tamayo Arias, J. A., Arango Serna, M. D., Branch Bedoya, J. W., & Burgos, D. (2020). Digital transformation in higher education institutions: A systematic literature review. *Sensors*, 20(11), 3291. <https://doi.org/10.3390/s20113291>
- Boh, W., Constantinides, P., Padmanabhan, B., & Viswanathan, S. (2023). Building digital resilience against major shocks. *MIS Quarterly*, 47(1), 343–360. <https://doi.org/10.25300/MISQ/2023/47.1.12>
- Budiarto, P. A. (2023). Pemanfaatan visual basic for applications (vba) berbasis microsoft excel untuk sistem pendukung keputusan dengan metode topsis. *JETCH: Journal Economy, Technology, Social and Humanities*, 1(1). <https://doi.org/10.59945/1k2g4r23>
- Candy, C., & Welen, W. (2021). Penerapan strategi pemasaran digital dan perancangan sistem arsip dokumen pada cv tribina jasaindo. *ConCEPT-Conference on Community Engagement Project*, 1(1), 2470–2077.
- Cichosz, M., Wallenburg, C. M., & Knemeyer, A. M. (2020). Digital transformation at logistics service providers: Barriers, success factors and leading practices. *The International Journal of Logistics Management*, 31(2), 209–238. <https://doi.org/10.1108/IJLM-08-2019-0229>
- Ernawatiningsih, N. P. L., & Kepramareni, P. (2019). Effectiveness of accounting information systems and the affecting factors. *International Journal of Applied Business and International Management*, 4(2), 33–40. <https://doi.org/10.32535/ijabim.v4i2.564>
- Faccia, A., & Petratos, P. (2021). Blockchain, enterprise resource planning (erp) and accounting information systems (ais): Research on e-procurement and system integration. *Applied Sciences*, 11(15), 6792. <https://doi.org/10.3390/app11156792>
- Faiz Zamzami, N. D. (2017). *Pengantar akuntansi 1*. Gadjah Mada University Press.

- García-Peñalvo, F. J. (2021). Avoiding the dark side of digital transformation in teaching. an institutional reference framework for elearning in higher education. *Sustainability*, 13(4), 2023. <https://doi.org/10.3390/su13042023>
- Gkrimpizi, T., Peristeras, V., & Magnisalis, I. (2023). Classification of barriers to digital transformation in higher education institutions: Systematic literature review. *Education Sciences*, 13(7), 746. <https://doi.org/10.3390/educsci13070746>
- Goulart, V. G., Liboni, L. B., & Cezarino, L. O. (2022). Balancing skills in the digital transformation era: The future of jobs and the role of higher education. *Industry and Higher Education*, 36(2), 118–127. <https://doi.org/10.1177/09504222211029796>
- Hai, T. N., Van, Q. N., & Thi Tuyet, M. N. (2021). Digital transformation: Opportunities and challenges for leaders in the emerging countries in response to covid-19 pandemic. *Emerging Science Journal*, 5(1), 21–36. <https://doi.org/10.28991/esj-2021-SPER-03>
- Halimuzzaman, M., & Sharma, J. (2022). Applications of accounting information system (ais) under enterprise resource planning (erp): A comprehensive review. *International Journal of Early Childhood Special Education (INT-JECSE)*, 14(2), 6801–6806. <https://doi.org/10.9756/INT-JECSE/V14I2.782>
- Hasanah, U. (2018). Teknik-teknik observasi: Sebuah alternatif metode pengumpulan data kualitatif ilmu-ilmu sosial. *At-Taqaddum*.
- Herman, H., Mei, C., Hesniati, H., Taufik, M., Geovanni, G., Viviani, V., & Setiawan, K. (2021). Perancangan sistem pencatatan persediaan berbasis macro visual basic for applications (vba) microsoft excel pada toko okindo jaya. *National Conference for Community Service Project (NaCosPro)*, 3(1), 904–913.
- Ismail, M., Halawa, I. K., & Muthmainnah, M. (2021). Perancangan sistem informasi akuntansi persediaan barang dagang di toko serba 35 pemkot cimahi. *JURSIMA*, 9(2), 95–103.
- Kalwar, M. A., Shahzad, M. F., Wadho, M. H., Khan, M. A., & Shaikh, S. A. (2022). Automation of order costing analysis by using visual basic for applications in microsoft excel. *Journal of Applied Research in Technology Engineering*, 3(1), 29–59. <https://doi.org/10.4995/jarte.2022.16390>
- Khan, M. A., Kalwar, M. A., & Chaudhry, A. K. (2021). Optimization of material delivery time analysis by using visual basic for applications in excel. *Journal of Applied Research in Technology Engineering*, 2(2), 89–100. <https://doi.org/10.4995/jarte.2021.14786>
- Kocsis, D. (2019). A conceptual foundation of design and implementation research in accounting information systems. *International Journal of Accounting Information Systems*, 34, 100420. <https://doi.org/10.1016/j.accinf.2019.06.003>
- Lawita, N. F. (2020). The influence of accounting information system (ais) on internal control in a company. *Jurnal Manajemen, Ekonomi dan Akuntansi*, 4(3), 459–471. <https://doi.org/10.31955/mea.vol4.iss3.pp459-471>
- Lestari, K. C. (2020). *Sistem informasi akuntansi: Beserta contoh penerapan aplikasi sia sederhana dalam umkm*. Deepublish.
- Litvinenko, V. S. (2020). Digital economy as a factor in the technological development of the mineral sector. *Natural Resources Research*, 29(3), 1521–1541. <https://doi.org/10.1007/s11053-019-09568-4>
- Moch, T. (2018). *Mudahnya membuat aplikasi akuntansi dengan excel (dengan macro vba)*. Exac Data Publisher.
- Mohamed Hashim, M. A., Tlemsani, I., & Matthews, R. D. (2022). A sustainable university: Digital transformation and beyond. *Education and Information Technologies*, 27(7), 8961–8996. <https://doi.org/10.1007/s10639-022-10968-y>

- Moradi, M., Tarighi, H., Hosseinipour, R., & Saravani, M. (2020). Factors influencing the learning of accounting information systems (ais): Evidence from iranian students. *Journal of Economic and Administrative Sciences*, 36(3), 226–245. <https://doi.org/10.1108/JEAS-02-2019-0014>
- Mulyadi. (2018). *Sistem akuntansi (4th ed.)*. Salemba Empat.
- Mulyanto, A., & Salam, S. A. F. (2021). Penerapan metode waterfall pada aplikasi toko online bima kirana cibitung. *Jurnal Teknologi Informasi Dan Komunikasi*, 12(2), 34–41. <https://doi.org/10.51903/jtikp.v12i2.283>
- Nadiyah, H. N. (2022). El fitra [Accessed: 2022-06-20].
- Naimi-Sadigh, A., Asgari, T., & Rabiei, M. (2022). Digital transformation in the value chain disruption of banking services. *Journal of the Knowledge Economy*, 13(2), 1212–1242. <https://doi.org/10.1007/s13132-021-00759-0>
- Noviani. (2020). *Siklus akuntansi perusahaan dagang*. Tidar Media.
- Ramadhan, F., Rukmi, H. S., Imran, A., Nugraha, C., & Ferdiansyah, R. (2020). Software design using visual basic for application and microsoft excel programming for students. *REKA ELKOMIKA: Jurnal Pengabdian kepada Masyarakat*, 1(2), 86–97. <https://doi.org/10.26760/rekaelkomika.v1i2.86-97>
- Sabri, S. N., Rapani, N. H. A., & Almaliki, O. J. (2022). The accounting information system (ais) effectiveness and smes performance: A conceptual paper. *Management Research Journal*, 11(2), 64–73. <https://doi.org/10.37134/mrj.vol11.2.6.2022>
- Saeed, S., Altamimi, S. A., Alkayyal, N. A., Alshehri, E., & Alabbad, D. A. (2023). Digital transformation and cybersecurity challenges for businesses resilience: Issues and recommendations. *Sensors*, 23(15), 6666. <https://doi.org/10.3390/s23156666>
- Saputri, Z. R., Oktavia, A. N., Ramdhani, L. S., & Suherman, A. (2019). Rancang bangun sistem informasi pemesanan makanan berbasis web pada cafe surabiku. *Jurnal Teknologi Dan Informasi*, 9(1), 66–77. <https://doi.org/10.34010/jati.v9i1.1378>
- Sumiyati. (2021). *Akuntansi keuangan smk/mak kelas xi*. Gramedia Widiasarana Indonesia.
- Ulfa, A. F., & Laily, N. (2023). Vba (visual basic for applications) based learning media development in accounting practice learning. *Journal of Accounting and Business Education*, 7(2), 25–40. <https://doi.org/10.26675/jabe.v7i2.37125>
- Wang, X., & Zhu, W. (2025). Exploring the relationship between accounting information system (ais) quality and corporate sustainability performance using the is success model. *Sustainability*, 17(4), 1595. <https://doi.org/10.3390/su17041595>
- Zamzami, F. (2021). *Sistem informasi akuntansi*. UGM Press.
- Zhang, J., & Chen, Z. (2024). Exploring human resource management digital transformation in the digital age. *Journal of the Knowledge Economy*, 15(1), 1482–1498. <https://doi.org/10.1007/s13132-023-01214-y>