

EVOLUTION AND OPTIMIZATION OF ACTIVITY-BASED COSTING FOR STRATEGIC COST MANAGEMENT: A SYSTEMATIC LITERATURE REVIEW

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Abstract

This article examines the development of Activity-Based Costing (ABC) and its optimization in supporting Strategic Cost Management (SCM). The study applies a Systematic Literature Review (SLR) based on the PRISMA 2020 procedure. Scopus was used as the main database, while Google Scholar was used to identify relevant national articles selected through SINTA 1 and SINTA 2 indexation criteria. At the identification stage, 122 records were collected. After the screening and eligibility process, 59 articles met the inclusion criteria and were analyzed using narrative synthesis and thematic analysis. The synthesis indicates that ABC implementation is still shaped by several practical challenges, including activity complexity, detailed data requirements, resource availability, technical capability, and organizational resistance. However, ABC has also developed into more flexible and applicable forms, such as Time-Driven Activity-Based Costing, Duration-Based Costing, hybrid costing, ERP/SAP integration, and digital information systems. In the context of SCM, ABC strengthens cost information by improving overhead allocation, profitability analysis, cost control, performance evaluation, and managerial decision-making. Therefore, ABC should not be viewed merely as a cost allocation technique, but as a strategic cost information system that supports managerial and organizational decisions.

Keywords: Activity-Based Costing, Cost Information, PRISMA, Strategic Cost Management, Systematic Literature Review

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1. Introduction

Cost information has become more important as companies face stronger competition, greater product variety, automation, and increasing indirect costs. Under these conditions, traditional costing systems may provide less accurate

information because overhead costs are commonly allocated using broad volume-based measures. This approach can create cost distortion when products, services, customers, or activities consume organizational resources in different ways. Activity-Based Costing (ABC) was developed to address this limitation by tracing resource costs to activities and assigning those activity costs to cost objects through relevant cost drivers (Alami & ElMaraghy, 2020; Kaplan, 1988; Quesado & Silva, 2021).

In management accounting studies, ABC is no longer viewed only as a product-costing method. It is also considered an important source of information for Strategic Cost Management (SCM). Through activity analysis, ABC provides clearer information about resource consumption, cost drivers, and value creation. This information helps managers make decisions related to pricing, profitability analysis, cost control, performance evaluation, process improvement, and strategic planning (Hofmann & Bosshard, 2017; Kitsantas et al., 2022; Sánchez-Rebull et al., 2023).

However, ABC implementation is not always easy in practice. Previous studies have identified several barriers, including high implementation costs, detailed data requirements, difficulties in defining activities and cost drivers, limited technical expertise, model maintenance problems, and resistance from organizational members (Allain & Laurin, 2018; Almeida & Cunha, 2017; Pietrzak et al., 2020; Tu Tran & Thi Tran, 2022). These issues show that ABC adoption depends not only on costing techniques, but also on organizational readiness, information-system capability, and managerial support.

ABC has continued to develop through more flexible and technology-based approaches. Time-Driven Activity-Based Costing (TDABC), for example, simplifies traditional ABC by using time equations and capacity cost rates. Other approaches, such as Duration-Based Costing (DBC), hybrid costing, and lean-integrated models, have also been introduced to make ABC more practical, efficient, and relevant to operational needs (Hoozée & Hansen, 2018; Lelkes, 2023; Stonciuvienė et al., 2020). In addition, ERP/SAP, cyber-physical production systems, Industry 4.0, and digital data streams have strengthened activity-level cost analysis by making cost information more detailed, timely, and traceable (Mattetti et al., 2022; Nota et al., 2020; Tsai et al., 2024).

Although ABC has been widely studied, the findings remain fragmented across sectors and research contexts. Some studies focus on implementation

barriers, while others discuss model development or the use of ABC information in decision-making. Therefore, this article synthesizes the literature through three research questions: (1) what factors influence the cost and complexity of ABC implementation, (2) how ABC frameworks have developed toward flexibility, efficiency, information-system integration, and value-added activity identification, and (3) how ABC information supports SCM and managerial decision-making.

Research Gap, Novelty, and Article Contribution

The main gap addressed in this article is the fragmented nature of ABC research. Previous studies have discussed ABC from different angles. Some focus on implementation barriers, some examine technical development, while others analyze the use of ABC information for managerial decisions. These separate discussions make it difficult to see how ABC has evolved from a costing technique into a strategic cost information system. Therefore, this review brings together implementation, development, and strategic-use perspectives within one SLR framework. This integration is important because the role of ABC in SCM depends not only on cost allocation accuracy, but also on organizational readiness, data availability, technological support, and managerial use of cost information (Almeida & Cunha, 2017; Quesado & Silva, 2021; Sánchez-Rebull et al., 2023).

The novelty of this article lies in its effort to connect three related issues. First, it explains the factors that make ABC costly and complex to implement. Second, it discusses the development of ABC into more flexible models, such as TDABC, DBC, hybrid costing, and technology-supported costing. Third, it explains how ABC information supports SCM through pricing, profitability analysis, cost control, performance evaluation, outsourcing, capacity planning, and sustainability-oriented decisions. By linking these issues, this article provides a clearer explanation of the relationship between implementation challenges, ABC optimization, and strategic usefulness.

This article also views ABC as a contingency-based management accounting system. ABC does not generate the same level of benefit in every organization. Its effectiveness depends on the fit between the costing system and organizational conditions, such as activity diversity, overhead intensity, information-system maturity, managerial commitment, and decision-making needs. This view is consistent with contingency theory, which argues that

organizational systems become effective when they are aligned with internal structures and external environments (Lawrence & Lorsch, 1967).

From a practical perspective, this synthesis can assist managers and accounting practitioners in evaluating their readiness to implement or redesign ABC. The results indicate that ABC implementation should not start only from choosing cost drivers. It should begin with a clear mapping of business processes, an assessment of data readiness, an evaluation of information-system capability, management support, and an understanding of the strategic decisions that the ABC system is intended to support.

Theoretical Background and Conceptual Positioning

This review uses contingency theory as the theoretical foundation. This theory explains that the effectiveness of a management accounting system depends on its alignment with organizational conditions, environmental uncertainty, operational complexity, organizational structure, and information needs (Lawrence & Lorsch, 1967). This perspective is relevant to ABC because ABC cannot be treated as a universal costing solution. Its usefulness depends on activity complexity, data reliability, information-system readiness, managerial support, and the ability of the organization to use cost information in decision-making.

From a contingency perspective, ABC is more relevant for organizations with diverse products, varied services, high overhead costs, complex processes, or a strong need for more accurate strategic cost information. In such conditions, traditional volume-based costing may create cost distortion because indirect costs are allocated using broad allocation bases. ABC responds to this limitation by tracing resource consumption to activities and then assigning activity costs to cost objects using appropriate cost drivers. Therefore, this article views ABC as a management accounting system whose usefulness depends on both organizational and informational contexts.

The main logic of ABC is to improve cost allocation through activity identification, activity cost pool formation, cost-driver selection, and cost tracing to products, services, customers, or other cost objects (Kaplan, 1988; Kitsantas et al., 2022). Unlike traditional costing, ABC emphasizes the causal relationship between activities and resource consumption. This allows managers to understand not only the amount of cost incurred, but also the activities that cause the cost. As a result, ABC can support pricing, profitability analysis, budgeting, cost control, and operational improvement (Quesado & Silva, 2021).

ABC becomes more strategically relevant when it is connected with Strategic Cost Management (SCM). SCM requires cost information that supports competitiveness, resource allocation, process improvement, value creation, and long-term decision-making. ABC contributes to this need by providing activity-level cost information,

identifying value-added and non-value-added activities, improving overhead transparency, and supporting decisions related to pricing, product mix, outsourcing, capacity use, process redesign, and profitability management (Hofmann & Bosshard, 2017; Sánchez-Rebull et al., 2023).

Previous Literature Based on the Research Question Framework

Previous studies on ABC can be grouped into three main streams. The first stream discusses the cost and complexity of ABC implementation. Several studies indicate that ABC requires detailed activity mapping, appropriate cost-driver selection, trained personnel, information-system support, and regular data maintenance (Allain & Laurin, 2018; Almeida & Cunha, 2017; Daowadueng, 2024; Sánchez-Rebull et al., 2023). In addition, organizational resistance may arise because ABC makes activities, resource consumption, and responsibility centers more visible. This stream provides the basis for RQ1, which examines the factors affecting ABC implementation cost and complexity.

The second stream focuses on the development and optimization of ABC. Traditional ABC has often been criticized for being costly, data-intensive, and difficult to update. In response, researchers have introduced more flexible approaches, such as TDABC, DBC, hybrid costing, and technology-enabled ABC models (Hoozée & Hansen, 2018; Mattetti et al., 2022; Stonciuviene et al., 2020). These approaches are intended to reduce the measurement burden, simplify cost-driver structures, improve flexibility, and make ABC more responsive to changes in activities, capacity use, and business processes.

The third stream examines the use of ABC information in SCM and managerial decision-making. Studies in manufacturing, healthcare, logistics, education, banking, public organizations, hospitality, agriculture, construction, and sustainability-related contexts show that ABC can improve cost transparency, profitability analysis, service costing, process evaluation, and strategic resource allocation (Abeysekera & Sharma, 2023; Cannavacciuolo et al., 2015; Duran & Afonso, 2020; Haroun, 2015; Hofmann & Bosshard, 2017; Tsai et al., 2024). However, ABC creates strategic value only when its information is actually used in planning, control, and decision-making processes.

Although these studies provide important insights, several issues remain unresolved. Discussions on implementation barriers are often separated from studies on ABC model development. Likewise, technical improvements in ABC are not always connected with their contribution to SCM. Research on decision use is also spread across different sectors and methods, making the overall pattern difficult to interpret. These limitations create the need for a synthesis that connects implementation challenges, model development, and strategic usefulness.

Based on this gap, the RQ framework in this article serves as a bridge between theory, prior literature, and synthesis. RQ1 focuses on implementation cost and complexity, including activity complexity, data quality, resource availability, and

organizational resistance. RQ2 examines the evolution of ABC toward flexibility, model efficiency, information-system integration, and value-added activity identification. RQ3 analyzes the contribution of ABC to SCM through cost transparency, profitability analysis, cost control, performance evaluation, and strategic decision-making.

2. Research Method

This article applies a Systematic Literature Review (SLR) because the study aims to synthesize and interpret previous research rather than test variables using primary data. The review process followed the PRISMA 2020 procedure to make the stages of identification, screening, eligibility assessment, and inclusion more transparent (Page et al., 2021). The SLR approach was also guided by principles of structured searching, explicit selection criteria, systematic data extraction, and thematic synthesis (Snyder, 2019).

Scopus was used as the main database because it provides access to internationally indexed academic articles. Google Scholar was used as a supporting source to identify relevant national articles. Articles obtained from Google Scholar were then selected using SINTA 1 and SINTA 2 indexation criteria. In this study, SINTA was not treated as a database, but as an indexation criterion for national literature.

The search process used several keyword combinations related to ABC and SCM. These included “activity-based costing”, “activity based costing”, “time-driven activity-based costing”, “TDABC”, “cost management”, “strategic cost management”, “implementation”, “complexity”, “ERP”, “SAP”, “information system”, “decision-making”, and “profitability”. The inclusion criteria covered journal articles and indexed proceedings published between 2015 and 2024. The articles also had to be written in English or Indonesian, available in full text, and relevant to ABC implementation, ABC framework development, or the use of ABC information for SCM and managerial decision-making.

The initial search identified 122 records, consisting of 107 articles from Scopus and 15 articles from Google Scholar. After removing 11 duplicate records, 111 articles were screened based on titles and abstracts. At this stage, 20 articles were excluded because they were not sufficiently relevant to the topic. The remaining 91 articles were assessed in full text. From this process, 32 articles were

excluded because they did not adequately address the research questions. The final synthesis included 59 articles.

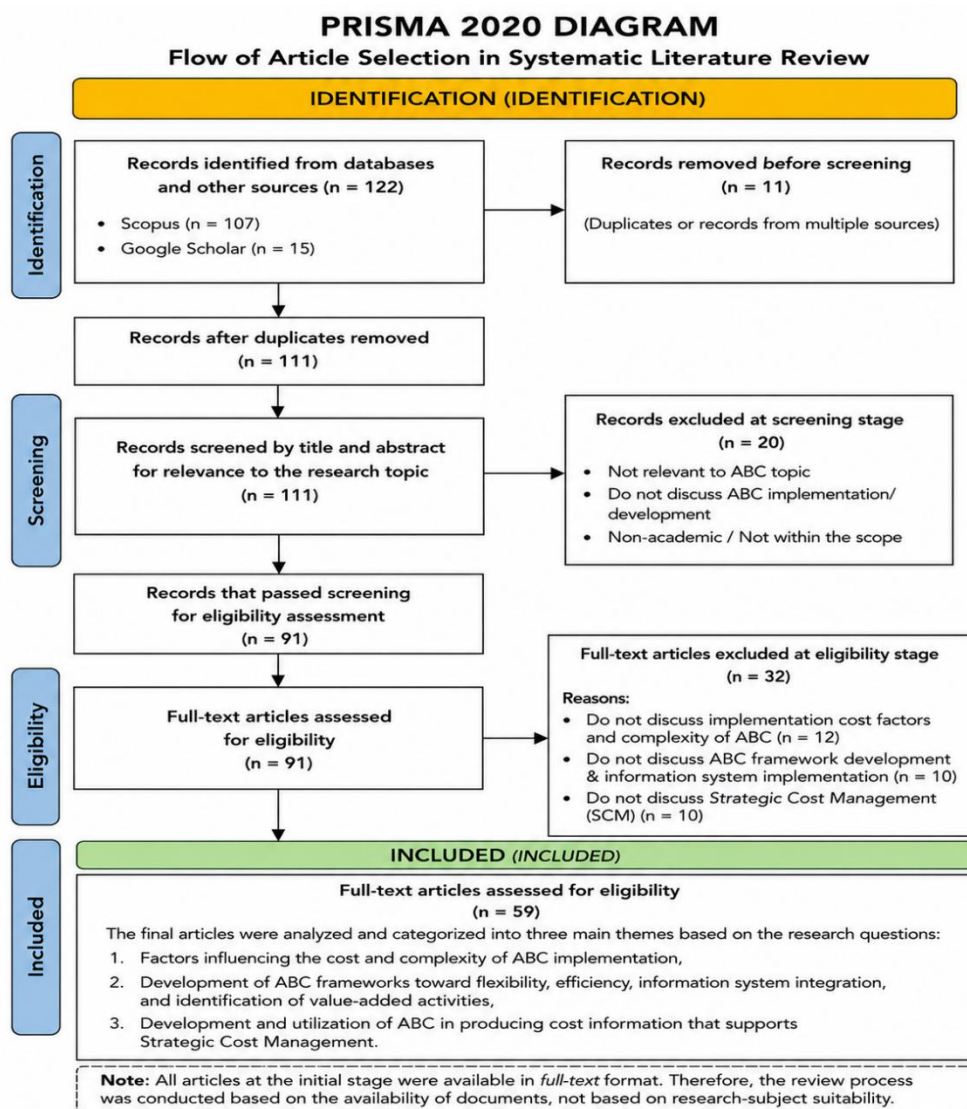
Table 1. Literature Selection Criteria

Criteria	Description
Databases	Scopus as the main database and Google Scholar as a supporting source for national articles selected using SINTA 1 and SINTA 2 indexation criteria.
Publication period	2015-2024.
Document type	Peer-reviewed journal articles and indexed conference proceedings.
Inclusion focus	Articles discussing ABC implementation, ABC framework development, or ABC information for SCM and managerial decision-making.
Quality threshold	Articles with quality assessment scores of at least 70% were retained.

Source: Research Data, 2026

Quality assessment was conducted using five indicators: clarity of research objectives, clarity of method or design, clarity of data or data sources, clarity of main findings, and disclosure of limitations or risk of bias. Each indicator was scored from 1 to 3. Articles that reached at least 70% of the total quality score were retained. The extracted data included author, year, sector, method, research focus, findings, limitations, and relevance to the research questions. The analysis combined narrative synthesis and thematic analysis, allowing each article to contribute to more than one theme when relevant

Figure 1. PRISMA 2020 Flow Diagram of the Literature Selection Process



Source: Research Data, 2026

SLR Protocol, Data Extraction, and Synthesis Procedure

The SLR protocol was designed to make the review process systematic, traceable, and reproducible. The process began by formulating research questions based on the relationship between ABC and SCM. These questions were then translated into search keywords, inclusion and exclusion criteria, quality-assessment indicators, and data-extraction categories. This procedure follows the logic of a systematic literature review, which requires clear research questions, structured searching, transparent selection, critical appraisal, and systematic synthesis (Kitchenham & Charters, 2007; Snyder, 2019; Xiao & Watson, 2017).

This study used Scopus and Google Scholar to balance international coverage and national relevance. Scopus was selected as the primary database because it allows a more

controlled search of peer-reviewed international literature. Google Scholar was used as a supporting source to identify national articles, especially those indexed in SINTA 1 and SINTA 2. In this study, SINTA was used as an indexation criterion, not as a separate article database.

The search terms were developed from three keyword groups: ABC-related terms, cost management terms, and strategic decision-making terms. To improve transparency and reproducibility, structured Boolean search strings were employed. In Scopus, the search was conducted using the following query: TITLE-ABS-KEY ("activity-based costing" OR "activity based costing" OR "time-driven activity based costing" OR "time driven activity based costing" OR TDABC) AND TITLE-ABS-KEY (implementation OR adoption OR "cost management" OR "strategic cost management" OR profitability OR performance OR "decision making" OR "supply chain management"). For Google Scholar, several keyword combinations were applied, including "activity-based costing" AND "cost management", "activity-based costing" AND implementation AND adoption, "activity-based costing" AND "implementation difficulties", "activity-based costing" AND "time-driven activity-based costing", and "activity-based costing" AND "lean accounting". The search process was conducted iteratively to capture studies that discussed ABC as a costing method, a developed costing framework, and a strategic management accounting tool.

Articles were included when they explicitly discussed ABC, TDABC, DBC, hybrid ABC, or other activity-based costing developments. They also had to examine ABC implementation, ABC development, or the managerial use of ABC information. In addition, the articles had to provide empirical, conceptual, or review-based evidence relevant to the research questions and be available in full text. Articles were excluded when they did not focus on ABC, discussed cost accounting only in general terms, were non-academic documents, were duplicates, were inaccessible in full text, or could not be linked to the research questions.

The screening process was conducted in several stages. First, duplicate records were identified and removed using Rayyan (Ouzzani et al., 2016). The remaining articles were then screened for relevance based on the predefined inclusion and exclusion criteria. Articles that passed the screening stage underwent full-text assessment to determine whether they met the inclusion criteria and contributed to at least one research question. Final eligibility decisions were made by the researcher according to the established review protocol (Ouzzani et al., 2016).

Quality assessment was applied to ensure that the selected studies had sufficient methodological clarity. The assessment covered five indicators: research objective, method, data or object, main findings, and limitations or implications. This step helped reduce the risk of including studies with unclear designs or unsupported conclusions.

Data were extracted using a structured matrix. The matrix recorded author, year, title, sector, research method, source, article type, ABC model, main findings, relevance

to RQ1, relevance to RQ2, relevance to RQ3, and thematic-coding notes. This format was used because one article could contribute to more than one theme. For example, a TDABC study in healthcare could provide evidence on model simplification, data requirements, cost accuracy, and decision usefulness at the same time.

The synthesis combined narrative and thematic approaches. Initial coding identified repeated concepts, such as implementation cost, activity complexity, data limitation, organizational resistance, TDABC, ERP integration, value-added activity identification, cost accuracy, profitability analysis, and strategic decision support. These concepts were then grouped into three main themes aligned with the research questions. This approach allowed the review to explain both the individual findings and the relationships among them.

3. Result and Discussion

Characteristics of the Included Studies

The final sample consisted of 59 articles from various sectors, including manufacturing, healthcare, education, logistics, agriculture, public organizations, services, construction, transportation, and technology-based industries. This variety indicates that ABC is no longer applied only in manufacturing settings. Its use has expanded to service-based and knowledge-intensive organizations, where overhead allocation, process transparency, and resource management are also important. The reviewed articles include case studies, surveys, conceptual papers, model-development studies, interventionist research, and decision-based models.

The selected articles also reflect a shift in ABC research. Earlier studies tended to focus on comparisons between traditional costing and ABC. More recent studies give greater attention to implementation readiness, information-system integration, sustainability-oriented costing, and strategic decision support. Some articles emphasize adoption factors and organizational readiness (Hoang et al., 2020; Rankin, 2020; Tu Tran & Thi Tran, 2022). Others examine the use of ABC in digital and technology-supported environments (Knox, 2023; Mattetti et al., 2022; Nota et al., 2020; Tsai et al., 2024).

ABC Implementation Cost and Complexity

The first theme shows that ABC implementation is influenced by four related barriers: system and activity complexity, data and information limitations, resource and cost constraints, and organizational resistance. System and activity complexity appears because ABC requires detailed activity mapping, cost pool formation, cost-driver selection, and overhead allocation. These processes require a strong understanding of organizational activities. They are also more demanding than traditional volume-based allocation methods (Almeida & Cunha, 2017; Haroun, 2015; Pietrzak et al., 2020).

Data limitation is another important issue. ABC depends on reliable data related to activities, costs, operations, and resource consumption. When data are fragmented, unavailable, or not integrated with information systems, the quality of ABC information may decline. This condition is often found in organizations with limited digital infrastructure or weak accounting information systems (Ibrahim et al., 2017; Mazbayeva et al., 2022; Wang et al., 2019).

Resource and cost constraints are also important in ABC implementation. Organizations need trained personnel, technical expertise, software support, sufficient time, and management commitment. The cost of implementation does not only include system development. It also includes training, data collection, coordination, and model maintenance. In addition, resistance may arise because ABC changes existing routines, increases cost transparency, and requires cooperation across functions. These barriers explain why ABC may be conceptually useful but difficult to apply consistently in practice (Allain & Laurin, 2018; Gosselin & Journeault, 2022; Tu Tran & Thi Tran, 2022).

Table 3. Synthesis of ABC Implementation Cost and Complexity

Category	Core Synthesis	Number of Articles
System and activity complexity	Activity mapping, cost driver selection, cost pool formation, overhead allocation, and detailed process analysis increase implementation complexity.	30
Data and information limitations	ABC requires accurate, detailed, and integrated cost, activity, resource, and operational data.	20
Resource and cost constraints	Implementation requires trained staff, technical expertise, software support, time, and continuous model maintenance.	17
Organizational resistance	ABC may create resistance because it changes routines, increases transparency, and requires cross-functional cooperation.	19

Source: Research Data, 2026

Development, Flexibility, and Value-Added Activity Identification

The second theme indicates that ABC has developed as a response to the complexity of implementation. TDABC, for instance, reduces the need for extensive activity surveys by using capacity cost rates and time equations. This approach makes the costing model easier to update when business processes change (Hoozée & Hansen, 2018). Other models, such as DBC, hybrid costing, and lean-integrated costing, also aim to simplify ABC and make it more closely connected with operational improvement (Lelkes, 2023; Stonciuviene et al., 2020).

Technology integration has also become an important part of ABC development. ERP/SAP systems, cyber-physical production systems, CANBUS-enabled data, and Industry 4.0 applications allow organizations to collect operational data more automatically. These data can then be converted into more timely and traceable cost

information. As a result, technology helps improve the accuracy of activity-level cost analysis while reducing the burden of manual data collection (Mattetti et al., 2022; Nota et al., 2020; Tsai et al., 2024).

ABC also contributes to the identification of value-added and non-value-added activities. Through activity mapping and resource-consumption analysis, managers can identify inefficient processes, unused capacity, bottlenecks, and areas that require improvement. This role is important for SCM because strategic cost management is not limited to producing accurate cost information. It also involves process redesign and the allocation of resources to activities that create value (Cannavacciuolo et al., 2015; Duran & Afonso, 2020; Linassi et al., 2016).

Table 4. Synthesis of ABC Framework Development

Category	Core Synthesis	Number of Articles
Flexibility and adaptation	ABC develops through TDABC, DBC, hybrid costing, adaptive costing, and context-specific applications.	33
Model simplification and efficiency	Simplified drivers, time equations, and process-oriented models reduce implementation burden.	18
ERP/SAP and digital integration	ERP/SAP, Industry 4.0, cyber-physical systems, automated data capture, and digital systems strengthen ABC use.	16
Value-added activity identification	ABC identifies value-added activities, non-value-added activities, unused capacity, and efficiency improvement opportunities.	12

Source: Research Data, 2026

ABC Information for Strategic Cost Management

The third theme shows that ABC contributes to SCM by improving the quality, relevance, transparency, and accuracy of cost information. Through ABC, managers can better understand the relationship between activities, cost drivers, resource consumption, and cost objects. This information is useful for several managerial decisions, including pricing, product and customer profitability analysis, make-or-buy decisions, outsourcing, budgeting, and performance evaluation (Hofmann & Bosshard, 2017; Manyueva et al., 2016; Musa & Ibrahim, 2023).

ABC also strengthens profitability analysis and cost control because indirect costs are allocated based on activity consumption. This approach can reveal hidden cost patterns and reduce cross-subsidization among products, services, or customers. In several sectors, such as healthcare, logistics, education, and manufacturing, ABC has been applied to estimate service costs, identify inefficiencies, and support process redesign (Adane et al., 2015; Cannavacciuolo et al., 2015; Hoang et al., 2020; Yang et al., 2023).

However, the strategic value of ABC depends on how far the information is used in organizational decision processes. ABC does not automatically improve performance. Its benefits appear when managers use the information for planning, control, benchmarking, and strategic decision-making. Therefore, ABC should be understood as a strategic cost information system. Its effectiveness depends on data quality, organizational readiness, technological support, and the active use of cost information by managers (Daowadueng, 2024; Vetchagool et al., 2020, 2021).

Table 5. Synthesis of ABC Information for Strategic Cost Management

Category	Core Synthesis	Number of Articles
Cost information quality	ABC improves transparency, relevance, reliability, monitoring capability, and managerial interpretation of cost information.	30
Cost accuracy and profitability	ABC improves overhead allocation, profitability analysis, cost reduction, and resource allocation.	18
Strategic decision support	ABC supports pricing, budgeting, benchmarking, outsourcing, make-or-buy decisions, performance evaluation, and strategic planning.	35

Source: Research Data, 2026

Integrated Thematic Interpretation

The three themes are closely connected. Implementation complexity explains why ABC adoption is often difficult in practice. Developments such as TDABC, DBC, hybrid costing, and digital integration can be seen as responses to these difficulties. The use of ABC in SCM then shows the strategic purpose of those developments. In this sense, ABC has evolved because organizations need cost systems that are more accurate, flexible, integrated, and useful for strategic decision-making.

This interpretation positions ABC as an adaptive management accounting system. Its relevance increases when ABC is connected with operational data, information systems, process improvement, and managerial decision routines. Therefore, ABC should not be understood only as a method for allocating overhead costs. It can also be used to analyze cost behavior, manage activities, improve efficiency, and support long-term competitiveness.

A more critical interpretation of the findings suggests that TDABC has become the most widely adopted development of traditional ABC because it directly addresses one of the major implementation barriers identified in the literature, namely system complexity. Traditional ABC often requires extensive activity mapping, frequent surveys, and detailed cost-driver identification, which can be costly and difficult to maintain. TDABC simplifies this process through time equations and capacity cost rates, making the model easier to update and more adaptable to organizational changes. This

explains why recent studies increasingly focus on TDABC, particularly in sectors where operational processes change rapidly and timely cost information is required.

The synthesis also indicates that the strategic benefits of ABC are most evident in sectors characterized by high overhead costs, service diversity, and complex resource consumption patterns. Healthcare, logistics, manufacturing, and service organizations frequently report significant improvements in cost transparency, profitability analysis, and resource allocation. In these sectors, traditional costing systems often fail to capture variations in activity consumption, whereas ABC provides a more accurate representation of how resources are used. Consequently, ABC contributes not only to cost measurement but also to strategic decision-making and process improvement.

The findings further suggest that unsuccessful ABC implementation may weaken Strategic Cost Management (SCM). When organizations experience implementation failure because of poor data quality, organizational resistance, limited resources, or excessive model complexity, managers may continue relying on distorted cost information. This can reduce the effectiveness of pricing decisions, profitability analysis, capacity planning, and process improvement initiatives. Therefore, implementation failure should be viewed not merely as a technical accounting issue but as a strategic challenge that may limit organizational competitiveness and the effectiveness of SCM initiatives.

Detailed Thematic Synthesis

RQ1: Implementation Costs and Complexity of ABC

RQ1 explains why ABC remains costly and complex even though it offers more accurate costing logic than traditional systems. The main difficulty lies in converting operational activities into reliable cost information. Organizations must identify activities, determine resource drivers, form activity cost pools, select cost drivers, and assign costs to cost objects. These steps require accounting judgment, technical knowledge, and detailed operational data, especially in organizations with diverse products, heterogeneous services, fragmented processes, or high indirect costs.

Activity complexity is one of the main causes of implementation difficulty. In both manufacturing and service organizations, activities may be numerous and may consume resources in different ways. Activities such as quality inspection, maintenance, procurement, logistics, patient care, teaching, menu planning, and customer service cannot always be traced using simple allocation bases. When these activities are not well documented, managers must first reconstruct the activity map before the ABC model can be developed. This makes implementation more time-consuming and dependent on cross-functional cooperation (Almeida & Cunha, 2017; Cannavacciuolo et al., 2015; Gosselin & Journeault, 2022).

Data quality also determines the usefulness of ABC. ABC is sensitive to incomplete, inconsistent, or outdated data. Even a well-designed model may produce weak

information if activity data are not collected regularly, cost objects are not clearly defined, or cost drivers do not reflect actual resource consumption. In many organizations, accounting data are available only in aggregate form, while ABC requires more detailed process-level information (Ibrahim et al., 2017; Mattetti et al., 2022; Mazbayeva et al., 2022).

Implementation cost should therefore be understood broadly. It includes not only financial investment, but also training, resistance management, data governance, staff involvement, model maintenance, and coordination. ABC also requires communication and change management because it increases cost transparency and may reveal unused capacity, non-value-added activities, or unprofitable products and services. Without managerial support and user involvement, ABC may remain a technical accounting exercise rather than a useful managerial system (Allain & Laurin, 2018; Tu Tran & Thi Tran, 2022).

RQ2: Development, Flexibility, and Optimization of ABC

RQ2 discusses how ABC has developed into a more flexible, efficient, and adaptive costing framework. This development can be understood as a response to the limitations of traditional ABC, especially its high data requirements and difficulty in model updating. As organizational processes and cost structures continue to change, firms need costing systems that can be revised without weakening the causal relationship between resources, activities, and cost objects. This need has encouraged the development of TDABC, DBC, hybrid costing, lean-integrated costing, and digital ABC models.

TDABC is one of the main developments in ABC literature. This approach simplifies measurement by estimating the cost of supplied capacity and the time required to perform activities. Unlike traditional ABC, which often relies on extensive activity surveys, TDABC uses time equations to capture differences in process complexity. This makes the model more practical in sectors where time is an important driver of resource consumption, such as healthcare, logistics, education, and other service-based organizations (Hoozée & Hansen, 2018; Sánchez-Rebull et al., 2023).

DBC and hybrid costing further show that ABC is not a rigid model. In some contexts, activity duration, service modularity, or a combination of activity-based and traditional cost drivers may provide more useful information. Hybrid costing is especially relevant when not all costs can be traced with the same level of detail. Direct costs may still be traced using conventional methods, while overhead and support costs can be allocated through activity drivers (Lelkes, 2023; Stonciuviene et al., 2020; Tay & Chen, 2016).

Digital integration has also become an important direction in ABC optimization. ERP/SAP systems, business intelligence tools, cyber-physical systems, machine-utilization data, and Industry 4.0 technologies allow organizations to collect operational data more continuously. When these data are connected with activity cost models, ABC

can move from a periodically updated spreadsheet model to a more dynamic cost information system. This strengthens the timeliness and usefulness of ABC for decisions related to processes, capacity, and product mix (Nota et al., 2020; Tsai et al., 2019).

The development of ABC also improves the identification of value-added and non-value-added activities. Through activity mapping, managers can identify activities that consume resources but do not contribute proportionally to customer value, service quality, or strategic objectives. This insight is important for SCM because cost management is not only about reducing costs. It also involves reallocating resources to activities that support efficiency, value creation, and competitiveness (Duran & Afonso, 2020; Medina et al., 2022; Stopka et al., 2021).

Table 7. Detailed Synthesis of RQ2 Findings

ABC Development	Optimization Logic	Strategic Relevance
TDABC	Uses capacity cost rates and time equations.	Reduces survey burden and supports faster model updates.
DBC and hybrid costing	Combines duration, activities, and selected traditional drivers.	Balances accuracy and practicality across different organizational contexts.
ERP/SAP integration	Links activity data with transaction and operational systems.	Improves data reliability, traceability, and timeliness.
Industry 4.0 and digital systems	Uses automated and real-time operational data.	Supports dynamic cost analysis, scenario analysis, and product mix decisions.
Value-added activity analysis	Separates resource-consuming activities by contribution to value.	Supports waste reduction, process improvement, and strategic resource allocation.

Source: Research Data, 2026

RQ3: ABC as Strategic Cost Management Information

RQ3 examines the role of ABC as a source of information for Strategic Cost Management. ABC becomes strategically relevant when its outputs are used beyond product costing. It provides activity-based information that helps managers understand not only how much a cost object costs, but also why the cost occurs, which activities create the cost, and how the cost can be managed. This makes ABC useful for pricing, profitability analysis, make-or-buy decisions, outsourcing, budgeting, and performance evaluation.

ABC supports pricing and profitability analysis by reducing cross-subsidization among products, services, or customers. Traditional costing may undercost complex products and overcost simple products when overhead is allocated using a single volume-based measure. By assigning costs based on activity consumption, ABC provides more accurate information about product, customer, channel, or service profitability. This information can support decisions related to pricing, product mix,

customer management, and resource allocation (Hofmann & Bosshard, 2017; Yang et al., 2023; Zavrbska & Besta, 2024).

ABC also contributes to cost control and performance evaluation. By linking costs with activities, managers can identify activities that consume excessive resources and assess whether those costs are justified by the value produced. In healthcare and public service settings, ABC has been used to estimate service costs and detect inefficiencies. In logistics and manufacturing, it supports cost-driver analysis and the evaluation of alternative operating scenarios. In education and public universities, ABC can improve overhead transparency and resource-use analysis (Abeysekera & Sharma, 2023; Adane et al., 2015).

The literature also indicates that ABC can support outsourcing, make-or-buy decisions, capacity planning, and sustainability-related analysis. When managers understand the activities and resources behind costs, they can decide whether an activity should be performed internally, outsourced, redesigned, automated, or eliminated. The integration of ABC with sustainability and life-cycle approaches further extends its role by linking cost information with environmental and long-term resource considerations (Tsai et al., 2024).

However, accurate cost information does not automatically lead to better decisions. ABC information must be interpreted and used in budgeting, planning, performance evaluation, and strategy formulation. Without this connection, ABC may remain only an accounting tool. Therefore, ABC needs to be embedded in the management control system through management commitment, user training, information-system integration, and an evidence-based decision culture (Daowadueng, 2024; Quesado & Silva, 2021; Vetchagool et al., 2021).

Table 8. Detailed Synthesis of RQ3 Findings

SCM Use	ABC Contribution	Decision Output
Pricing and profitability	Traces overhead based on activity consumption.	More accurate pricing, product mix, and customer profitability decisions.
Cost control	Identifies cost drivers and activities that consume resources.	Improved monitoring, cost reduction, and efficiency programs.
Performance evaluation	Links activity performance to cost behavior.	Better evaluation of processes, services, departments, and capacity use.
Strategic decisions	Supports outsourcing, make-or-buy, resource allocation, and scenario analysis.	More evidence-based managerial and strategic decisions.
Sustainability and long-term value	Connects activity costs with life-cycle and environmental considerations.	Supports sustainable cost management and resource efficiency.

Source: Research Data, 2026

Integrated Model of Findings

The synthesis indicates that the findings can be understood through three connected layers. The first layer is implementation, which includes activity complexity, data quality, resource availability, and organizational acceptance. This layer determines whether ABC can be implemented in a reliable way. The second layer is development, which includes TDABC, DBC, hybrid costing, digital integration, and value-added activity analysis. This layer explains how ABC remains flexible and relevant in changing organizational conditions. The third layer is strategic use, which covers pricing, profitability analysis, cost control, performance evaluation, and managerial decision-making. This layer shows how ABC contributes to SCM.

The relationship among these layers is not only sequential, but also reciprocal. Weak implementation can reduce the reliability of ABC information. Weak model development can make ABC difficult to update in dynamic environments. Weak strategic use can prevent ABC from influencing managerial decisions. On the other hand, strong strategic demand may encourage organizations to improve data systems, simplify costing models, and integrate ABC with digital platforms. Therefore, ABC optimization should be treated as both an organizational and strategic issue, not merely as a technical accounting matter.

From a contingency perspective, there is no single ABC design that fits all organizations. The appropriate design depends on organizational complexity, sector characteristics, cost structure, information-system maturity, managerial objectives, and available resources. Manufacturing firms may emphasize product profitability analysis. Healthcare organizations may focus on patient pathways and service costs. Universities and public organizations may prioritize overhead transparency and resource allocation. Logistics firms may focus on customer profitability, routing, capacity, and unused resources.

This integrated model also clarifies the role of ABC in SCM. Strategic cost management requires cost information that explains cost behavior, supports resource allocation, strengthens competitive positioning, and improves long-term performance. ABC can provide this foundation when it is embedded in managerial routines. The shift from traditional activity costing to digital, flexible, and strategic cost information systems reflects the broader movement of management accounting toward data-driven and strategy-oriented practices.

4. Conclusion

This review concludes that ABC has evolved from a cost allocation method into a strategic cost information system that supports SCM. The first finding indicates that ABC implementation is affected by activity complexity,

data limitations, resource requirements, technical capability, and organizational resistance. The second finding shows that ABC has become more flexible through TDABC, DBC, hybrid costing, ERP/SAP integration, Industry 4.0, cyber-physical systems, and other digital information systems. The third finding indicates that ABC supports SCM by improving cost information quality, cost accuracy, profitability analysis, cost control, value-added activity identification, performance evaluation, and managerial decision-making.

Theoretically, this review suggests that ABC should be understood as a dynamic management accounting system rather than a fixed costing technique. ABC develops in response to organizational complexity, technological capability, and the need for strategic cost information. Future studies should therefore move beyond simple comparisons between ABC and traditional costing. More attention is needed on how ABC is redesigned, integrated with information systems, and used in different organizational contexts.

Practically, managers should treat ABC implementation as a strategic information project. Its usefulness depends on accurate activity mapping, appropriate cost-driver selection, reliable data, information-system support, and managerial willingness to use the results. Organizations that intend to implement ABC should first assess process complexity, data readiness, human-resource capability, and the strategic decisions that require activity-based cost information.

This review has several limitations. First, the literature search was limited to Scopus and Google Scholar. Although these sources provide broad coverage of international and national publications, relevant studies indexed in other databases such as Web of Science, Dimensions, EBSCO, or ProQuest may not have been captured. Consequently, some potentially relevant evidence may have been excluded from the synthesis.

Second, this review may be subject to publication bias because the analysis primarily relied on published academic articles and indexed conference proceedings. Studies reporting significant or successful ABC implementation outcomes are generally more likely to be published than studies reporting unsuccessful implementations or insignificant findings. As a result, the synthesized evidence may overrepresent positive experiences and outcomes associated with ABC adoption and development.

Third, although quality assessment was conducted using predefined evaluation criteria, the review did not employ a standardized critical appraisal instrument such as the Mixed Methods Appraisal Tool (MMAT) or the Joanna Briggs Institute (JBI) Critical Appraisal Checklist. The absence of a standardized appraisal framework may limit the comparability and methodological rigor of the quality assessment process.

Future research may expand database coverage by incorporating additional academic databases, include gray literature and unpublished studies to reduce publication bias, and apply standardized appraisal tools such as MMAT or JBI to further strengthen the robustness, transparency, and reproducibility of systematic literature review findings.

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