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DIGITAL CAPABILITIES IN MANAGEMENT ACCOUNTING AND THEIR ROLE IN IMPROVING THE QUALITY OF COST INFORMATION AN EXPLORATORY APPLIED STUDY AT THE UNIVERSITIES OF KUFA AND KARBALA

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Abstract: The aim of this research is to examine how digital skills of management accounting contribute to the quality of cost information. It dissects how the use of digital capabilities in management accounting is associated with the quality of the information generated, which is linked to effective planning, control and managerial decision-making. This study's value lies in the ever increasing demand to transform the management accounting system, given the speed of the move to digital systems. These systems can provide potential for data integration, data analysis, process automation, and faster reports—helping to deliver more accurate, relevant, and reliable cost information. The study is descriptive analytical, using a questionnaire as the main tool to collect the field data from accounting and management professionals, financial planning and analysis staff in Universities of Kufa and Karbala. The 354 questionnaires were sent out, and 317 valid questionnaires were returned for statistical analysis, giving a return rate of 89.55%. The digital capabilities in management accounting are represented by the independent variable which is measured in four aspects: digital integration of data and systems, digital capacity for cost data analysis, automation of management accounting processes, and digital capacity for cost reporting. The dependent variable, cost information quality, is operationalized by five dimensions; relevance, accuracy, timeliness, reliability and completeness. This research will develop an applied framework that will explain the value of using digital skills to support and strengthen management accounting practices and improve the nature of cost-information. It reveals the importance of connecting accounting and management systems and data, increasing the application of digital analytical tools, and automating work around cost data and reporting. The study suggests that building a digital infrastructure to assist in management accounting and developing technical and analytical skills of professionals in the field should be prioritized. Moreover, it highlights the importance of final statistical analysis results in identifying key factors that have the most significant impact on fostering the quality of cost information and to develop relevant and actionable recommendations.
Keywords: *Digital Capabilities for Management Accounting, Cost Information Quality, Digital Integration, Cost Data Analysis, Automation of Accounting Processes, Digital Reportin*.

Introduction

Today's world is experiencing fast changes in the use of digital solutions in administration and accounting processes. This has changed the way that data are gathered, processed and analysed, and how they are presented to decision makers. The usefulness of accounting information is no longer just about the availability of the information or the possibility of keeping a record, but increasingly about the ability of the systems used to combine the various sources of information, process it efficiently and present it in high-quality forms adapted to administrative tasks. In this context, management accounting becomes a field that is directly affected by the digital advancement as a result of its information provision to support the planning, control, performance evaluation and informed decision-making. Knauer et al., 2020, have underlined the role that information system quality plays in explaining the quality of the data used in management accounting, which further affects the information base for the basis of administrative decisions.

With all of these changes, the evolution of management accounting cannot be restricted to accounting software or to the changing of manual processes to electronic processes. Instead, it now demands the mastery of digital skills that can make technology part of the fundamental management accounting practice. These include integrating data and systems, analysing cost data, automating accounting processes, creating digital reports and updating them in real-time. Digital technologies are particularly relevant to the core management accounting functions, including calculating costs, analysing variances, tracking resource usage, and feeding information into evaluation of different options, as these areas become significant. Therefore, the significance of digital skills is not only in having a technological tool, but also in how far it can support the information processes used by management in carrying out its functions.

Cost information is central to this area and has a vital role within the product/service costing, resource efficiency, expenditure monitoring and pricing, planning and resource allocation decision making processes. The information that these functions need to access must be detailed, have a manager's perspective, accurately represent the cost elements of the budget, be timely, and be reliable for analytical and decision-making purposes. In this context, Cohen and Kaimenaki (2011) pointed out that the value of cost information can be related to its features: its relevance, its accuracy, its timeliness, its reliability and the completeness of its information, as well as to its users' needs. Their study also examined the linkage between the nature of cost systems and the quality of information that is provided, thereby highlighting the need to develop accounting systems that meet their use by managers.

Although digital skills are becoming increasingly key for the development of accounting practices, this does not guarantee that the use of digital skills will ensure the desired quality in cost information. Results are contingent upon levels of system integration, data processing efficiency, appropriateness of digital processes to accounting work and staff's ability to fully leverage digital outputs. Digital systems alone, if not well-integrated across data sources, can cause ongoing problems of data duplication and data inconsistency. In addition, the timeliness of the reports does not ensure that the content of the reports, or reported information as a whole, is accurate or that the reports meet management's needs. In this sense it is crucial to explore digital capabilities from a specific perspective, as management accounting: as a way to process cost data and provide quality information, and not only as a trend in

technology. This view is consistent with the research conducted by Knauer et al., (2020) about the key role of information system quality in influencing the quality of data employed in managerial accounting.

The importance of the research is that it has investigated the digital competencies of management accounting and the correlation between these competencies and the quality of the cost information. It is based on four dimensions of the independent variable: digital integration of data and systems, digital capacity to analyse cost data, automation of management accounting procedures, and the digital capacity to prepare cost reports. On the other hand, the research focuses on the quality of cost information in five dimensions: relevance, accuracy, timeliness, reliability, and completeness. The framework allows a study of the digital competences used in the management accounting practices and the key features of the information that is produced, which provides a more specific view of the connection between digital competences and information quality in the cost accounting field.

In the application, the study investigates this relation in the Universities of Kufa and Karbala, by surveying the accounting, management experts and professionals who use financial and administrative information in their work. A field questionnaire was used in the study with 354 questionnaires returned, and 317 were considered valid for statistical analysis. This gave the data set to look at respondents' perceptions of the digital capabilities of management accounting, and the quality of cost information. The methodology's utility lies in trying to establish how well digital capabilities are implemented according to the information characteristics that management needs. Moreover, the results can be used to pinpoint possible areas of accounting systems and procedures development. Given the above, this research aims to carry out a scientific and practical analysis of the connection between the digital competence of management accounting and the quality of cost information. This is done by testing this relationship in an area of interest and determining the signs that are provided by this data for the dimensions being studied. The research results are hoped to assist in clarifying the aspects that should be further studied in the creation of digital management accounting practices after conducting statistical analysis. In addition, they will develop recommendations for enhancing the quality of the cost information and its utilization in planning, control and managerial decision-making processes based on a scientific foundation.

Section One: Research Methodology

I. Research Problem

As digital technologies are increasingly embraced in accounting and administrative processes, it is important to consider how far these technologies can go in improving the actual practice of management accounting, in particular the processing of accounting information and the creation of accounting information that is used for planning, control and decision making purposes by managers. Digital systems alone, will not necessarily produce better cost information quality; they have to be used well in order to be involved in data integration, cost element analysis, the automation of accounting procedures and the timely preparation of reports. On the other hand, cost information that is useful for management must have the following characteristics: it must be relevant to management, it must accurately reflect cost elements, it must be timely, and it must be reliable and complete enough to satisfy management decision makers.

The research problem is about the relationship between the digital capabilities being used in management accounting practices and the quality of the cost information, and the link between the deployment of these capabilities and the characteristics of the information generated by accounting systems and procedures. This is an important issue in an organizational setting where the need for coordination of accounting and administrative data for planning and financial analysis exists. Lack of digital integration (or simply ineffective use of analytical and automation tools) can limit the value that can be gained from existing data. Conversely, strong and cohesive digital competencies can enable opportunities to improve the quality of information and how it can support management use. Based on this, the research problem is related to exploring the role of digital capabilities in management accounting in improving the quality of cost information at the Universities of Kufa and Karbala. This includes conducting surveys of accounting and management experts, financial planning and analysis practitioners, and analysing field data to understand how digital capabilities are related to the dimensions of cost information quality. The main research question is:

What is the role of digital capabilities in management accounting in enhancing the quality of cost information at the Universities of Kufa and Karbala?

Second: Significance of the Study

The importance of the study can be attributed to the relevance of the variables investigated in the study and the need to understand what digital skills can do to further improve management accounting practices and the quality of information used for decision making. Significance of the study can be explained in two related ways:

Scientific Significance

The importance of the scientific contribution is that it goes beyond the concept of 'digital transformation' and focuses on the digital capabilities as they relate to management accounting. It discusses the relationships between digital integration of data and systems, the ability to analyse costs, automation of accounting processes and the ability to produce cost reports on one side and quality of cost information (relevance, accuracy, timeliness, reliability and completeness) on the other. In addition, this study offers a conceptual and practical framework that can be used as a base for further research on management accounting systems development and the quality of their information outputs.

Practical Significance

This study has practical significance because of the findings of the field study sample (students from the University of Kufa and the University of Karbala) to evaluate how far the use of digital skills is in the practice of management accounting and the relationship between it and the quality of cost information. After statistical analysis, the results can be used to pinpoint opportunities for improvement in system integration, data analysis and process automation, reporting, etc. This, in turn, will help professionals in the areas of accounting, management, planning, and financial analysis, and provide more relevant information to help management make decisions.

Third: Research Objectives

The study's primary goal is to discuss the role of digital skills in management accounting in improving the quality of cost information at the Universities of Kufa and Karbala. The following are integrated sub-objectives that help to achieve this primary

objective:

1. Formulating the conceptual framework for digital competencies in management accounting and outlining their dimensions: digital integration of data and systems, digital analyzing capacity of cost data, digital automation of management accounting procedures and digital capacity for preparing cost reports.
2. Establishing a conceptual structure for quality cost information, describing the attributes: relevance, accuracy, timeliness, reliability and completeness.
3. Measuring the perceptions of the study sample towards the use of digital tools for the task of management accounting at the Universities of Kufa and Karbala, as well as the extent to which cost data processing, and report preparation are conducted in that manner.
4. Examining the attitude of the study sample on the relevance of the cost information to management needs, its accuracy, timeliness, reliability, and completeness.
5. Analysing relationship between digital capabilities in management accounting and quality of cost information both from field data and results of the statistical analyses to better explain the nature of the correlation between the two variables and the respective dimensions.

Fourth: Study Measurement and Coding

Questionnaire was the main tool used in the study to collect data. The size of the measurement was defined in the light of existing scientific studies relating to the digital competences, information systems in management accounting and the quality of cost information. Digital competences in management accounting are the independent variable and quality of cost information is the dependent variable. The items of the questionnaire were designed in accordance with the nature and purpose of the study, its specific application context (Universities of Kufa and Karbala), and the operational characteristics of each of the variables.

Table (1): Coding of the study variables and their dimensions

Sources	Encoding	Encoding	Dimensions	Variables
Knauer et al. (2020)	DW	5	Digital integration of data and systems	**Digital Capabilities for Management Accounting DCMA**
	DE	5	Digital capability for cost data analysis	
	DR	5	Automation of management accounting processes	
	DT	5	Digital capability for cost reporting	
Cohen & Kaimenaki (2011)	QA	4	Relevance	**Quality of cost information QCI**
	QS	4	Accuracy	
	QD	4	Timeliness	
	QF	4	Reliability	
	QG	4	Completeness	

Source: Prepared by the researcher

Section Two: Theoretical and Conceptual Framework of the Study

I. Digital Capabilities for Management Accounting

1. The Concept of Digital Capabilities for Management Accounting

In the current business landscape, digital capabilities for management accounting are the foundation of the transformation that is ongoing in the field of management accounting and their associated thinking. They are a complete organization's ability to integrate and use cutting-edge automation and computing tools in its management accounting systems and processes, turning raw data into strategic knowledge flows.

The idea has developed quickly, moving from conventional accounting systems, which focused on the past and looked back in hindsight to create periodic, aggregated reports, to dynamic, interactive systems. Such modern systems make use of advanced technology to deliver real-time information to facilitate decision-making and monitor strategic operational performance (Nakrong et al., 2024: 22). Digital management accounting is more than just having accounting hardware and software. It includes an embedded organizational capability that brings together high tech advanced technology systems including cloud computing, big data and artificial intelligence as well as management accountants' analytical expertise. This capability helps in establishing an adaptable control and management framework that can respond to growing market complexities, allowing for effective cost management, opportunity identification, and value-add improvements for the organization (Atobishi et al., 2026: 131).

Digital capabilities in management accounting are seen as a high-level core competency in the theoretical perspective of Dynamic Capabilities Theory. This will allow an organization to detect environmental and technological trends and to quickly adapt to them, capitalize on digital opportunities, and reorganize or reconfigure their internal accounting resources and systems. This dynamism enables organisations to break away from rigid control systems and embrace flexible systems that can quickly adapt to market changes, changing consumer preferences and competitive challenges (Jibrin & Folagbade, 2026: 229).

Moreover, this notion is realized in the way of seamlessly integrating traditional financial data with strategic non-financial data, which is intertwined with both the business processing flows and the external environment. This ability enables management accountants to utilize advanced data analytics to give executive management predictive and prescriptive insights, which extend beyond simply analysing what has happened in the past and into the future (Franke & Hiebl, 2023: 93).

Digital competences of management accounting are closely related to the quality of information systems and accounting information. Digital technology minimises manual data entry which can be human error, and provides accurate, reliable, timely, and complete data. Such high-quality data is essential to management accountants in carrying out their roles of planning, administrative control and performance evaluation, as it would help maintain a connection with the operational world (Knauer et al., 2020: 97).

Accounting literature stresses the importance of these abilities in reinforcing the risk management process and in allowing the foreseeing of the development of resources and Production. This transforms management accounting from a reactive tool that was only used to address issues after they occurred, into an early-warning tool that relies on simulation modelling and quantitative analysis. This accounting flexibility enables organisations to create budgets and financial forecasts with great accuracy, reducing the chances of estimation gaps or the gap between actual expenses and planned paths (Bergmann et al, 2020: 25). Moreover, targeted research has highlighted the importance of the human-in-the-loop and skill aspect of digital accounting skills. Making the most of digital capability in an organization is only possible if management accountants have the statistical and technical skills needed to use complex software and analyse digital data. This fusion of technology and human expertise empowers management accountants to shift from being mere data recorders to strategic decision-makers (Imjai et al., 2023: 203).

The concept also involves the "continuous accounting" approach, in which the use of cloud technologies and the automation of accounting processes eliminate the old accounting period of "closing the books" (monthly or annual) and make it possible to reconcile accounts and prepare financial statements in real time, as they are created. Financial and operational performance measures are constantly updated, thus helping to ensure the financial data reflects the actual economic event and there is a minimum time lag between the event and a comprehensive management decision (Badria & Hasanah, 2024: 345). The researcher considers digital capabilities in management accounting to be an "integrated and dynamic" system consisting of state-of-the-art technological infrastructure (including cloud computing, artificial intelligence, big data analytics, and process automation) and accounting professionals with the analytical skills needed to leverage the system. This system can be used to gather, improve and analyse different financial and operational data and provide high precision real-time reporting. Therefore, it facilitates strategic decision-making in a proactive way, cost management and sustainable performance of organizations.

2. Dimensions of Digital Capabilities for Management Accounting

The theoretical framework developed by Knauer et al. (2020) and relevant literature are used to derive the dimensions of the independent variable in this study. The Digital Capabilities of Management Accounting are organized into the four dimensions of the framework, all of which are integral to the digital accounting environment, to capture the technical, analytical, procedural and reporting dimensions of management accounting.

A. **Digital Integration of Data and Systems**: An organization's ability to integrate and harmonize a variety of financial and operational data sources into a single digital accounting platform through Enterprise Resource Planning (ERP) and cloud-based applications. This integration helps to break down silos and allows information to flow freely between various departments of the company, and with its suppliers and customers. This means that management accountants have a comprehensive and current understanding of the operational and financial processes and can make well-informed management decisions.
B. **Digital Capability for Cost Data Analysis**: This dimension relates to the ability to break down cost components and monitor cost drivers with high level accuracy at all points in the value chain, using complex algorithms and big data analytics. This analytical ability allows management accountants to move from their traditional focus on historical cost reporting to predictive and prescriptive analysis, and thus uncover new potential to reduce costs strategically, to optimize product pricing, and maximize the organization's profitability when operating.
C. **Automation of Management Accounting Processes**: This dimension is related to the use of automation including Robotic Process Automation (RPA) and Artificial Intelligence (AI) to perform repetitive, mundane accounting tasks, including data entry, reconciliation and automating the process of recording transactions. This automation minimizes human errors, operational and administrative costs and frees up the management accountant's time, which can be spent on activities that create greater value, like strategic planning and analytical support.
D. **Digital Capability for Cost Reporting:** This dimension is related to the effectiveness of the costing system in generating interactive, customised and real-time cost reporting, with the use of digital dashboards and data visualization tools. With these smart reports, senior management will have immediate access to the cost variances and financial

performance metrics, this will speed up the process of taking corrective actions and will also allow the information to reach decision makers quickly and transparently.

Second: Quality of Cost Information

1. The Concept of Cost Information Quality

Therefore, the quality of cost information is the cornerstone of modern management accounting systems that enable the organization to lead itself with accurate financial and operational information. It demonstrates the integrity and appropriateness of accounting outputs for real-world application to solving management problems and to decision making. The conceptual importance of cost information quality is that there has been a transition in the accounting world from the traditional accounting systems, which were used mainly for external reporting, to more sophisticated cost accounting systems that give in-depth details to assist in financial planning, resource allocation, and the monitoring of investment and operating budgets (Pavlatos and Kostakis, 2023: 89).

In an organisational setting the quality of cost information is a summarised attribute that describes how well the information provided by a cost accounting system meets the technical and informational needs of different levels of management. Also, the concept is not just limited to the accounting system's ability to provide abstract accounting information, but also includes the flexibility of the accounting system to produce customized accounting information reports based on the structure of responsibility centers. Moreover, it allows for the distinction between cost behaviour, differentiating between fixed and variable, and direct and indirect costs, creating cost transparency, and improving efficiency in internal controls (Cohen & Kaimenaki, 2011: 6). In the context of management and strategic planning, the quality of cost data is used to minimize risks with the environment and uncertainty as it helps decision makers to consider the business profitability of different product lines and pricing segments down to even the last centimetre level. The high quality of accounting outputs helps to reduce these cognitive gaps that managers face and enable the restructuring of pricing policies, the objective assessment of project economic feasibility (free from arbitrary estimates and personal biases) and the implementation of the goal of target cost management (Balios et al., 2024: 131).

In addition, data quality relates to data governance infrastructure of an organization. This quality is reflected in the fact that the accounting systems do not distort the data and have a low error rate when processing the data and making accounting entries. High quality cost information also depends on an integrated digital accounting environment, equipped with a strong control of the inputs of the system, which allows for the consistent reporting of financial information and the proper representation of the reality of the production and service operations (Knauer et al., 2020: 97). Besides, the quality of cost information is affected by new aspects of technological development relating to its analytical and predictive power. The key to measuring quality now is not just the accuracy of historical data, but how much it's used to transform measurement of cost into real-time predictive models and tools that use that big data. The informational efficiency helps to move away from a static analysis of activity costs towards a dynamic, interactive process and allows for the identification of operational deviations before their financial implications grow (Franke & Hiebl, 2023: 93).

Furthermore, the idea is applicable to the continuous production and reporting in real-time. The use of automated accounting methods and the shift to cloud-based

systems has reduced the time between when an economic event that is the cause of a cost occurs and it is identified for reporting purposes. Having this cost information readily available increases an organization's agility by enabling direct changes to production plans and supply chains (Oracle EPM Study, 2021: 21).

The current literature on accounting stresses the idea of "situational relevance" for cost information. In this perspective, the quality of the cost information is defined by the degree of matching between the nature and scope of the information and the degree of environmental complexity and the competitive approach used (e.g. cost leadership or differentiation strategy). High quality cost information is a key medium that allows a company's innovation and development capabilities to be reflected in tangible financial results and thus improve its performance overall (Carolina et al., 2024: 380).

Finally, this concept refers to the functional aspect of integrated cost control. The key input to the development of a management control system that can successfully sense and adapt to market changes is accurate and complete cost information. This quality makes raw data into operational information that is meaningful and useful, and helps the organizations to behave optimally to achieve sustainable operational performance (Nasiri & Abdollahian, 2026: 55).

The researcher views the quality of cost information as having the characteristics of accuracy, relevance, timeliness, reliability, and completeness in the output and financial and/or operational reports from a cost accounting system. These attributes help management to grasp the behavior of costs, classify costs, investigate variations, and leverage this information for making strategic decisions, budgeting, and improving the performance of the organization.

2. Dimensions of Cost Information Quality

This study uses the model suggested by Cohen and Kaimenaki (2011) which is widely used in accountancy research to help identify the dimensions of cost information quality. This model defines five essential, integrated dimensions to assess the qualitative characteristics of outputs of a cost accounting system, that make it effective for decision-making and managerial control (Cohen & Kaimenaki, 2011: 6).

A. **Relevance**: A cost's relevance is its ability to provide meaningful information for the manager's decision-making process. It has both predictive and confirmatory value, and is very close to the needs of a particular situation. Relevance means that management accountants receive cost information that is relevant to each managerial tier; cost information that will enable them to measure performance and determine the optimal alternatives, but not so much that it overloads the management.
B. **Accuracy:** Accuracy refers to the freedom of cost information from computation inaccuracies or number distortions, so that accounting measurements reflect the actual operational reality of resource consumption. The accuracy ensures that direct and indirect costs are properly allocated to products or responsibility centers, giving management a sound basis for identifying true costs and properly, but not misleadingly, price products.
C. **Timeliness:** Timeliness means that cost information is made available to decision makers at the right time, before it ceases to have the ability to influence managerial decisions and processes. Providing cost reports on a periodic basis, or as soon as they are requested, allows an organization to act quickly in response to financial variances and environmental changes, helping to implement corrective actions as quickly as possible.

D. **Reliability:** This is the level of assurance that the decision-makers have in the accuracy and validity of the products provided by a cost information system and can depend on the products of the system for strategic planning or control. Reliability is when accounting information is verifiable from original documentation and is kept in accordance with the same accounting principles, thus avoiding the use of incorrect personal opinions and assumptions.

E. Completeness: Completeness relates to whether cost reports contain all the necessary information and data for the financial analysis and whether any significant information that a decision maker would be interested in is missing. This involves providing an in-depth understanding of the components of fixed costs, variable costs, and variations in production/service operations, which allow proper evaluation and complete control of an organization's resources.

Third: The Interactive Relationship Between Digital Capabilities in Management Accounting and the Quality of Cost Information

The relationship between the interactive nature of digital development of management accounting and the quality of cost information is essentially built on the basis of organizational information-processing theory. When things change quickly in the supply and production side of a business it can be a major increase in uncertainty, and generates a lot more data. In this regard, digital accounting abilities serve as an organizational mechanism that expands a company's capability to absorb and process the massive amounts of data. It avoids "information overload," filters information, and makes it 'cost report ready' - reports without 'digital noise' and structured for accuracy and continued relevance to address operational variances (Poyda-Nosyk et al, 2023: 1). A digital infrastructure (intelligent software and automated tracking systems) invites a radical change in the cost measurement paradigm from the point of view of procedural processing and control. It minimizes the need for human judgments and estimates which, in the past, caused budget slack and distorted the "true" drivers of cost. Continuous documentation and analysis algorithms allow monitoring of actual resource use at all stages of the value chain. This helps to reduce the number of mistakes in calculations and complicated reconciliations, increasing the reliability of cost outputs which can then be used directly within the control and evaluation. (Ibrahim et al., 2023: 119)

Additionally, the digital skills of management accountants have a causal link to the strategic value of cost information. With technical and analytical skills, accounting professionals can move beyond "historical record-keeping" to "predictive guidance" for operations by the evolution of cost systems. These analysis skills enable the analysis of the financial consequences of operational changes prior to implementation, using simulation models and alternative scenarios. This provides timely, very predictive cost reporting which gives executive management the freedom to make pricing and investment decisions with great confidence (Imjai et al., 2023: 203). An advanced analysis of these variables within the framework of Contingency Theory, shows that the interaction between these variables is regulated by the level of coordination and structural similarity between technological development and the selected cost accounting system. No matter how current the technology is, if it doesn't come with a set of features designed to improve data management and extraction, it won't necessarily boost the output quality of accounting work. Digital accounting capability serves as a strategic mediator in organizing the classification and measurement process in accounting. It can be adjusted to the production complexity

and product diversity to produce complete and customized cost information for specific production decisions (Carolina et al., 2024: 380).

Moreover, the automation of accounting management processes, and the integration with cloud, can help reduce the costs of accounting management transactions. They also break the cyclical time limits that are often linked with the closing of accounts. The modern technologies allow for making adjustments, and drawing up cost statements, in an interactive and automated manner—this is called 'continuous cost accounting'. This ongoing flow of information removes time lags between use of a physical resource and physical the financial information reflected in cost reports, and between use of a human resource and the financial information reflected in the cost report. The availability of cost information, as a consequence, is timely and at an appropriate level of analytical detail to enable the proactive management of operational performance (Balios et al., 2024: 181). The end goal of this complementary relationship is the evolution of the cost information quality from a mere static attribute with computational accuracy to an active organizational enabler. Management Accounting's digital tools and knowledge create the technology and knowledge foundation that secures the integrity of inputs, the smoothness of processes, and the fullness of outputs related to costs. It is one of the basic building blocks of strategic decision-making and increasing the efficiency of long-term resource management (Nasiri & Abdollahian, 2026: 55).

Section Three: Statistical Framework and Discussion of Results

1.Coding the study variables

Table No. (1) Coding of the study variables and their dimensions

Sources	Encoding	Encoding	Dimensions	Variables
Knauer et al. (2020)	DW	5	Digital integration of data and systems	**Digital Capabilities for Management Accounting DCMA**
	DE	5	Digital capability for cost data analysis	
	DR	5	Automation of management accounting processes	
	DT	5	Digital capability for cost reporting	
Cohen & Kaimenaki (2011)	QA	4	Relevance	**Quality of cost information QCI**
	QS	4	Accuracy	
	QD	4	Timeliness	
	QF	4	Reliability	
	QG	4	Completeness	

Source: Prepared by the researcher

2. Descriptive Analysis of Study Variables (Digital Capabilities for Management Accounting and Cost Information Quality)

The analysis results presented in Table (2) indicate a consensus among the research sample regarding these two variables.

Table (2): Results of the Descriptive Analysis for the Dimensions of Digital Capabilities for Management Accounting and Cost Information Quality

Standard deviation	Arithmetic Mean	Paragraph
0.75	4.66	**DW**
0.88	4.76	**DE**
0.92	4.98	**DR**

0.65	4.41	**DT**
0.67	4.45	**SN**
0.774	**4.652**	**DCMA**
0.76	4.87	**QA**
0.74	4.48	**QS**
0.69	4.87	**QD**
0.65	4.78	**QF**
0.56	4.76	**QG**
0.68	**4.752**	**QCI**

Source: Prepared by the researcher

The results show that the sample members' perception of the capability of management accounting in the digital age is high, as well as their perception of the quality of the information obtained from costs. This is consistent with the nature of the sample of the experts interviewed (professors and specialists from public universities) as this enables a greater awareness of the importance of trust in government institutions.

3.Testing the Main Hypothesis

The primary hypothesis is: "Management accounting digital capabilities have a positive and significant impact on the quality of cost information. This was tested using a structural model as illustrated in Figure (1), the results of which are shown in tabular form in Table**.(2)**

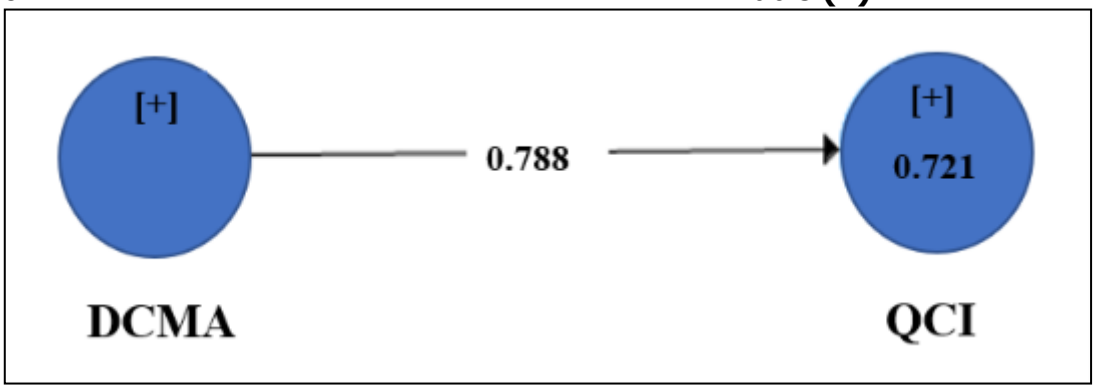


Figure (1) Structural model for testing the main hypothesis

Source: SmartPLS software output

Note: The numbers on the arrows represent path coefficients, while the numbers within the circles represent coefficients of determination. The symbol [+] indicates that the items associated with a variable have been hidden, as they are not required for the evaluation of the structural model**.**

Table (3): Results of the structural model evaluation for the main hypothesis

Hypothesis	Path	VIF	Path coefficient	t Value	p Value	Result	Effect size f2	Coefficient of determination R^2	Adjusted R^2
H1	DCMA → QCI	1	0.788	25.47	0.000	Acceptance	3.443	0.79	0.772

Source: SmartPLS software output

The results of the evaluation of the model structure used for the main hypothesis can be seen in Table (3). The path coefficient is 0.788 with t value and p value as

required and falls within the significance and the main hypothesis is accepted. In addition, coefficient of determination (R^2) is 79%, which indicates that 79% of the variance of the dependent variable is explained by the independent variable, and 21% is due to the other factors that were not considered in this study.

4. Testing sub-hypotheses

The sub-hypotheses of the main hypothesis state the following:

H1-1 There is a positive and significant influence relationship of digital integration of data and systems on the quality of cost information.

H1-2 There is a positive and significant relationship of influence of digital ability to analyze cost data on the quality of cost information.

H1-3 There is a positive and significant influence relationship of automation of management accounting procedures on the quality of cost information.

H1-4 There is a positive and significant relationship of influence of digital ability to prepare cost reports on the quality of cost information.

For the purpose of testing the hypotheses (H1-2, H1-3, H1-4, H1-1), the researcher built the structural model, the results of which are presented in Table No. (4).

Table No. (4): Results of evaluating the structural model for the sub-hypotheses

Hypothesis	Path	VIF	Path coefficient	t Value	p Value	Result	Effect size f2	Coefficient of determination R^2	Adjusted R^2
H1-1	DW → QCI	1.121	0.366	4.098	0.000	**Acceptance**	0.072	0.798	0.776
H1-2	DE → QCI	1.327	0.280	3.056	0.000	**Acceptance**	0.166		
H1-3	DR → QCI	1.277	0.236	3.222	0.000	**Acceptance**	0.269		
H1-4	DT → QCI	1.348	0.435	2.316	0.000	**Acceptance**	0.276		

Source: SmartPLS software output

To test the sub-hypotheses of the first main hypothesis (H1) i.e. for the relationship and pathway, the results of the structural model evaluation are presented in Table (4) which was obtained by using the Partial Least Squares Structural Equation Modeling (PLS-SEM) approach. The statistical results verify that the conceptual model is of good quality, strong and explanatory, according to the international scientific accounting and management standards.

In terms of the multicollinearity of the dimensions, the result shows that the model is free of this problem. The paths have Variance Inflation Factor (VIF) values from a minimum of 1.121 to a maximum of 1.348, which are well below the critical statistical value of 3.0. This validates the independence of what is measured for each dimension and the accuracy of the estimates obtained for the links and paths in the structural model.

The model's explanatory power was high, the coefficient of determination (R2) was 0.798 and the adjusted coefficient of determination (R2adjusted) was 0.776. From a statistical point of view, the dimensions of the independent variable, Digital capabilities for management accounting, together account for 79.8% of the variance and change in the quality of cost information (QCI). The remaining 20.2% comes from other external factors and variables not explained in the present model. The results of the t-test and p-value showed that all the sub-hypotheses (H1-1, H1-2, H1-3, and H1-4) were accepted at a high level of statistical significance ($p < 0.001$) with t-values

> 1.96. The results of the first sub-hypothesis (H1-1) showed that DW had a statistically significant positive direct effect on the quality of cost information with the path coefficient 0.366 (t = 4.098) and effect size (f^2) of 0.072. The results of the second sub-hypothesis (H1-2) showed that there was a significant positive effect for the second dimension (DE) with path coefficient = 0.280 (t = 3.056) and effect size = medium (f^2 = 0.166).

The results obtained for the third sub-hypothesis (H1-3) that DQ causes an increase in the third dimension (DR), revealed a positive effect between the third dimension (DR) and the dependent variable (DQ), with a medium effect size (f^2) of 0.269 and a path coefficient of 0.236 (t = 3.222) and statistically significant (t > t table). In the same way, the fourth dimension (DT) with the highest path coefficient (β = 0.435, t = 2.316) and the most size (f^2 = 0.276) was found in the field model in the fourth sub-hypothesis (H1-4). It highlights the critical value of this particular aspect as a fundamental pillar and an important driver in the field environment under study, for improving and strengthening the quality of cost information.

Section Four: Conclusions and Recommendations

First: Conclusions

1. The theoretical basis shows that the function of digital skills is not limited to being an auxiliary technology, but that it is a strategic approach that brings management accounting beyond the traditional concept of being based on historical records and reporting, to become an active, predictive and proactive function that plays a role in planning and control systems.
2. The results show consistency with theoretical approaches, indicating that the capacity to process vast amounts of data is increased when academic institutions and service-oriented institutions have an advanced digital infrastructure. This eliminates the risk of "information overload", as all inputs are filtered and converted to distortion-less, distortion-free "cost-related outputs" of information without any distortion or digital bias.
3. The primary variable "digital capabilities for management accounting" is highly significant to "cost information quality" according to the statistical data, which has a path coefficient of 0.788 and a coefficient of determination (R2) of 0.79. This means that 79% of the differences in the quality of the cost-related outputs in the studied environment are due to investment in digital infrastructure.
4. The result of statistical analysis for the sub-hypothesis is that the dimension that has the most influence in the statistical model is the "digital reporting capability" dimension which has an effect size (f2) value of 0.276 and a path coefficient (PC) value of 0.435. This means that the timely and relevant availability of cost-related information for management decision makers is essential and interactive dashboards play a key role in this.
5. The results provide clear evidence of the positive effect of digital integration, both in terms of data and systems, on the quality of cost information. This means that connecting databases together and combining them through cloud platforms will significantly reduce the redundancies and overlaps of administration, and improve the accuracy and reliability of the outputs of the cost.
6. The findings on the effect of digital competences on cost data analysis highlight the fact that the use of the modern algorithms and data analysis allows management to break down the cost elements throughout the value chain. This moves the emphasis from any superficial historical measurements to analytical insights to help make rationalised expenditure decisions.

7. The results from the statistical analysis on the automation of management accounting processes indicate that these processes have an impact on the direct reduction of the amount of human errors that are committed, which is typically associated with manual data entry, but also on the capacity to release staff and analysts from routine, repetitive tasks and allow them to focus on effective control and decision making.

Second: Recommendations

1. The study suggests that the university administrations and institutions should expedite the completion of their cloud infrastructure and bring together financial and administrative departments of the institution into an integrated and comprehensive Enterprise Resource Planning (ERP) platform. This would remove "information silos" and provide an open communication of cost-related information.
2. The study recommends a gradual transition away from paper periodic reports and towards interactive, real-time digital dashboards that take advantage of the relative strengths of digital reporting. These tools would make administrative leadership more capable of tracking on-going cost variances.
3. Again, the study acknowledges that technology is only part of the solution, and calls for long-term, intensive training programs for accountants and financial workers. This training should help them improve their technical skills, such as handling big data analysis and complex financial modelling, and empower the accountant to move beyond being a "historical recorder" to a "strategic partner in decision making".
4. The formation of special oversight units for the governance of accounting data is crucial. These units should develop digital access policies for data input and retrieval, including standards for completeness and reliability, and be designed to stop manipulation of financial information and the duplication of financial information.
5. The study also recommends the use of the results from a digitally supported cost information system for the purpose of assessing the efficiency of the use of resources by different units and responsibility centres. Performance based incentives for both office and field staff should be tied to the performance and results of specific departments in rationalizing expenditures and minimizing waste and loss. Modernizing accounting functions to best suit the needs of the digital era, allowing accountants to get ahead of the curve by using simulation tools and predictive analytics to assess options before making financial and managerial decisions.
6. Based on the study, researchers and academics are advised to carry out similar studies in other economic sectors, like banking, telecommunications, or industrial, or to include moderating or mediating variables (e.g., organisational culture or management support) to test the generalizability of the digital capabilities model for management accounting in different work contexts.

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