



THE DEVELOPMENT OF MANAGERIAL ACCOUNTING IN THE ERA OF DIGITAL TRANSFORMATION

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Article history:	Abstract:
Received: 24 th September 2025	The article studies how the digital transformation influences the management accounting processes by identifying the opportunities and challenges posed by the introduction of new sophisticated digital technologies into the management accounting processes, and the degree to which management accountants are able to cope with this accelerated process. In the study, an extensive exploration of literature on digital transformation in management accounting was done by reviewing academic papers and literature on the topic. The article also introduces a suggested model on how to develop management accounting processes by integrating digital technology in the process and the role played by management accountants in this process. The analysis indicates that digital transformation has a great impact on the performance and accuracy of management accounting processes and helps to properly distribute the resources and minimize the operational costs. Moreover, implementing artificial intelligence and prediction data analytics will contribute to better decision-making, intensified risk management, and improved inventory control. On the other hand, the findings also focus on overcoming issues associated with skills development, data analysis, and cybersecurity to take advantage of all the opportunities of digital transformation. Thus, the implementation of modern technological achievements into the management accounting and the continuous improvement of the technological competence of the management accountants are the issues, which should be taken seriously by organizations to become competitive and succeed in the age of the digital transformation.
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INTRODUCTION

The world is experiencing a total revolution in the digital age that includes every sphere of life, including the business operations and the financial activity. Management accounting is one of the areas that were undoubtedly impacted by this change greatly. Management accounting is another important field that contributes immensely to aiding organizations take strategic decisions and to controlling their operations as well as improve their performance. It does it through the gathering, quantification, evaluation, explanation, and presentation of financial data to the management to make decisions. Previously, management accountants were using manual means of data collection and preparation of sophisticated spreadsheets to complete their work. Nevertheless, this has been radically changed and permanently redefined by the digital revolution. Within the last 20 years, new technologies have been developed, including AI, ML, big data analytics, cloud computing, and IoT. (Wolf et al. 2020). Such technologies gave companies enormous data and have also given them the tools that they need

to analyze the data provided in real time transforming the way management accounting is done.

Significance of the Study:

The relevance of exploring the concept of management accounting within the framework of digital transformation is dictated by the fact that digital technologies are a competitive advantage along with sustainability and quick adaptation to the ever-changing world of business. Making decisions grounded on data, organizations can streamline their resources, become more efficient and responsive to the shifts in the market. Besides cyber security, development of human skills, and remote employment facilitation are other factors that should be taken into consideration in order to prosper in the long term. Because of the new phenomenon of digital transformation and the current transformation in the accounting profession, understanding and adoption of it becomes a necessity and not an option. Other models presented by the digital age and which can change the management accounting practices are blockchain, advanced analytics, and robotic process automation. The



organizations that employ such innovations will be in a position to possess new insightful insights into the future and also improve management accounting techniques. Therefore, there might be a risk of missing the opportunities and the loss of a competitive advantage due to the delay in the development and adoption of such technologies. The digital transformations in management accounting do not mean only efficiency, but the changes can also transform the businesses and ensure the success of organizations which live in the times of an even more digitalized world. That is why the need to act within the nearest future, and to examine the opportunities that digital transformation proposes and to utilize them to the fullest extent, as well as to overcome the challenges they are associated with.

RESEARCH OBJECTIVES:

Perform the in-depth analysis of the effects of the digital transformation on management accounting through examining the challenges of management accountants in adjusting to digital technologies and discovering the prospects.

Evaluate how digital transformation impacts performance in organizations and influence institutions to the best practices in order to maximize the use of digital tools.

Learn how organizations are changing in response to this digital transformation and how technology is changing the role of decision-making.

Equip accountants, institutions, and decision-makers with the necessary knowledge required to remain modern in the digital world and be competitive.

RESEARCH METHODOLOGY

This study employed the literature review approach to understand how management accounting methods were developed in the context of digital transformation. This methodology comprised a thorough and orderly examination of scholarly articles and other literature in the domain of management accounting. The information was retrieved based on the chosen studies, systematised, and objectively examined to draw up difficulties and opportunities and, at the same time, infer the best practices concerning digitizing transforming in management accounting. The results have been debated, explained, and synthesized to present useful information regarding the present management accounting in the digital age.

The Development of Management Accounting in the Context of Digital Transformation

The management accounting has also seen major transformations in order to meet the fast shifting business environment. The adoption of innovative technologies and data analysis has also changed how

organizations gather, process, and analyze financial data and make more informed decisions and increase operational efficiency (Susanto and Meiranyi, 2019). One major role of management accounting in the digital time is the usage of cloud-centered accounting services and applications. The technologies allow real-time access and analysis of data and a smooth cooperation with other departments, which is why manual data entry is unnecessary, and the financial information is accurate and up-to-date. This helps companies to simplify their accounting systems, minimize errors, and maximize efficiency (Valeet al, 2022).

Digital-time management accounting involves the use of data analytics. Business processes have been generating massive data that necessitates sophisticated analytical methods like machine learning algorithms and artificial intelligence. These technologies provide useful information on the financial performance and can take predictions. This kind of information empowers management accountants to make effective and data-driven decisions, to allocate resources better, and to improve overall performance of a business. Also, the emergence of (IoT) has transformed management accounting. (Ascani et al. 2021). IoT is able to gather and send financial information of different sources like production activities, supply chain activities, and customer interfaces. This networked system offers a big picture approach of the business and therefore management accountants can comprehend the effects of financial measures on operational variables and external elements. Moreover, the digital age has made it possible to create complex cost-allocation models. By managing the costs at a more finer level, management accountants will be in a position to assign costs better which will enhance cost control and resource usage. Such understanding contributes to the saving of costs and improvement of product and service offering.

A second significant change resulting in the digital age in the scope of management accounting is the transition to the use of data in measuring performance. Although the majority of companies continue to use conventional financial performance measures, the digital development allows relying on non-financial measures that can give information on customer satisfaction, staff involvement, and efficiency of the working process. Such key performance indicators based on data enable a more extensive evaluation of organizational performance and align the business tactics with the business goals (Korhonen et al, 2020).

Through predictive models, the management accountants can make decisions about the future financial situation using past information and market



trends. Such predictions help organisations to foresee the challenges they may face, the opportunities available to grow and find efficient ways of staying competitive in a competitive business world. Moreover, the move to incorporate financial reporting online has revolutionized the process of making information available to the stakeholders by the management accountants. The collaborative dashboards and data-visualization gears offer more interactive and readable format of fiscal data, as the decisions-makers can easily obtain the complicated information (Gunarathne and Lee, 2021). This improved communication creates greater partnership between the management accountants and further business functionalities promoting more unified decision making. Although the privileges of digital-era management accounting are numerous, there are challenges associated with it. The fact that companies have become more dependent on technology opens them up to cybersecurity risks, which makes it necessary to implement more effective data-protection policies. Additionally, due to the acceleration of technological advancement, management accountants have to continuously enhance their competencies and knowledge to apply these tools and techniques in their work (Alvaerz et al. 2021).

Cloud-based accounting software, data analytics, the Internet of Things, and predictive models modernized the way financial data is gathered, processed, and analyzed. The digitization of financial reporting and the integration of data-driven performance metrics have strengthened decision-making and improved collaboration across different business functions (Alsharari and Al-Shboul, 2019).

Challenges Facing Management Accounting in the Context of Digital Transformation

Management accounting is an area with great obstacles due to the penetration of modern digital technologies into the management accounting processes. Such a change necessitates management accountants to evolve their abilities and expertise so as to derive maximum advantage of such advanced technologies. They should embrace new business models and develop the technical abilities required to be abreast with the fast-evolving and dynamic working environment. The need to adjust skills and create technological literacy has become one of the primary goals in the training of management accountants. The old-fashioned skill sets are no longer adequate in the wake of high levels of digitization (Oeywo, 2021). To perform successfully in the digital world, management accountants will have to learn the art of data analytics, gain skills of interpreting complicated algorithms and become tech-savvy in making wise decisions. The

change demands taking initiative to grow professionally, through constant training and acquisition of skills. Higher education institutions and professional organizations should therefore revise their course and qualification requirements to include digital skills and make sure that upcoming management accountants will be able to handle the demands of the digital time (Varaniute et al, 2022).

The digital age has made it possible to open the floodgate of data, including huge amounts of sensitive financial data. This proliferation of data creates pressure on the data management and protection practices. The privacy of financial information and its protection is a priority because its violations or leakage may cause devastating financial outcomes and reputation harm to an organization (Bhimani, 2020). The management accountants should make sure that the data are handled securely and that they conform to the laws and best practices of data protection. In order to overcome these issues, institutions ought to embrace sound cybersecurity strategies which can encompass the use of encryption, access restrictions, and an irregular security audit. Besides, it is also important to promote the culture of data-privacy awareness between the workers in order to ensure the financial information is secure. Another issue posed by the digital transformation is the necessity to achieve the proper balance between the modern technologies and human discretion (Ascani et al, 2021). Even though data analytics and predictive solutions offer high-quality insights and forecasts, humane input cannot be substituted with strategic decision-making. The data-driven insights have to include intuition, experience, and context. The management accountants should be aware of the strengths and weaknesses of technology and when to apply their knowledge to decipher the complicated fiscal situation. A right balance between data-driven insights and human judgment is important when it comes to making decisions during digital transformation (Varaniute et al, 2022).

With these problems, there are also endless opportunities of management accounting brought by digital transformation. The use of the digital technologies will greatly improve efficiency and precision in the accounting operations. Automizing and digitizing data and manual computation processes make the work of management accountants less time-consuming and effort-consuming, leaving more time to perform more valuable work, i.e., financial analysis, strategic planning, and evaluation of performance (Varzaru et al. 2022). Moreover, electronic applications would minimize the human factor, which would make financial reporting more credible. The other important



advantages of digital transformation are real-time reporting and decision-making. High-end reporting applications and dashboards can help firms to track their financial performance in real-time. This is a timed availability of financial information, enabling stakeholders to make proactive decisions and address the shifts in the market fast and recognize new trends (Almatanreh et al, 2022).

Integrating the data analytics and artificial intelligence allows management accountants to make correct forecasts regarding future trends and implement proactive approaches that mitigate the risks and use the future opportunities (Al-Zaqeba et al. 2022). The data-based strategy has other benefits to digital transformation in management accounting like enhancing cost management and better allocation of resources by identifying cost drivers and waste and thus enabling organizations to optimize resource utilization and minimise operational costs. Management accountants are proactive in enhancing financial sustainability of organizations in the long run. Digital transformation, in turn, shifts management accountants to be strategic business partners and thus be able to give valuable data based on real-time data and sophisticated analytics to aid the decision-making process. This strategic alliance trend necessitates close integration with other business divisions, including marketing, operations, and sales, so that the monetary objectives are aligned with the general organizational objectives (Alvarez et al, 2021).

To sum up, the adaptation of digital technologies in management accounting seems to be a challenge and opportunity to organizations and professionals. To adjust to the digital world, management accountants will have to become technologically literate and focus more on data security and management and find the optimal balance between technology-driven information and human judgment. Through such challenges, management accountants will be able to leverage the power of digital technologies to become more efficient, make better decisions, and provide the strategic value of organizations in this fast-evolving environment. By taking the opportunities presented by the digital transformation, management accounting can be a core leader in business success in the digital era.

Opportunities for Developing Management Accounting in the Context of Digital Transformation

The digital transformation offers the management accounting with numerous opportunities, the greatest of which is technology efficiency and accuracy. The management accountants will be in a

position to make the routine work simple in automated data collection, processing, and analysis, and the managers will have time to stress upon other further critical activities. Digital gears help the management accountants elevate towards the levels of strategic partnerships within the organization. They can devote themselves to such activities as planning of the strategy, researching the growth prospects, and providing the relevant financial information to the decision-makers (Alsharari et al, 2019). Financial managers will be able to present financial data in appealing manner that is easy to comprehend using interactive dashboards and reporting tools hence make decisions out of the complex financial information at the right time and in an informed manner. This group of tools also enhances the ability of an organization to react quickly to the changes in the market, identify the new tendencies, and actively modify the strategies, which is a significant advantage in the highly dynamic world of business that demands staying on track with the rivalry (Ostaev et al, 2020).

The introduction of machine learning and AI algorithms into the management accounting is a paradigm shift in the field. Such technologies can forecast based on overwhelming historical data trends, recognize trends and give feasible decisions concerning future. Using predictive analytics, the management accountant is able to make valuable insights which can be utilized to make strategic decisions (Bella et al, 2023). Could one foresee what happens in the market and identify the potential threats and opportunities and harness them before it turns into a complete reality? Additionally, e-accounting systems can be used to implement new technologies that can enhance the degree of remote access and collaboration among different departments. This enables management accountants to be located at any location and collaborate with colleagues beyond geographical locations (Oyewo, 2021). The cloud systems also enable the sharing of data which makes the teams able to operate effectively as a team. The novel connection allows organizations to tap into a variety of talent, eliminate physical boundaries and provide a further comprehensive and varying workplace. Moreover, the digital transformation enables the management accountants to dive deeper and analyze the financial data to find answers to questions and patterns that could not be perceived in the big data. All these functions lead to informed decision-making, financial performance, and formulation of data-driven strategies (Balstad and Berg, 2020). (Oyewo, 2021)

Management accountants can also work on the general performance of the enterprise by implementing



digital technologies and raising the level of expertise in the field of data analytics. Instead of passively responding to the existing financial occurrences, they will be able to actively seek opportunities and predict challenges (Ascanin et al, 2021).

Digital technologies are integrated to enable smooth interaction within departments in an organization. Online platforms facilitate the exchange of data, enhance the communication and coordination of activities, and tightly integrate financial operations as well as the marketing, operations, and sales departments, uniting financial goals with the overall organizational goals. This interdisciplinary work enhances the cohesiveness of the organization and makes financial decisions aligned with strategic business (Korheonen et al, 2020). In addition, the digital transformation also offers a chance to improve risk management as it is possible to detect possible vulnerabilities and irregularities in financial information and allow management accountants to react in time and introduce more efficient risk-management strategies. It also creates opportunities of saving and optimizing costs and resources through automation of routine functions and optimization of processes which lowers

the cost of operation and reallocates resources more effectively. It also helps to have a better inventory and procurement, which translates into a significant reduction of costs and enhances financial performance (Gunaratne and Lee, 2021).

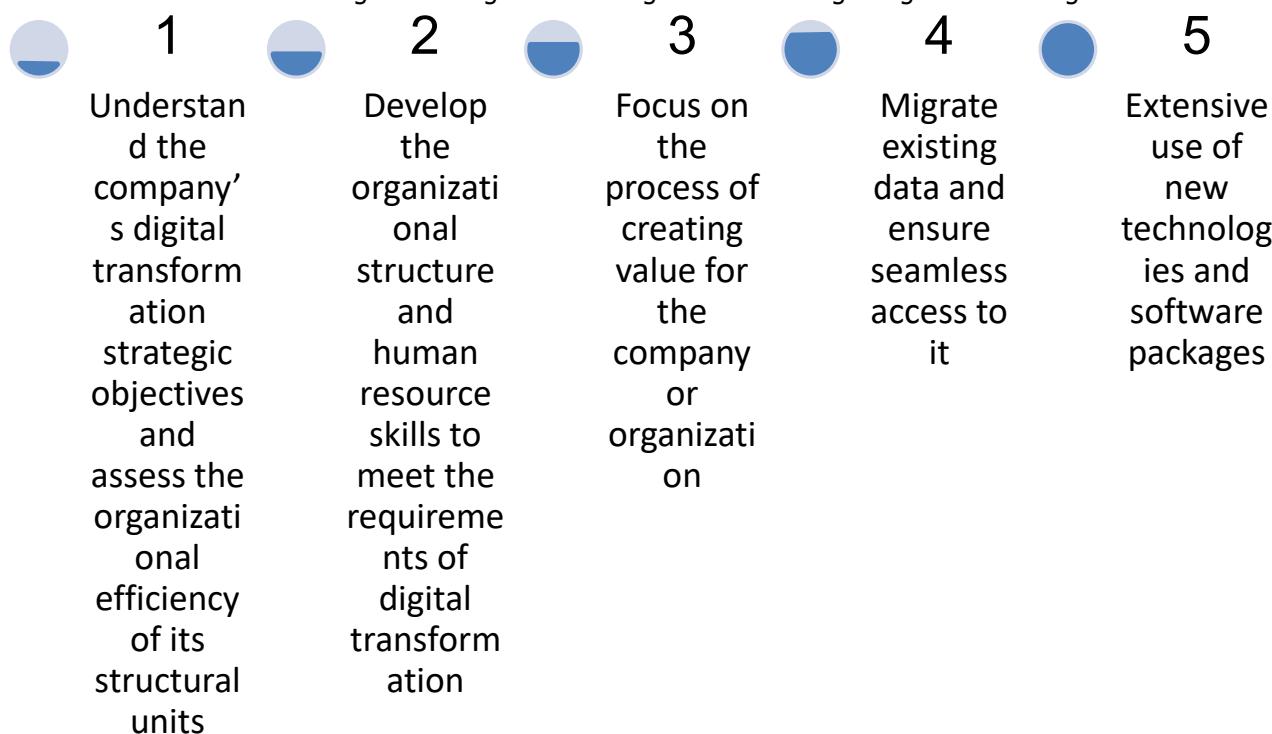
Model for Enhancing Management Accounting Through Technology Integration

Digitization of the majority of companies and their organizational units is supposed to establish a new management model of using digital technologies and operation potential in a logical and sequential way to attain incremental improvement in management accounting.

The following stages (Figure 1) can be implemented to create a general model of digital transformation.

1. Having knowledge about the strategic goals of digital transformation to the company and a review of the efficiency of organizational units of the company is the entry point of this procedure.
2. The second phase concentrated on the building of the organizational structure and human resource competencies to address the needs of digital transformation.

Figure 1. Stages of Building a Model for Digitizing Transforming



3. The main contributor to substantial growth in revenue is data-driven digital improvement and overall digital solutions to the accounting and management systems. The third phase presupposes the

establishment of real value through digitization in the operations of the companies, as it is more than just the consistent monitoring of the existing products and processes.

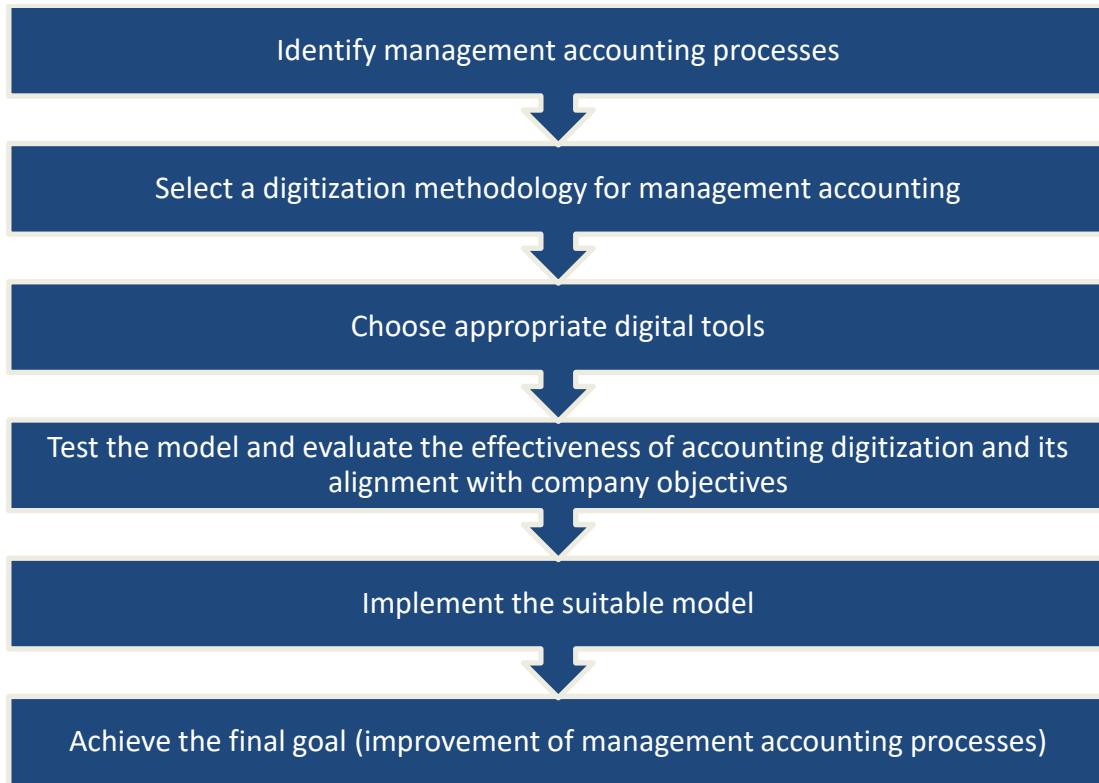


4. Data migration is the process of distributing data of one computing environment or system to another. This is an essential part of the digital transformation because it will enable companies to modernize their data infrastructure and keep pace with technological changes. This level makes management and accounting operations consistent, access to required information smooth, and makes decisions-making in a data-driven setting. Effective data migration should be planned, executed and thoroughly verified to reduce risks and guarantee the accuracy and integrity of the data that is transferred. This process is one of the crucial factors that companies can use to create and innovate with the aim of attaining their digital transformation objectives.

5. Management accounting where technology is highly applied can also be analyzed in real time and help make quick decisions based on information obtained. It also allows the company to be more efficient through automation of repetitive jobs and create more time on strategic activities. The new software packages enhance precision since the human error in calculations and data input is minimized. They help to control cost better with the help of detailed tracking and monitoring costs and to collaborate more efficiently by allowing the access of financiers to information remotely and encouraging the collaboration of different places. Moreover, higher analytics are more insightful to aid in the forecasting and future planning. Lastly, such systems enhance security through the adoption of strong safety procedures to safeguard sensitive financial data in the online systems.

The process of digital transformation of the supply chain usually leads to a temporary disruption of the operations, but in the long-term perspective, it is a defense against more drastic disruptions. The technologies that have contributed to this change are blockchain, the Internet of Things, and the big data analytics that assist in integrating data among different supply chain stakeholders and enhancing communication with the consumers. The digital transformation in inventory monitoring is based on the big data ecosystem which begins with the implementation of sensors recording data online up to the cognitive computing platforms that offer analysis and interpretation of information to be used in making informed management decisions. The particular structure of digital technologies applied is dependent on various factors, the most significant of which is the extent of the economic activity of the organization. The work of the company, especially its work in the industrial field, presupposes the work with significant amounts of documents with purchase agreements, purchase orders, and delivery information, etc., which requires the implementation of digital technologies to manage the inventory accurately. One can distinguish several phases of the digital transformation of the management accounting activities (Figure 2) such as marginal analysis, constraint analysis, capital budgeting, inventory and product cost evaluation, and trend analysis and forecasting. The phases guarantee the best management and accounting judgment during the monitoring of inventory without involving the employees directly.

Figure 2. Stages of Digital Transformation in Management Accounting Processes



The Role of Management Accountants in the Digital Transformation Process

Management accounting work has now necessitated the completion of tasks that are not limited to dealing with numbers and positioning management accountants as business partners who give critical insights and advice to the management team. This change implies that accountants will have to acquire new skills that can determine them to manipulate complicated data and transform it into practical information, communicate effectively with different members of the management team, and align their tasks with the strategic goals of the company. This

highlights the significance of digital flexibility as a fundamental component to the future of the accounting profession. As the world of artificial intelligence continues to develop, companies have the potential to use the best opportunities to create competitive advantage never seen before. In this regard, management accountants should be actively involved in the implementation and control of AI models and be part of the strategy of creating performance management systems and key performance indicators (KPIs) that will measure and monitor business operations.

Table 1. The Role of Management Accountants in Digital Transformation Processes, Particularly Regarding AI Applications

Task	Process	Role of Management Accountants
1	Define the problem: This step includes describing the problem, how AI will facilitate its solution, and specifying detailed requirements and KPIs to track progress.	Ensure that the business problem aligns with the company's AI strategy and requirements.
2	Data collection: Define the type and source of required data.	Participate in identifying data and ensure it supports the business problem in Process 1.
3	Data preparation: Assess data for accuracy, completeness, or correct formatting. Failure in this process may affect model quality.	Management accountants can evaluate the data preparation process to ensure completeness and accuracy, and review the data from an accounting perspective.



4	Model building: At this stage, digital technology specialists and AI engineers play a key role.	Ensure the model meets the requirements of the business problem.
5	Model testing: Ensure that the model built in Process 4 addresses the business problem defined in Process 1.	Participate in evaluating the test model.
6	Model application	Evaluate results to support decision-making.
7	Model monitoring	Monitor the model to verify that it achieves the desired outcomes.

CONCLUSION

This paper explored out the digital transformation on management accounting applications and organizations. It discusses the changes of management accountants to novel technologies, the use of digital gears in decision-making, and the difficulties organizations experience during the process of digital transformation. Articles and other studies have shown that digital transformation can greatly improve the effectiveness and precision of management accounting processes and allow organizations to make data-driven and timely decisions. The implementation of predictive analytics and artificial intelligence helps in proactively making decisions. Nevertheless, obstacles like adaptation of skills, data handling, and information protection should be solved in order to use the opportunities of digital transformation to the full capacity. To ensure competitiveness and success in the digital age, an organization must create a culture of lifelong learning and the use of technology. The work also has a model on how management accounting could be enhanced by incorporating technology, and the contribution of the management accountants to the process.

KEY FINDINGS

1. One of the pillars of digital era management accounting is data analytics. With the help of sophisticated analytics such as machine learning or artificial intelligence, large amounts of data produced by companies can be exploited.
2. Predictive models can be utilized by management accountants to predict a future financial situation based on past records and the market trends, thereby helping organizations to predict pitfalls, opportunities of growth, and devise a winning approach to survive in a competitive business world.
3. One of the major goals of enhancing the performance of management accountants is developing technological skills and knowledge.
4. Digital transformation provides the management accounting with several growth and development opportunities, the most

prominent of which is improving efficiency and accuracy. Accountants are able to automate data collection, processing and analysis which makes their day to day operations more efficient since they can use their time and resources on activities that have greater value.

5. The adoption of digital technologies enhances the cross-department collaboration that allows sharing of the data, enhances the communication, and enhances the coordination to support improved decision-making.
6. Digital transformation facilitates the management of risks because it enables the detection of any potential risk and anomaly in financial information and accountants can act proactively on the matter.
7. The development of technological skills is the major objective of improving the performance of digital transformation of management accountants as adapting their skills and technological knowledge is one of the most serious challenges of digital transformation.

RECOMMENDATIONS

1. Pay serious consideration to the incorporation of modern technological improvement in the field of management accounting and improve predictive analytics and automated decisions.
2. Keep training the technological capabilities of the management accountants especially with regard to data processing and analysis through machine learning and artificial intelligence algorithms.
3. Develop elaborate models that are informed by the suggested model in this paper bearing in mind the particular aspects of the company or organization in order to align them with their goals.

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