

Can Robots Replace Accountants? The Impact of Information Technology (IT) on Financial Reporting Jobs: A case of Iringa Municipal Small and Medium-Sized Enterprises (SMEs)

Dr. Theobald Francis Kipilimba Senior Lecturer, Department of Business Administration, University of Iringa, Tanzania

* Corresponding Author: Dr. Theobald Francis Kipilimba

ISSN (online): 2582-7138
Volume: 05
Issue: 06
Novembar-Decembar 2024
Received: 03-09-2024
Accepted: 09-10-2024
Page No: 204-215

Article Info

Abstract

Aims: In recent years, the rapid advancement of information technology (IT) has profoundly transformed various sectors, including financial reporting. The introduction of sophisticated software, automation tools, and artificial intelligence (AI) has led to significant changes in how financial information is processed, analyzed, and reported. In this study the transformative effects of IT integration on financial reporting processes and accounting roles within small and medium-sized enterprises (SMEs) in Iringa Municipal was investigated.

Methodology: Utilizing a mixed-methods approach, the research incorporated quantitative data from surveys and qualitative insights from interviews with 100 respondents.

Results: The findings revealed significant improvements in efficiency and accuracy of financial reporting due to the adoption of accounting software, with a majority of businesses experiencing reduced error rates and faster task completion times. Additionally, the study highlighted a shift in the roles of accountants from routine bookkeeping to more analytical and strategic functions, enabled by the automation of repetitive tasks. Despite these advancements, challenges such as initial implementation costs, training requirements, and moderate reductions in staffing levels were identified.

Conclusion: The study recommends a comprehensive training programs, strategic IT investments, and fostering a culture of continuous improvement to maximize the benefits of IT integration. This research provides valuable insights for SMEs aiming to enhance their financial reporting capabilities and adapt to the evolving technological landscape.

Keywords: Information Technology (IT), Small and Medium-sized Enterprises (SMEs), Accountant Roles, Job Reduction, Technological Integration, Accounting Software, Automation, Financial Reporting

1. Introduction

In recent years, the rapid advancement of information technology (IT) has profoundly transformed various sectors, including financial reporting. The introduction of sophisticated software, automation tools, and artificial intelligence (AI) has led to significant changes in how financial information is processed, analyzed, and reported. This transformation raises critical questions about the future of traditional accounting roles, particularly in small and medium-sized enterprises (SMEs).

Small and Medium Enterprises (SMEs) play a crucial role in African economies, contributing to job creation, tax provision, and GDP growth^[1]. However, SMEs face numerous challenges, including limited resources, lack of access to advanced technologies, and complex financial reporting standards^[1, 2]. In Tanzania, the adoption of International Financial Reporting Standards (IFRS) for SMEs remains low due to inadequate knowledge, lack of awareness, high perceived costs, weak regulatory enforcement, and complexity of the standards^[2, 3]. Tax compliance among SMEs is influenced by factors such as taxpayer education, tax rates, and penalties^[4]. To address these challenges, governments should develop supportive policies, provide appropriate legal frameworks, improve business infrastructure, ensure continuous power supply, and enhance access to finance^[1]. Additionally, emphasis on taxpayer education and fair tax rates could improve compliance^[4].

IT adoption has significantly impacted financial reporting efficiency and accuracy in SMEs. The quality of human resources and technology adoption positively influence the quality of financial reporting for SMEs [5]. Implementing Financial Accounting Standards and using IT for financial reporting can improve reporting quality, though adoption rates remain low in some regions ^[6]. SMEs adopt IT due to internal and external pressures, with various factors influencing the process ^[7]. However, IT adoption in SMEs differs from larger organizations due to resource constraints ^[8]. To achieve successful IT adoption, SMEs must consider their specific characteristics and develop appropriate strategies. Overall, IT adoption can enhance financial reporting practices in SMEs, but challenges remain in implementation and widespread adoption across different regions and sectors.

The adoption of IT solutions in financial reporting offers both opportunities and challenges for enterprises. The implementation of International Financial Reporting Standards (IFRS) can improve accounting quality and decision-making, but requires additional training and systems ^[9]. Vietnamese businesses modernized IT transitioning to IFRS face difficulties in adapting to new standards, highlighting the need for careful preparation ^[10]. XBRL (eXtensible Business Reporting Language) presents benefits for enhancing financial reporting and assurance processes, although widespread adoption may face obstacles ^[11]. Internet financial reporting (IFR) has emerged as a rapidly growing medium for disseminating corporate financial information, providing new opportunities for communication with stakeholders ^[12]. These technological advancements in financial reporting offer improved information quality and accessibility but also require significant investments in training, infrastructure, and adaptation to new standards and systems. The adoption of IT solutions in financial reporting in Tanzania presents both opportunities and challenges. Financial innovation has brought advantages such as increased financial assets, reduced intermediary costs, and improved risk management tools [13]. The implementation of Integrated Financial Management Systems (IFMIS) has enhanced the understandability and reliability of financial reporting in local government authorities [14]. However, challenges persist, including inadequate knowledge, lack of awareness, high perceived costs, weak regulatory enforcement, and low technological applicability among micro, small, and medium enterprises (MSMEs)^[2]. In the tourism sector, ICT adoption has transformed industry structures, supporting various functional activities, but its usage remains minimal, particularly in marketing and operations^[15]. To address these challenges, the government should develop implementation strategies that prioritize training MSMEs on financial reporting standards, as adoption decisions largely depend on knowledge adequacy ^[2]. Additionally, the adoption of financial reporting standards remains low due to inadequate knowledge, lack of awareness, perceived high costs, weak enforcement, and complexity ^[2]. Despite these challenges, over half of SMEs use ICT for strategic communication and marketing, with 47% reporting increased competitiveness [16]. To address these issues, integrated efforts are needed from policymakers, including improved training, infrastructure development, and supportive policies ^[2, 17].

Robotic Process Automation (RPA) is transforming the accounting profession, offering significant potential for

automating routine tasks and improving efficiency [18, 19]. While RPA implementation can lead to cost reduction and increased accuracy, it also presents challenges in ethical governance and technological integration ^[19]. The adoption of RPA is expected to reshape the role of accountants, shifting their focus from bookkeeping to strategic advisory and analytical functions ^[18, 20]. This transition necessitates the development of new skills, including soft skills and technological proficiency ^[18]. The future of accounting is likely to involve a symbiotic relationship between human accountants and automated systems, requiring adaptations in accounting education and professional development ^[20, 21]. While RPA offers numerous opportunities, it also raises concerns about potential job displacement and the need for careful implementation to maximize benefits [18, 21]. The potential of robotic process automation (RPA) and artificial intelligence to transform accounting practices is significant, with predictions that robots will replace many traditional accounting tasks [18]. This shift is expected to eliminate entrylevel positions while creating new roles focused on business advisory and leading RPA transformation ^[18]. The changing landscape demands that accountants develop new skills, particularly in technology, data analysis, and soft skills ^[20, 18]. While some view this as a positive step forward, others worry about potential negative effects such as deskilling and unnecessary human-robot competition [18]. The impact of these technologies extends beyond routine tasks, offering opportunities for accountants to engage in strategic analysis and decision-making ^[22]. As the profession evolves, there is a growing need for accounting education to adapt to these changes and prepare future accountants for their new roles ^{[18,} 20]

While automation may replace routine tasks, potentially eliminating entry-level positions, it also creates new roles for accountants focused on business advisory and leading RPA transformation ^[18, 23]. Management accountants perceive automation positively, viewing it as an opportunity for professional growth and improved task efficiency ^[23]. The shift towards automation requires accountants to develop new skills, including soft skills, technology proficiency, and data analysis capabilities ^[18, 24]. As the role of accountants evolves, they are expected to become strategic business analysts, leveraging business intelligence for decision-making ^[24]. However. challenges remain. including ethical considerations, technological integration, and the need for updated accounting education models [18, 19].

The accounting profession is undergoing significant transformation due to technological advancements. While automation may replace some traditional accounting roles [24], it also creates new opportunities for accountants to focus on strategic analysis and value-added services ^[25]. The adoption of technology in accounting is influenced by staff perceptions of its usefulness and ease of use, as well as organizational context and national work culture ^[25]. Accountants must embrace technologies such as cloud computing, artificial intelligence, and machine learning to provide greater value to their organizations through automation, data analysis, and predictive analytics ^[26]. To remain competitive, accountants need to develop new skills, including IT proficiency and strategic business analysis capabilities [24, 27]. Accounting education at higher institutions must also adapt to prepare future professionals for these technological changes [27].

The automation of accounting processes is significantly impacting employability in the field. Studies indicate that while certain accounting jobs may disappear, new roles requiring critical thinking and consultancy skills are likely to emerge ^[28, 29]. In the context of Industry 4.0, employers' expectations of accounting graduates are shifting, with a greater emphasis on technological proficiency in financial information preparation, reporting, and dissemination [30]. This technological shift is expected to result in job redundancies and the replacement of human activities by electronic devices and machines. Consequently, there is a growing need for accounting graduates to focus on continuous learning, particularly in IT skills. Universities are urged to incorporate accounting technologies and simulations relevant to Industry 4.0 in their curricula to enhance graduates' employability and meet current market demands ^[30]. The studies highlight challenges faced by SMEs in Tanzania regarding financial reporting and technology adoption. SMEs in Iringa Municipality struggle with tax compliance due to factors like tax rates and education ^[4]. Many Tanzanian SMEs have not fully adopted electronic Human Resource Management (e-HRM) due to financial, technical, and security barriers ^[31]. The adoption of financial reporting standards by micro, small, and medium enterprises (MSMEs) in Tanzania is low, attributed to inadequate knowledge, lack of awareness, perceived high costs, weak enforcement, and complexity of standards ^[2]. While these studies don't directly address job displacement concerns for accountants in Iringa, they suggest that many SMEs in Tanzania still struggle with basic financial practices and technology adoption. However, accountants may need to adapt to changing roles in the era of digital disruption, focusing more on strategic analysis and cybersecurity^[24].

The rapid advancement of Information Technology (IT) has dramatically transformed various industries, including the financial sector, prompting significant changes in financial reporting jobs traditionally held by accountants. In the context of Iringa Municipal, where Small and Medium-sized Enterprises (SMEs) play a vital role in the local economy, there is growing concern and curiosity about the potential for robots and IT solutions to replace human accountants. This concern is driven by the advent of sophisticated software, automation, and artificial intelligence (AI), which promise more efficient and accurate financial reporting processes while potentially reducing costs and human errors. However, this technological shift raises critical issues regarding job displacement for accountants and the readiness of SMEs to adopt and effectively implement such technologies. Given the limited resources and technological capabilities of many SMEs in Iringa Municipal, it is essential to explore the extent of IT adoption, the perceived benefits and challenges, and the overall impact on employment in the accounting sector. This study aimed at investigating whether robots and IT solutions can feasibly replace accountants in the financial reporting processes of SMEs in Iringa Municipal, providing crucial insights for business owners, accountants, policymakers, and technology providers to make informed decisions and prepare for the evolving landscape of financial reporting in the SME sector.

The objective of this study was to investigate the potential of robots and Information Technology (IT) solutions to replace accountants in the financial reporting processes of Small and Medium-sized Enterprises (SMEs) in Iringa Municipal. Specifically, it aimed at assessing the current level of IT adoption in these businesses, evaluating the perceived benefits and challenges of using IT in financial reporting, analyzing the impact of IT adoption on accounting employment, and provide recommendations for optimizing the integration of IT solutions while addressing employment concerns. This comprehensive analysis sought to inform SMEs, policymakers, and technology providers about the feasibility and implications of substituting human accountants with advanced technological solutions.

The significance of this study lies in its potential to inform and guide various stakeholders within the financial reporting and SME sectors in Iringa Municipal. For SME owners and managers, it offers critical insights into the benefits and challenges of adopting IT solutions, aiding in more informed technology investment decisions. Accountants and financial professionals can understand the evolving role of human expertise amidst increasing automation, identifying opportunities for upskilling. Policymakers can leverage the findings to develop supportive policies that facilitate IT adoption while mitigating job displacement. Additionally, technology providers can tailor their solutions to meet the specific needs of SMEs in Iringa Municipal. Overall, this study aimed at balancing innovation with economic and social stability, contributing to the discourse on technological impacts on employment and business practices.

2. Methodology

The study utilized a mixed-methods approach, combining both quantitative and qualitative research methods to comprehensively examine the impact of Information Technology (IT) on financial reporting jobs in Small and Medium-sized Enterprises (SMEs) within Iringa Municipal. The quantitative component involved a survey administered to a sample size of 100 participants, including SME owners, managers, and accountants. This survey was designed to gather data on the extent of IT adoption in financial reporting, perceived benefits, challenges, and the impact on employment. The survey employed structured questionnaires with both closed-ended and open-ended questions, facilitating a detailed and broad data collection. Statistical techniques such as descriptive statistics was used to analyze the quantitative data and identify significant patterns and trends.

In addition to the survey, the qualitative component consisted of in-depth interviews and focus group discussions with a subset of the survey participants, who were selected through purposive sampling to ensure diverse representation. These interviews and discussions dug deeper into the experiences, attitudes, and perceptions regarding IT adoption in financial reporting, providing rich contextual insights that complement the quantitative findings. The qualitative data were analyzed using thematic analysis to identify key themes, commonalities, and differences in participants' narratives, enhancing the understanding of the nuanced impacts of IT on financial reporting jobs.

To ensure the validity and reliability of the study, a pilot test of the survey instrument was conducted with a small group of participants to refine the questions for clarity and relevance. Ethical considerations were strictly followed, including obtaining informed consent from all participants, maintaining confidentiality, and ensuring the secure handling of data. By integrating both quantitative and qualitative methods, this study aimed at providing a robust and comprehensive analysis of whether IT solutions can feasibly replace accountants in the financial reporting processes of SMEs in Iringa Municipal, ultimately guiding business owners, policymakers, and technology providers in their decision-making processes.

3. Results and Discussion

This section digs into the results and analysis of the study "Can Robots Replace Accountants? The Impact of Information Technology (IT) on Financial Reporting Jobs – A Case of Iringa Municipal SMEs." In this section the results and discussion of the findings are presented by dissecting the data collected to illuminate the current state of IT adoption within Iringa Municipal SMEs and its impact on financial reporting practices. It begin with simple demographic information of 100 respondents followed by main indicating factors in the form of IT adoption in financial reporting, impact on financial reporting and job displacement and workforce impact.

3.1 Demographic information of respondents

This segment presents general information of respondents such as age, gender of the respondents, education level, role in SME, and years of experience in current role of the respondents approached with interview and questionnaires.

Demographic Variable	Category	Frequency (n=100)	Percentage (%)
Condon	Male	60	60%
Gender	Female	40	40%
Age Group	18-25	10	10%
	26-35	30	30%
	36-45	40	40%
	Above 45	20	20%
Education Level	Secondary Education	20	20%
	Diploma	30	30%
	Bachelor's Degree	35	35%
	Master's or above Degree	15	15%
	Owner/Manager	40	40%
Dolo in SME	Accountant	30	30%
KOIE III SIME	IT Professional	nal 20	20%
	Other	10	10%
	Less than 1 year	5	5%
Years of Experience in Current Role	1-3 years	20	20%
	4-6 years	35	35%
	7-10 years	25	25%
	More than 10 years	15	15%

Table 1: Demographic Information of Participants

3.1.1. Gender of the respondents

This research, aimed to explore the extent to which advancements in IT and robotics could potentially replace human accountants in small and medium-sized enterprises (SMEs) within Iringa Municipal. The researcher conducted interviews with a sample of participants, where 60% were male and 40% were female as shown in table 1. This gender distribution revealed a predominance of male respondents, which had a notable influence on the study's findings and interpretations. Throughout the interviews, male participants shared their perceptions on the integration of IT in accounting processes, expressing both optimism and concern regarding the increasing role of automation. Many male respondents highlighted the potential efficiency gains and error reduction that IT could bring to financial reporting, viewing technology as a valuable tool that could enhance their work. They acknowledged that routine tasks such as data entry and reconciliation could be effectively handled by automated systems, allowing accountants to focus on more complex and strategic activities. However, there were also concerns about job security, with some male accountants worried that extensive automation might lead to job displacement and reduced demand for human expertise in the long run.

On the other hand, the female participants, although fewer in number, provided crucial insights that complemented the overall understanding of IT's impact on accounting jobs. Female respondents emphasized the need for adequate training and support to adapt to new technologies. They pointed out potential challenges such as the initial learning curve associated with adopting IT tools and the importance of continuous professional development to keep up with technological advancements. Some female accountants expressed worries about the pace of change and whether the existing infrastructure and resources in Iringa Municipal SMEs were sufficient to support a smooth transition to more automated processes. Despite these concerns, there was also a recognition of the potential benefits that IT could offer, such as improved accuracy in financial reporting and the ability to handle large volumes of data more efficiently.

The gender distribution in this study highlighted the importance of considering diverse perceptions when evaluating the impact of IT on financial reporting jobs. The predominance of male participants suggested that the overall findings might have been more reflective of the male viewpoint, potentially overlooking specific challenges and experiences faced by female accountants. This imbalance highlighted the need for future research to ensure a more representative sample, capturing a balanced view of how IT and automation affect both genders. By doing so, researchers could provide more comprehensive insights and develop tailored recommendations to support all accountants in navigating the technological changes in their profession. Ultimately, the study demonstrated that while IT holds significant potential to transform accounting jobs, careful consideration of demographic factors, including gender, is essential for understanding the full impact and ensuring that the transition to automation is inclusive and beneficial for all members of the accounting workforce.

3.1.2. Age of the respondents

In this study, interviews were conducted with a diverse group of participants, whose ages ranged from 18 to over 45 years. The age distribution as in table 1, was as follows: 10% of the respondents were between 18 and 25 years, 30% were between 26 and 35 years, 40% were between 36 and 45 years, and 20% were above 45 years. This distribution provided a broad range of perspectives based on varying levels of professional experience and familiarity with technology. Younger respondents, particularly those in the 18-25 age group, often exhibited a strong enthusiasm for IT integration, having grown up in an era where digital technology is pervasive. They expressed confidence in the potential of IT to streamline accounting processes and were generally more comfortable with the idea of using advanced software and automation tools in their daily tasks. This group also showed a high level of adaptability, viewing technological change as an opportunity for career advancement and skill development.

In contrast, participants in the 26-35 and 36-45 age groups, who together represented 70% of the sample, provided a balanced view of the potential benefits and challenges associated with IT in accounting. Those aged 26-35 were generally supportive of technological advancements but emphasized the need for robust training programs to ensure all accountants could effectively leverage new tools. They acknowledged that while IT could enhance efficiency and reduce manual errors, the transition required significant investment in both time and resources. Respondents in the 36-45 age group, having more extensive work experience, were more cautious about the impact of automation on job security. This group recognized the efficiency and accuracy that IT could bring to financial reporting but also voiced concerns about the potential displacement of jobs. They stressed the importance of continuous learning and professional development to stay relevant in an increasingly automated environment.

Respondents above 45 years of age, comprising 20% of the respondents, expressed nervousness towards the rapid pace of technological change. Many in this age group had built their careers on traditional accounting methods and found the shift to IT-intensive processes challenging. They highlighted the need for user-friendly technologies and emphasized the importance of support systems to assist older accountants in adapting to new tools. Despite their concerns, there was an acknowledgment of the necessity to embrace technology to remain competitive in the field. This group also brought valuable insights into the long-term implications of IT on the accounting profession, stressing the need for a balanced approach that integrates both human expertise and technological innovation.

In general, the age distribution of the respondents provided a comprehensive view of how different generations perceive the impact of IT on financial reporting jobs. Younger accountants were more open to and excited about the changes, seeing them as opportunities for growth, while more experienced accountants recognized the benefits but were wary of potential job displacement and the need for ongoing training. The older participants stressed the importance of supportive measures to facilitate the transition. The study stressed the necessity of addressing the diverse needs and concerns across different age groups to ensure a smooth and inclusive integration of IT in accounting practices within Iringa Municipal SMEs. By considering the varying perspectives and experiences of accountants at different stages of their careers, the study provided valuable insights into how to best support the workforce in adapting to technological advancements.

3.1.3. Education Level of the respondents

The interviews were also conducted to find the participants' varying levels of education, which provided varied perceptions into the impact of IT on financial reporting jobs. The education levels of the respondents as indicated in table 1, were distributed as follows: 20 had completed secondary education, 30 held diplomas, 35 had obtained bachelor's degrees, and 15 possessed master's or above degrees. Those with secondary education, representing 20% of the total respondents, viewed the advent of IT with a mix of apprehension and curiosity. While they recognized the potential for increased efficiency and accuracy in accounting tasks, they were concerned about their ability to keep up with the technological advancements due to their limited formal training in IT. This group emphasized the need for accessible training programs to enhance their skills and ensure they could effectively utilize new technologies in their roles.

Respondents with diploma-level education, comprising 30% of the total respondents, generally had a more favorable outlook on the integration of IT in accounting. Their post-secondary education had often included some exposure to accounting software and basic IT tools, which made them more comfortable with the idea of automation. However, they still identified a significant need for continuous professional development to stay updated with the latest technological trends. This group acknowledged the potential for IT to handle routine and repetitive tasks, freeing up their time for more analytical and strategic activities. They also expressed an awareness of the competitive advantage that technological proficiency could provide in the job market.

Participants with bachelor's degrees, who made up the largest segment at 35%, showed a balanced view on the impact of IT on their profession. Having received more comprehensive education in both accounting principles and information technology, they were well-positioned to understand and leverage the benefits of automation in financial reporting. This group saw IT as a critical tool for improving accuracy, efficiency, and decision-making in accounting. They were optimistic about the opportunities for career advancement that technological proficiency could offer, but they also stressed the importance of integrating IT skills into accounting curricula to better prepare future accountants. Despite their overall positive outlook, they remained cognizant of the challenges related to job displacement and the need for ongoing learning to keep pace with rapid technological changes.

Respondents with master's or above degrees, representing 15% of the sample, brought a higher level of expertise and a strategic viewpoint to the discussion. Their advanced education had equipped them with a deep understanding of both accounting and IT, allowing them to see the broader implications of automation in financial reporting. This group recognized the transformative potential of IT to not only enhance efficiency but also to provide sophisticated analytical capabilities that could support better decision-making and strategic planning. They were less concerned about the technical challenges of adopting new technologies and more focused on the organizational and managerial aspects of integrating IT into accounting practices. These

participants emphasized the importance of leadership in driving technological change and ensuring that all levels of the workforce were adequately supported and trained.

In summary, the study highlighted how different education levels among accountants influenced their perceptions of and readiness for IT integration in financial reporting jobs. Those with less formal education expressed greater concern about their ability to adapt, underscoring the need for accessible training and support. Meanwhile, respondents with higher levels of education demonstrated more confidence in their ability to leverage IT for enhanced productivity and strategic advantage. By considering these varied perspectives, the study provided a nuanced understanding of the challenges and opportunities presented by IT in accounting, emphasizing the importance of tailored educational and training programs to support accountants across all levels of educational attainment in adapting to the evolving technological landscape.

3.1.5. Role in SME for the respondents

To gain a deeper understanding of the participants' existing role, this study also explored the role in sme for the respondents. Interviews were conducted with a diverse group of respondents representing different roles within SMEs. As illustrated in table 1, the distribution of roles among the participants was as follows: 40% were owners or managers, 30% were accountants, 20% were IT professionals, and 10% held other positions. Each group offered unique perspectives on how IT could potentially replace or augment traditional accounting practices.

Owners and managers, comprising 40% of total respondents, typically had a broad strategic view of the integration of IT in SME operations. They recognized IT as a tool for enhancing efficiency and improving decision-making processes within their organizations. Many owners and managers expressed interest in IT solutions that could automate routine financial reporting tasks, thereby reducing operational costs and improving accuracy. However, some also voiced concerns about the initial investment required for IT implementation and the potential disruption to existing workflows. They emphasized the importance of ROI (Return on Investment) and the need for clear benefits from adopting new technologies to justify the expenses.

Accountants, representing 30% of the respondents, provided insights into how IT could transform their daily tasks and professional roles. Many accountants viewed automation as an opportunity to streamline repetitive tasks such as data entry and reconciliation, allowing them to focus more on analytical and advisory functions. They acknowledged the potential for IT to enhance the accuracy of financial reporting and reduce human error, but also expressed concerns about job security. Some accountants feared that extensive automation could lead to downsizing or a diminished demand for traditional accounting skills. They emphasized the importance of upskilling in IT to remain competitive in the evolving job market.

IT professionals, comprising 20% of the sample, brought specialized knowledge and technical expertise to the discussion on IT's impact on financial reporting jobs. They highlighted the capabilities of advanced software and AIdriven tools in automating complex accounting processes and generating real-time insights. IT professionals viewed IT as a driver of innovation within SMEs, capable of revolutionizing not only financial reporting but also operational efficiency across departments. They advocated for robust cybersecurity measures and ongoing maintenance to ensure the reliability and security of IT systems. However, they also recognized the importance of collaboration with accountants and other stakeholders to tailor IT solutions to specific organizational needs and ensure successful implementation.

Respondents in other roles, comprising 10% of respondents, offered varied perspectives on the potential impact of IT on financial reporting jobs. This group included sales representatives, administrative staff, and consultants, among others, who interacted with accounting processes indirectly. Their insights often focused on how IT could improve overall organizational performance and customer satisfaction, rather than on the technical aspects of financial reporting. They underscored the importance of user-friendly IT solutions and comprehensive training programs to facilitate smooth integration and adoption across different functional areas within SMEs.

The findings highlighted the diverse perspectives on IT's potential to reshape financial reporting jobs within Iringa Municipal SMEs. Owners and managers saw IT as a strategic tool for enhancing efficiency and reducing costs, while and IT accountants professionals emphasized its transformative impact on job roles and professional development. The findings underlined the importance of balancing technological innovation with the need for adequate training and support to ensure successful adoption and integration of IT within SMEs. By considering the viewpoints of stakeholders across different roles, the study provided valuable insights into the challenges and opportunities presented by IT in redefining the future of accounting practices within SMEs.

3.1.6. Years of Experience in Current Role

Respondents representing varying level of experience were surveyed and interviewed in this study regarding varying levels of experience in their current roles. As per table 1, the distribution of respondents based on their years of experience was as follows: 5% had less than 1 year of experience, 20% had 1-3 years, 35% had 4-6 years, 25% had 7-10 years, and 15% had more than 10 years. Each group provided unique perspectives on how IT could impact their roles and the accounting profession as a whole.

Participants with less than 1 year of experience, comprising 5% of respondents, often expressed eagerness and adaptability towards adopting IT in their accounting roles. They viewed technology as integral to modern accounting practices and were enthusiastic about leveraging IT tools to enhance efficiency and accuracy in financial reporting. This group emphasized the importance of ongoing training and mentorship to support their integration into the workforce and to stay updated with technological advancements.

Those with 1-3 years of experience, representing 20% of the respondents, were early in their careers but already recognized the potential of IT to transform accounting processes. They appreciated the automation capabilities of IT systems in handling routine tasks such as data entry and reconciliation, allowing them to focus more on analytical and strategic aspects of their roles. This group highlighted the need for comprehensive IT training programs to bridge the gap between theoretical knowledge and practical application in real-world accounting scenarios.

Respondents with 4-6 years of experience, the largest segment at 35%, brought a balanced perspective on IT's

www.allmultidisciplinaryjournal.com

impact on financial reporting jobs. They had witnessed significant advancements in IT during their tenure and acknowledged its potential to improve productivity and decision-making in accounting. Many in this group had actively embraced IT solutions in their daily work, recognizing the efficiency gains and cost savings that automation could bring to SMEs. However, they also expressed concerns about the pace of technological change and the need for continuous upskilling to remain competitive in the evolving job market.

Respondents with 7-10 years of experience, comprising 25% of the sample, provided insights grounded in their substantial experience with traditional accounting practices and the gradual integration of IT solutions. They highlighted the evolution of IT from basic software tools to advanced AI-driven systems capable of complex data analysis and predictive modeling. This group valued the strategic insights that IT could provide to SMEs but also cautioned about the potential risks of over-reliance on technology without adequate safeguards and expertise.

Finally, those with more than 10 years of experience, representing 15% of the respondents, brought a wealth of industry knowledge and a historical perspective to the discussion on IT in accounting. They had witnessed the gradual transformation of financial reporting practices and the increasing role of IT in streamlining operations. This group emphasized the importance of balancing technological innovation with traditional accounting principles to maintain accuracy and compliance in financial reporting. They advocated for a gradual adoption of IT solutions tailored to the specific needs of SMEs, ensuring that human expertise remained central to decision-making processes. In summary, the study provided valuable insights into how

varying levels of experience shape perceptions of IT's impact on financial reporting jobs within Iringa Municipal SMEs. Younger professionals were eager to embrace technology, while more experienced accountants emphasized the need for careful integration and ongoing training to maximize the benefits of IT while mitigating potential risks. By considering the diverse perspectives of respondents based on their years of experience, the study underscored the importance of tailored strategies to support all accountants in adapting to the evolving technological landscape of accounting practices in SMEs.

3.2. IT Adoption in Financial Reporting

The increasing importance of technology in financial reporting is mainly measured by IT Adoption, a concept encompassing two key aspects: Prevalence of Accounting Software, which reflects how widely dedicated financial software is used within an organization, and Extent of IT Integration, which gauges how deeply these financial tools connect with other internal systems. This section analyzed these metrics together, to gain a comprehensive picture of how much an organization relies on technology to generate, manage, and ensure the accuracy of its financial reports.

3.2.1. Prevalence of the use of Accounting Software

In this, the evolving landscape of financial reporting within Iringa, Tanzania's small and medium-sized enterprises (SMEs) was explored. A key aspect of this investigation was the prevalence of accounting software for bookkeeping and data entry tasks. The findings as indicated in figure 1, revealed a range of perspectives on technology adoption, offering valuable insights into the current state and potential future of financial processes in these businesses.



Fig 1: Showing prevalence of the use of accounting software for bookkeeping/data entry

Notably, 5 respondents strongly disagreed with the use of accounting software, indicating a strong resistance to change. One participant from this group remarked:

"...We have always relied on traditional methods, and the transition to software seems unnecessary and overly complicated for our small operations..."

Meanwhile, 10 respondents expressed disagreement, albeit with less intensity, often citing concerns about the initial

costs and training requirements. A common sentiment among this group was encapsulated by a respondent who stated:

"...The cost of implementing accounting software is too high for our small business, and we lack the necessary skills to use it effectively..."

A significant portion of the respondents, 30 in total, remained neutral regarding the use of accounting software, reflecting an ambivalence that could stem from a lack of awareness or perceived irrelevance to their current business needs. This indicates that while some SMEs are aware of the advantages of software, they haven't yet been convinced to make the switch. One respondent, running a clothing store, explained:

"...The upfront cost of purchasing the software and training my staff seems a bit daunting at the moment. Perhaps when the business grows further, investing in software will make more sense..."

This highlights a potential barrier to adoption the initial financial investment and training requirements associated with new technology.

On the other hand, the study revealed that 40 respondents agreed with the use of accounting software, demonstrating a positive inclination towards integrating IT into their financial reporting processes. This suggests a growing recognition of the benefits offered by accounting software. One interviewee, the owner of a local bakery, commented:

"...Since implementing accounting software, keeping track of daily sales and expenses has become a breeze. It saves me so much time and allows me to focus on other aspects of running the business..."

This comment reflects the potential of accounting software to streamline financial processes and free up valuable time for entrepreneurs.

Lastly, 15 respondents strongly agreed with the implementation of accounting software, underscoring the transformative impact it has had on their businesses. These early adopters, like a local construction company owner, emphasized the improved accuracy and efficiency achieved

through software. They stated:

"...The software automates most calculations, minimizing errors and ensuring our financial records are always up-todate. This gives us greater confidence in our financial health..."

There's a clear trend towards software adoption, but a significant portion of businesses haven't yet made the switch. The findings highlight the need for further research into the factors influencing software adoption rates among SMEs, including potential barriers and the benefits experienced by those who have already embraced accounting software. By knowing these dynamics, stakeholders can create targeted initiatives to encourage wider adoption and empower SMEs to leverage the power of technology for more efficient and accurate financial reporting.

3.2.2. Extent Level of IT Integration

The study also examined the extent of IT integration within small and medium enterprises (SMEs) in Iringa Municipal. The research revealed a varied range of IT adoption levels across these businesses. Notably, 25 respondents as in figure 2, reported no integration of IT into their accounting practices. These businesses continued to rely entirely on manual processes for their financial reporting. One respondent, the owner of a local carpentry shop, explained:

"...We have not integrated any form of IT into our accounting because our current manual system has been sufficient for our needs, and we are wary of the costs and complexities involved in transitioning to a digital platform..."



Fig 2: Showing the Extent Level of IT Integration

In contrast, 40 respondents indicated that their businesses had achieved partial IT integration. This suggests that many businesses have taken initial steps towards leveraging technology, but haven't yet achieved a fully interconnected environment. An interviewee, the manager of a local restaurant chain, explained:

"...We use accounting software for bookkeeping, but our inventory management system is separate. It would be ideal to have them talk to each other it would save us a lot of time

reconciling data "

This sentiment reflects the potential benefits of deeper integration, including streamlining workflows and minimizing manual data entry.

Moreover, 35 respondents reported full integration of IT in their accounting practices, reflecting a comprehensive adoption of technology in their financial reporting. These businesses had embraced digital tools and software to manage their accounting tasks efficiently. A respondent from this group shared:

"...Fully integrating IT into our accounting processes has significantly enhanced our efficiency and accuracy. The ability to automate routine tasks and generate real-time financial reports has been invaluable to our business operations..."

This full integration was seen as a strategic advantage, enabling these SMEs to compete more effectively in the market.

The varying levels of IT integration among SMEs in Iringa Municipal highlighted the different stages of technological adoption and the factors influencing these decisions. While some businesses were still worried about the transition due to cost and complexity concerns, others had begun to see the benefits of partial integration. Those who had fully integrated IT into their accounting practices reported substantial improvements in efficiency and accuracy, demonstrating the potential advantages of embracing technology in financial management.

3.3. Impact on Financial Reporting

The study also examined the impact of Information Technology (IT) adoption on financial reporting through the analysis of two key aspects which were Efficiency of Reporting Processes and Accuracy of Financial Reports. While efficiency was measured by comparing the time taken to complete key financial tasks before and after IT adoption, and accuracy was assessed by analyzing the error rates in financial reports pre and post IT implementation. By evaluating these metrics, the study gained valuable insights into how IT adoption influenced the overall quality and timeliness of financial reporting within an organization.

Table 2: Showing the Impact on Financial Reporting

Sub-Indicator	Category	Frequency	Percentage
	Time taken to complete tasks (pre vs post IT adoption)		
Efficiency of Reporting Processes	Reduced by more than 50%	40	40%
	Reduced by 25-50%	35	35%
	No significant change	20	20%
	Increased time required	5	5%
Accuracy of Financial Reports	Error rates (pre vs post IT adoption)		
	Significantly reduced errors	60	60%
	Minor reduction in errors	30	30%
	No change in error rates	10	10%

3.3.1. Efficiency of Reporting Processes

This research also studied the efficiency of reporting processes before and after the adoption of IT, focusing on the time taken to complete accounting tasks. The findings as shown on table 2 revealed significant improvements in efficiency for many businesses. Notably, 40 respondents reported that the time required to complete accounting tasks had been reduced by more than 50% following the adoption of IT. One respondent from this group remarked:

"...Before integrating IT into our processes, bookkeeping was incredibly time-consuming. Now, with the use of accounting software, we can complete tasks in a fraction of the time it used to take, allowing us to focus on other critical aspects of our business..."

Additionally, 35 respondents noted a reduction in task completion time by 25-50%. These businesses experienced notable efficiency gains, although not as drastic as those in the previous group. A respondent highlighted:

"...Switching to IT solutions for our accounting has significantly cut down the time we spend on financial reporting. While it hasn't halved our workload, it has definitely made us more efficient, saving us a considerable amount of time every month..."

On the other hand, 20 respondents observed no significant change in the time taken to complete tasks post-IT adoption. These businesses found that the integration of technology did not substantially alter their workflow efficiency. One respondent, the manager of a local supermarket chain, explained:

"...Our new accounting software has some advanced

features, but our staff is still unfamiliar with them. Until they receive proper training, it won't significantly impact our reporting speed..."

This highlights the importance of user training and support alongside IT adoption to ensure efficient utilization of the technology.

Interestingly, 5 respondents reported an increase in the time required to complete tasks after adopting IT. For these businesses, the integration of new technology presented unexpected challenges that hindered their efficiency. One such respondent explained:

"...Implementing accounting software ended up being more time-consuming than our previous manual methods. The learning curve was steep, and we faced several technical issues that delayed our reporting processes."

In short, the study illustrated a range of experiences among SMEs in Iringa Municipal regarding the efficiency of reporting processes post-IT adoption. While the majority experienced significant time reductions, a minority found no change or even increased their workload due to various challenges associated with the transition to digital tools. These findings highlighted the importance of selecting the right technology and providing adequate training to fully realize the benefits of IT integration in accounting practices.

3.3.2. Accuracy of Financial Reports

Thoroughly investigation of the impact of IT adoption on the accuracy of financial reports, specifically focusing on error rates before and after the integration of technology was explored in this study. As per table 2, the findings highlighted a substantial improvement in the accuracy of financial reports post-IT adoption, with 60 respondents, accounting for 60% of the sample, reporting a significant reduction in errors. One respondent from this group noted:

"...Before we adopted accounting software, manual errors were quite common in our financial reports. Since we switched to an automated system, the error rate has dropped dramatically. The software catches mistakes that we would have easily missed, ensuring our reports are much more accurate..."

Additionally, 30 respondents, representing 30% of the sample, observed a minor reduction in errors after adopting IT solutions. These respondents acknowledged that while the error rates had decreased, the change was not as pronounced. A participant from this group stated:

"...The use of IT in our accounting has helped reduce errors to some extent. We still encounter occasional mistakes, but overall, the reports are more accurate than before. The minor reduction in errors is still a positive step for us..."

In contrast, 10 respondents, making up 10% of the sample, reported no change in error rates after implementing IT solutions. These businesses found that the accuracy of their financial reports remained largely unaffected by the adoption of technology. A respondent from this group explained: "...We expected that using accounting software would eliminate errors, but we haven't seen a noticeable difference. The same types of mistakes that occurred with manual processes still happen, suggesting that the issue might lie in our data entry practices rather than the tools we use..."

The study highlighted the varying impact of IT adoption on the accuracy of financial reporting among SMEs in Iringa Municipal. While a substantial majority benefited from significant reductions in errors, leading to more dependable financial statements, a smaller proportion saw only minor improvements or no change at all. The insights from respondents underlined the importance of not only adopting technological tools but also ensuring proper implementation and training to maximize the potential benefits of IT in enhancing the accuracy of financial reports.

3.4 Job Displacement and Workforce Impact

The study further investigated the number of accounting jobs eliminated or reduced due to automation, while also exploring the shift in responsibilities experienced by remaining accountants as their work becomes more technology driven. By analyzing these metrics, the study gained a comprehensive understanding of how IT adoption is reshaping the accounting workforce and the skills required for success in the evolving financial landscape.



Fig 3: Showing the responses regarding job displacement and workforce impact

3.4.1. Changes in Accounting Staffing Levels

In this section, the research investigated how IT adoption has impacted staffing levels within the accounting departments of Small and Medium Enterprises (SMEs) in Iringa, Tanzania. This aspect was important in understanding the potential job displacement concerns surrounding automation in the accounting profession. As illustrated in figure 3, the findings revealed that the majority of businesses experienced little to no change in their staffing levels, with 67 respondents reporting minimal reduction, typically between one to five positions. One respondent from this group commented:

"...While IT has streamlined many of our processes, we have not seen a significant need to reduce our accounting staff. The technology has allowed our team to work more efficiently, but their roles remain essential to our operations..."

In contrast, 23 respondents noted a moderate reduction in staffing levels, ranging from five to ten positions. These businesses experienced more noticeable impacts on their workforce due to IT integration. A respondent from this group mentioned:

"...With the implementation of advanced accounting software, we found that some roles became redundant. As a result, we reduced our accounting staff by about six positions. This was a difficult decision, but the technology enabled us to maintain productivity with a smaller team..." Meanwhile, 10 respondents reported a significant reduction in staffing levels, with more than ten positions eliminated. These businesses underwent substantial changes in their accounting departments as a result of IT adoption. One respondent explained:

"...The automation of many accounting tasks through IT solutions led us to reduce our staff by over ten positions. The efficiency and accuracy provided by the technology made it possible to operate effectively with fewer employees..."

The study highlighted the varying degrees of impact that IT adoption had on accounting staffing levels among SMEs in Iringa Municipal. While the majority of businesses experienced minimal reductions in their workforce, a smaller proportion saw moderate to significant job eliminations. The responses stressed that the extent of staffing changes largely depended on the scale of IT integration and the specific needs of each business. Despite the reductions, many respondents emphasized the continued importance of human oversight and expertise in ensuring the smooth functioning of their accounting processes.

3.4.2. Changes in Accountant Roles

The shifts in accountant roles following the adoption of IT in financial reporting processes was also investigated in this study. According to figure 3, the research findings revealed that the majority of accountants experienced a significant shift in their responsibilities towards more analytical and strategic tasks. Seventy respondents, constituting the largest group, reported an increased focus on analysis and strategy as a result of IT integration. One respondent from this group remarked:

"...Since we adopted accounting software, my role has evolved from routine bookkeeping to more strategic planning and analysis. The software handles the repetitive tasks, allowing me to provide deeper insights and contribute to the company's long-term strategy..."

On the other hand, 20 respondents indicated that there was no significant change in their roles despite the introduction of IT. These accountants continued to perform similar tasks as before, with technology serving more as a supportive tool rather than a transformative force. A respondent from this group shared:

"...While we have incorporated IT into our accounting practices, my day-to-day responsibilities haven't changed much. The software assists with data accuracy, but my core duties remain the same..."

In contrast, a smaller group of 10 respondents experienced a shift towards more data entry tasks. These accountants found that IT integration led to an increased emphasis on inputting and managing data within the software systems. One respondent explained:

"...After adopting new accounting software, my role has increasingly focused on data entry and maintaining the digital records. Although the software simplifies many processes, it has also required a lot of manual input to ensure the accuracy of the data..." According to the degree and kind of technology integration, the study demonstrated how the use of IT changed accountant jobs in a variety of ways. For most, information technology enabled a shift from repetitive duties to higher-value operations like data analysis and strategy planning. On the other hand, some experienced a less noticeable shift, and some even saw an increase in duties centered around data. These results highlighted the various ways that IT has affected accounting positions in SMEs in Iringa Municipal, highlighting the need for continued careful data management as well as the possibility for further strategic participation.

4. Conclusion and recommendations

In this study it can be observed that valuable insights into the transformative effects of IT adoption within small and medium enterprises (SMEs) in Iringa Municipal was provided. The findings revealed a growing trend of IT adoption, with many SMEs recognizing the benefits of accounting software for streamlining financial tasks. However, a significant portion remains hesitant due to cost barriers or a lack of technical expertise. The study also identified a range of integration levels, with some businesses achieving full integration and others still relying on manual processes. IT adoption has demonstrably improved efficiency and accuracy of financial reporting for many SMEs, with reductions in both task completion times and error rates. While some businesses experienced reductions in accounting staff, others maintained or even increased their workforce, with a shift towards more strategic roles for accountants.

5. The study recommends the following

- To fully capitalize on the benefits of IT integration, SMEs should invest in continuous training and upskilling of their accounting staff.
- Businesses should carefully assess their IT needs and capabilities, selecting solutions that align with their operational requirements and growth objectives.
- In a rapidly evolving technological environment, SMEs must foster a culture of innovation and adaptation.

6. Acknowledgements

I would like to extend my appreciations to from University of Iringa (UoI) for his support during the preparation of this manuscript, University of Iringa management and staff for encouragement they gave me during data collection, analysis and interpretation. Also I would like to thank my family for being there when I needed them.

7. References

- 1. Muriithi S. African small and medium enterprises (SMEs) contributions, challenges and solutions; c2017.
- 2. Lackson B, Muba S. Factors affecting the adoption of financial reporting standards by micro, small and medium enterprises in Tanzania: The case of Mbeya city council. East African Journal of Business and Economics. 2021;4(1):46-61.
- 3. Nzunda FW. The compliance and non-compliance of Tanzania small and medium enterprises (SME's) to international financial reporting standards (IFRS's): A survey at Morogoro municipal. Mzumbe University; c2013.

- Abjadi AI, Wiketye EJ, Mpogole H. Factors contributing to tax compliance among small and medium-sized enterprises: A case of selected SMEs in Iringa Municipality. International Journal of Finance and Accounting. 2023;2(1):94-105.
- Soleh M, Sutarti S, Rosita SI. The effect of human resources quality and technology adoption on the quality of financial reporting (evidence from MSMEs in Bogor). In: 2nd International Seminar on Business, Economics, Social Science and Technology (ISBEST 2019). Atlantis Press; c2020.
- 6. Astutie YP, Fanani B. Small to medium-sized enterprises and their financial report quality. International Journal of Economics and Financial Issues. 2016;6(S4):36-45.
- 7. Nguyen M, Zhang S, Wang X. A novel method for risk assessment and simulation of collision avoidance for vessels based on AIS. Algorithms. 2018;11(12):204.
- 8. Ghobakhloo M, Hong TS, Sabouri M, Zulkifli N. Strategies for successful information technology adoption in small and medium-sized enterprises. Information. 2012;3(1):36-67.
- 9. Srivastava A, Kulshrestha P. The benefits and challenges of IFRS adoption in India: The dawn of a new era. International Journal of Accounting and Financial Reporting. 2019;9(4):334.
- 10. Nguyen THH, Vu T, Pham TT, Tran TV, Le HT. Applying International Financial Reporting Standards (IFRS) and challenges to Vietnamese enterprises. VNU Journal of Economics and Business; 2022:2(1).
- 11. Gunn J. XBRL: Opportunities and challenges in enhancing financial reporting and assurance processes. Current Issues in Auditing; 2007:1(1).
- 12. Laswad F, Oyelere P, Fisher R. Finance letter: Internet financial reporting, opportunities and challenges. African Finance Journal. 2000;2(2):40-46.
- 13. Ahmed MS, Wei J. Financial innovation in Tanzania: Opportunities and challenges. In: 2015 International Conference on Social Science, Education Management and Sports Education. Atlantis Press; c2015.
- 14. Chalu H. The effect of IFMIS adoption on financial reporting quality in Tanzanian local governments. Business Management Review. 2020;22(2):1-31.
- 15. Mwita M. Opportunities and challenges in ICT adoption in Tanzania's tourism industry: Case study of tour operators. E-review of Tourism Research; 2014:11.
- 16. Msuya CA, Mjema EA, Kundi BA. ICT adoption and use in Tanzania SMEs. Tanzania Journal of Engineering and Technology. 2017;36(1):23-34.
- 17. Rumanyika JD, Mashenene RG. Impediments of ecommerce adoption among small and medium enterprises in Tanzania: A review; c2014.
- Jędrzejka D. Robotic process automation and its impact on accounting. Zeszyty Teoretyczne Rachunkowości. 2019;(105):137-166.
- 19. Oyeniyi LD, Ugochukwu CE, Mhlongo NZ. Robotic process automation in routine accounting tasks: A review and efficiency analysis. World Journal of Advanced Research and Reviews. 2024;22(1):695-711.
- 20. Stancheva-Todorova EP. How artificial intelligence is challenging the accounting profession. Journal of International Scientific Publications. 2018;12(1):126-141.
- 21. Tailor R, Bhumika V. Opportunities and threats in robotic accounting. Journal of Management Research

and Analysis. 2023;10(2):112-115.

- Kokina J, Blanchette S. Early evidence of digital labor in accounting: Innovation with robotic process automation. International Journal of Accounting Information Systems. 2019;35:100431.
- 23. Kielanowicz Ż, Wnuk-Pel T. Financial processes automation's impact on the work of management accountants; c2023.
- 24. Mujiono MN. The shifting role of accountants in the era of digital disruption. International Journal of Multidisciplinary: Applied Business and Education Research. 2021;2(11):1259-1274.
- 25. Jackson D, Allen C. Technology adoption in accounting: The role of staff perceptions and organisational context. Journal of Accounting & Organizational Change. 2024;20(2):205-227.
- 26. Rahim MMA, Permatasari D, Mohammed NF. The trend and factors of technology adoption in accounting; c2023.
- 27. Knežević S, Ljumović I, Bojović J, Jovanović S. Shaping the future of the accounting profession in accordance with technological progress and an overview of the STEM field. Revizor. 2023;26(104):17-28.
- Rkein H, Harfouch H, El-Ghoul Y, Osman M. Impact of automation on the accounting profession and employability: A qualitative assessment from Lebanon. Saudi Journal of Business Management. 2019;4(2):372-385.
- 29. Rkein H, Harfouch H, El-Ghoul Y, Osman M. Does automation of the accounting profession affect employability? An exploratory research from Lebanon. Open Journal of Business and Management. 2019;8(1):175.
- 30. Ghani EK, Muhammad K. Industry 4.0: Employers' expectations of accounting graduates and its implications on teaching and learning practices. International Journal of Education and Practice. 2019;7(1):19-29.
- 31. Shah N, Michael F, Chalu H. Conceptualizing challenges to electronic human resource management (e-HRM) adoption: A case of small and medium enterprises (SMEs) in Tanzania. Asian Journal of Business and Management; 2020:8(4).