

Industry 4.0 and Accounting Innovation: A Mixed-Methods Analysis of Technological Adoption and Its Implications

Industrie 4.0 et innovation comptable : une analyse à méthodes mixtes de l'adoption technologique et de ses implications

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Received: 06/01/2025

Accepted: 19/04/2025

Published: 01/06/2025

Abstract: With the rise of Industry 4.0, digital transformation driven by advanced technologies has profoundly impacted various sectors, including accounting. Emerging technologies have revolutionized accounting by automating routine tasks, allowing professionals to work faster and with greater accuracy. This evolution highlights the growing role of digital tools in enhancing efficiency within the field. This study examines how technological advancements have transformed accountants' responsibilities and explores the potential for technology to replace traditional accounting roles. Utilizing a mixed-methods approach, the research collected data through surveys administered to accountants in KRG cities. Findings show that 90.9% of accountants believe the future of the profession is digital, with unanimous support for the use of accounting software.

Keywords: Industry 4.0, Digital Transformation in Accounting; Emerging Technologies; Accounting Innovation; Technological Adoption; Future of Accounting Practices.

Jel Classification Codes: M41, O33, L86, D83.

Résumé: Avec l'essor de l'industrie 4.0, la transformation numérique impulsée par les technologies avancées a profondément impacté divers secteurs, dont la comptabilité. Les technologies émergentes ont révolutionné la comptabilité en automatisant les tâches de routine, permettant aux professionnels de travailler plus rapidement et avec plus de précision. Cette évolution met en évidence le rôle croissant des outils numériques dans l'amélioration de l'efficacité au sein du domaine. Cette étude examine comment les avancées technologiques ont transformé les responsabilités des comptables et explore le potentiel de la technologie pour remplacer les rôles comptables traditionnels. En utilisant une approche à méthodes mixtes, la recherche a recueilli des données au moyen d'enquêtes administrées aux comptables des villes du KRG. Les résultats montrent que 90,9 % des comptables pensent que l'avenir de la profession est numérique, avec un soutien unanime à l'utilisation de logiciels de comptabilité.

Mots clés: Industrie 4.0, transformation numérique en comptabilité; technologies émergentes; innovation comptable; adoption technologique; avenir des pratiques comptables.

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1. INTRODUCTION

Technology has been advancing rapidly in the globalized world, introducing profound changes across various professional domains. The accounting sector is no exception, where technological innovation has proven to be a vital ally. This is primarily due to the necessity of adapting to the evolving demands of the labor market, as information technology increasingly integrates with and supports various fields it encompasses. In the accounting profession, the adoption of technology, particularly software solutions, has become indispensable. These tools transform the traditionally labor-intensive and time-consuming nature of accounting tasks into processes characterized by more incredible speed and precision. This optimization saves time and enhances client satisfaction by enabling real-time access to accurate financial information.

Where manual, labour-intensive methods once constrained the role of the accountant, today's reliance on technological tools demands that accounting professionals become agile and efficient, significantly boosting their productivity. (Arruda, et al. (2013)) Noted that information technology is now deeply embedded in the accountant's daily operations. Previously manual and handwritten processes are now managed through sophisticated systems, requiring meticulous attention to data handling and information accuracy. Given this context, the need for tools that enhance accounting practices becomes evident, as the benefits they provide are of considerable importance to the field. This study, therefore, examines the role of technology in the accounting sector, investigating how it facilitates the execution of tasks, improves professional workflows, and adds value to the work of accountants. The primary objective of this research is to explore how technology has assisted accounting professionals, identify the advantages it brings to the field, and assess the extent to which technological advancements might eventually substitute traditional accounting functions. This analysis aims to provide a comprehensive understanding of the transformative impact of technology on the accounting profession.

2. Theoretical Framework

2.1 The Impact of Technology on Accounting

Accounting is often described as the language of business, serving as an essential tool for understanding, evaluating, and managing an organization's financial activities. However, to fully grasp the depth and complexity of accounting, it is necessary to outline its evolution briefly. Accounting has transitioned from a basic transaction recording system to a sophisticated science that influences nearly every aspect of the modern financial landscape. The accounting narrative spans millennia, intertwining with the broader evolution of human civilization. From its earliest iterations, accounting emerged as a response to humanity's need to safeguard ownership, convey information, and understand events involving material resources to pursue predetermined objectives. According to Franco (1997, as cited in Tessmann, 2011), accounting is a science that investigates phenomena related to the patrimony of entities. This investigation involves recording, classification, denomination, exposition, analysis, and interpretation of financial events. (Prokopenko, O., et al. (2023)) These processes aim to provide accurate information and guidance essential for decision-making regarding the composition of patrimony, its variations, and the economic outcomes derived from managing wealth. Given the complexity of the accountant's profession, it becomes evident that the role demands proficiency in recording, analyzing, interpreting, and communicating financial and economic information for organizations and individuals. Additionally, accountants are bound by rigorous ethical standards, further elevating the challenges of their practice.

Technological advancements have become invaluable to the accounting profession in light of these challenges. Software tools, which have evolved alongside technological innovations since the Industrial Revolution, significantly simplify accounting tasks. As technology advances, computing systems have become indispensable in the business environment, exerting a profound influence on accounting. (Borges and Miranda (2011)) Assert that information technology has revolutionized accounting professionals' daily routines for decades, contributing to enhanced efficiency, productivity, and overall work quality. This

intersection of accounting and technology underscores the critical role of digital tools in modernizing the profession, providing solutions that alleviate the complexities of traditional practices and enable accountants to meet the dynamic demands of contemporary financial management.

2.2 Advantages of Using Software in Accounting

In contemporary accounting practices, the adoption of software solutions offers numerous advantages. These tools automate tasks, streamline processes, and facilitate advanced data analysis, enabling organizations to enhance their financial accuracy and strategic decision-making. This is particularly critical in today's complex business environment. This section explores these advantages in detail.

According to Oliveira (2003, as cited in Ferreira, 2010), companies implementing computerized accounting systems have achieved significant improvements and continuously strive to refine these processes. The primary benefits include:

Increased Productivity: The speed of information processing through computers significantly boosts productivity. The time required for an individual or team to produce financial statements or reports using conventional methods is substantially longer than utilizing automated systems. (Fried, H. O., et al. (2008))

Enhanced Service Quality: Electronic printing via high-quality printers results in more professional and visually appealing deliverables. (Qadir, A. M. A. (2023))

Improved Employee Morale: By reducing the tedium associated with manual tasks, accounting software makes the work environment more engaging and stimulating for professionals in the field. (Larasati, A. P., & Martono, S. (2020))

Preliminary Report Review: Systems-generated reports can be reviewed and corrected for potential errors before final printing, ensuring greater accuracy. (Maurer, H. M., et al. (1977)).

Compliance with Regulatory Deadlines: Many businesses rely on computerized systems to meet strict deadlines imposed by regulatory bodies, as delays in fulfilling obligations often result in penalties and

interest charges. (Bertelli, A. M., & Doherty, K. M. (2019))

Quick Access to Information: These systems allow rapid information retrieval, such as identifying specific transactions, checking balances, or analyzing revenue and expense trends through detailed reports. (Upton, J., et al. (2017))

Enhanced Data Security: Features such as file encryption and backup systems ensure the integrity and security of stored information. (Alrikabi, H. T. S., & Hazim, H. T. (2021))

Reduced Physical Space Requirements: Modern computing equipment occupies minimal physical space, and digital storage solutions are far more efficient and organized compared to traditional paper archives. (Otto, A., & Battaia, O. (2017))

These advantages illustrate why the adoption of technology is essential for accounting practices, ensuring alignment with operational and organizational needs. As noted by Simas, Alves, and Cabral (2011), technology and the inclusion of computers in accounting allow professionals to save time while improving the security and accuracy of their work. Comprehensive accounting software systems perform most tasks within an organization's accounting department or at accounting firms, freeing professionals to focus on in-depth financial analysis and strategic decision-making with greater precision and efficiency.

In this context, it is evident that accounting has been one of the fields most significantly impacted by technological advancements. Consequently, accountants must adapt to these changes. In the modern business world, strategic management requires leveraging available technological tools and information systems. Professionals must remain vigilant and responsive to digital innovations, (Agasisti, T., Frattini, F., & Soncin, M. (2020)) as resistance to inevitable changes can lead to obsolescence and professional stagnation. The market increasingly demands proactive, adaptable professionals who embrace and capitalize on technological advancements.

2.3 The Role of Accounting Professionals in the Digital Era

In the digital era, the role of accounting professionals has undergone significant transformation. Driven by advancements in information

technology and computing, the emergence of Digital Accounting, encouraged by government initiatives, has aimed to centralize corporate information through systems designed to enhance efficiency and simplify workflows while also combating tax evasion. This paradigm shift enables accountants to access and analyze data with greater speed, enhancing productivity and allowing them to focus on higher-value tasks. As a result, the accountant's role has expanded in recent years, granting these professionals a more strategic position within organizations by participating in decision-making processes and contributing to corporate management (Pardinho et al., 2021).

As technology continues evolving rapidly, the accounting profession must adapt to capitalize on opportunities offered by automation, advanced data analytics, and other innovations. Simultaneously, accountants face challenges such as cybersecurity risks, regulatory compliance requirements, and the growing need to acquire digital skills to remain relevant in a highly dynamic environment. According to Bomfim (2020), the primary challenge for accounting lies in maintaining consistency and adhering to established standards, even as real-time factors increasingly influence financial results and patrimony analysis. In this digital revolution, (Qadir, A. M. A., & Arab, H. R. (2023)) the hallmark of a successful accounting professional is the ability to address the diverse and evolving needs of accounting users effectively. In the digital economy, accountants no longer record historical financial data; they also play a pivotal role in shaping the financial future of organizations. Their expertise is essential for helping businesses adapt to and thrive in an increasingly digitized and interconnected world.

3. Methodology

This research is categorized as a basic study with exploratory and explanatory objectives, employing a mixed qualitative and quantitative approach. The methodology encompasses bibliographic research and field studies. The research was conducted in Kurdistan, utilizing a non-probabilistic purposive sampling method. A questionnaire comprising relevant and targeted questions was administered to a group of 11 accounting professionals and technicians based in the cities of Sulaimani,

Erbil, and Duhok, Halabja. The survey aimed to collect insights pertinent to the study's objectives, providing a comprehensive understanding of the impact of digital transformation on accounting practices in the region.

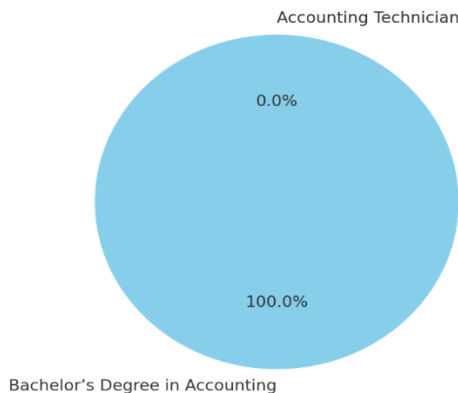
4. Results and Discussion

Based on the responses provided by accounting professionals in the questionnaire, the study yielded the following findings:

The first question revealed that all respondents hold a bachelor's degree in Accounting, while none possess qualifications as Accounting Technicians. This result highlights a sample predominantly composed of individuals with higher academic credentials, reflecting the increasing emphasis on advanced education in the accounting profession.

Fig N° 1: Academic Qualification in Accounting

Graph 1. What is your academic qualification in Accounting?

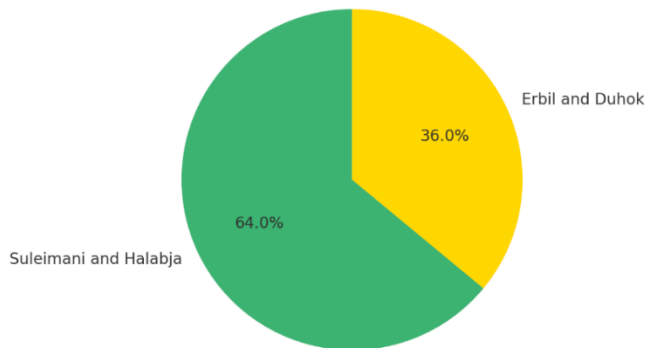


Based on the data collected, 100% of respondents possess a bachelor's degree in Accounting, while none are qualified as Accounting Technicians. This finding underscores a sample comprised exclusively of highly educated professionals in the accounting field, reflecting the emphasis on advanced academic qualifications in modern accounting practices.

Additionally, the geographic distribution of respondents indicates that the majority (63.6%) work in Sulaimani and Halabja. In comparison, 36.4% are based in Erbil and Duhok, highlighting the concentration of accounting professionals in urban centers within the region.

Fig N° 2: Geographic Distribution of Accounting Professionals

Graph 2. In which cities do you perform your professional accounting activities?

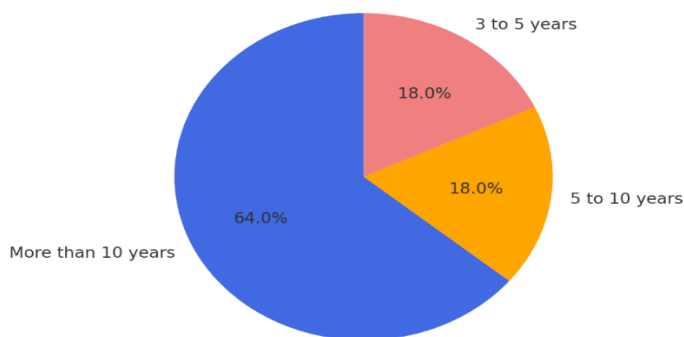


This analysis reveals that the majority of respondents (64%) perform their professional accounting activities in Suleimani and Halabja, while 36% operate in Erbil and Duhok.

Additionally, the data highlights a wealth of professional experience within the surveyed group, with 63.6% having worked in accounting for over 10 years. Meanwhile, 18.2% have 5 to 10 years of experience, and another 18.2% have worked in the field for 3 to 5 years. These results underscore the concentration of experienced accounting professionals in urban centers such as Suleimani and Halabja. They also demonstrate a significant presence in Erbil and Duhok, reflecting a balanced regional distribution of expertise.

Fig N° 3: Professional Experience in the Accounting Field

Question 3: How long have you been working in the accounting field?

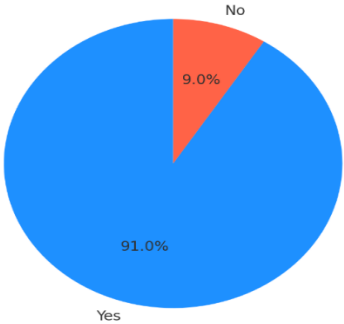


The data reveals that a significant majority of respondents (64%) have over 10 years of experience in the accounting field, reflecting a substantial level of expertise within the sample. An additional 18% have 5 to 10 years of experience, while the remaining 18% have worked in the field for 3 to 5 years.

These findings underscore the diverse range of professional experience among the participants, highlighting the predominance of seasoned accounting professionals who have adapted to various advancements within the field over time. This distribution provides valuable insight into the workforce composition across regions such as Suleimani and Halabja, and Erbil and Duhok, where the survey was conducted.

Fig N° 4: Utilization of Accounting Software in Professional Practice

Question 4: Do you use accounting software in your professional practice?

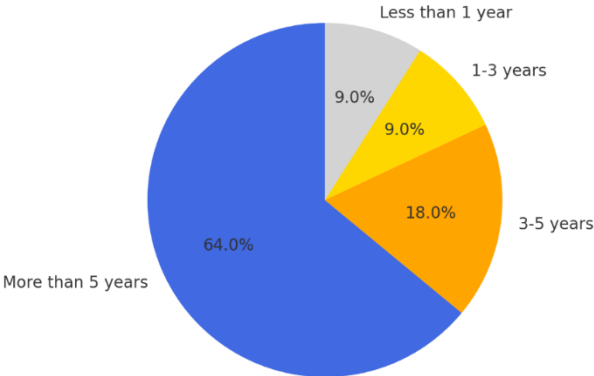


The survey results indicate that the overwhelming majority of respondents (91%) use accounting software in their professional practices, while a minority (9%) do not.

This finding underscores the widespread adoption of digital tools among accounting professionals, reflecting a strong inclination toward leveraging technology to streamline operations, improve accuracy, and enhance productivity. These results hold particular relevance in the regional context of Suleimani and Halabja as well as Erbil and Duhok, where digital transformation is becoming a cornerstone of professional accounting practices.

Fig N° 5: Duration of Accounting Software Usage

Question 5: How long have you been using accounting software?

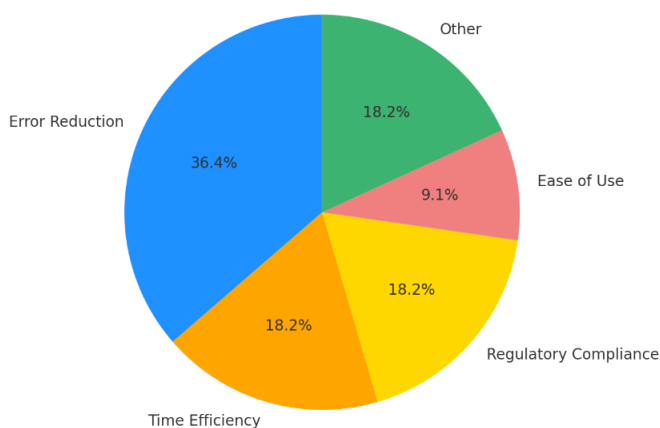


The survey reveals that a significant majority of respondents (64%) have been using accounting software for over 5 years. An additional 18% have utilized such tools for 3 to 5 years, while 9% reported usage between 1 to 3 years. Another 9% have adopted accounting software within the last year.

These findings underscore a high level of familiarity and integration of digital tools among accounting professionals, particularly in regions such as Suleimani and Halabja, and Erbil and Duhok, reflecting the widespread adoption of technology in modern accounting practices. The prolonged use by the majority highlights the role of software as a cornerstone in improving efficiency and accuracy in financial management.

Fig N° 6: Primary Motivation for Adopting Accounting Software

Question 6: What is the primary motivation for adopting accounting software?



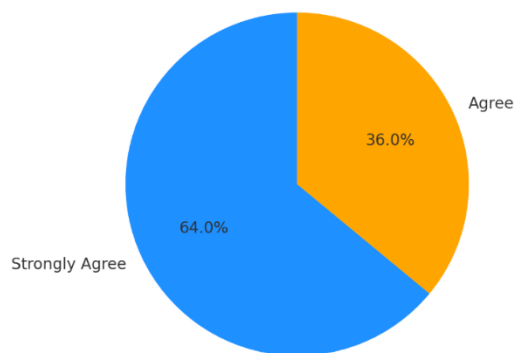
The survey reveals that 36.4% of respondents indicated error reduction as their primary motivation for adopting accounting software. This is followed by time efficiency and regulatory compliance, each cited by 18.2% of participants. Ease of use was identified by 9.1%, while 18.2% selected other reasons as their motivation.

These findings highlight the multifaceted benefits driving digital tool adoption in accounting practices, particularly in regions like Suleimani, Halabja, Erbil, and Duhok. The emphasis on error reduction and time efficiency underscores software's critical role in enhancing accounting professionals' accuracy and productivity in a complex regulatory and

operational environment.

Fig N° 7: Belief in Accounting Software Improving Data Accuracy

Question 7: Do you believe accounting software improves data accuracy?

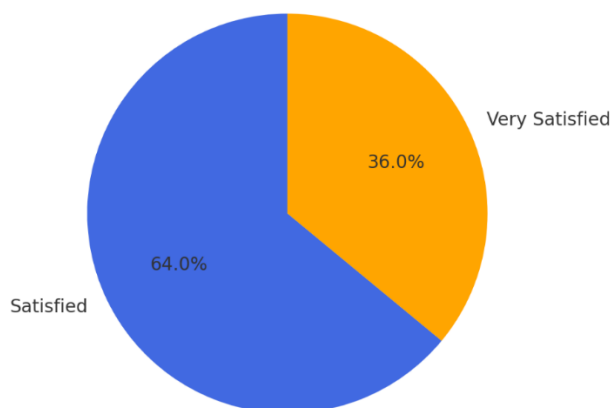


The survey results indicate that all respondents agree that accounting software enhances the accuracy of financial data. Of these, 64% strongly agree, while 36% agree.

These findings reflect a strong consensus among accounting professionals about the benefits of leveraging software to ensure precision and reliability in financial reporting. This perspective is particularly significant in regions such as Suleimani, Halabja, Erbil, and Duhok, where technological adoption is increasingly shaping professional practices in accounting.

Fig N° 8: Satisfaction Level with Accounting Software

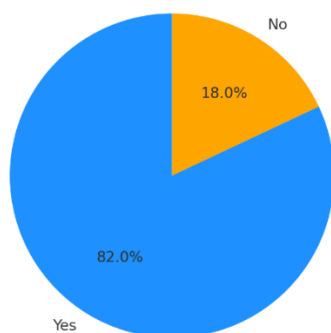
Question 8: Level of Satisfaction with Accounting Software



The survey indicates that the majority of respondents (64%) report being satisfied with the accounting software they use, while an additional 36% are delighted.

Fig N° 9: Adequacy of Accounting Software for Professional Needs

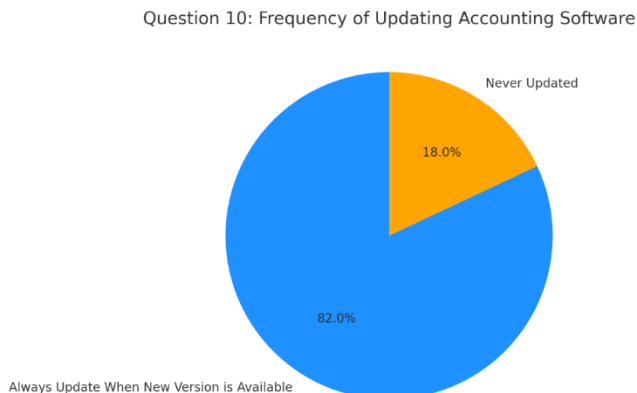
Question 9: Is the accounting software you use adequate for all your professional needs?



The survey results indicate that the majority of respondents (82%) consider the accounting software they use to be fully adequate for addressing all their professional needs. In comparison, 18% do not share this view. This data underscores the effectiveness of accounting software in meeting the functional requirements of most professionals, where

technology continues to play a critical role in streamlining and enhancing accounting practices. However, the minority viewpoint highlights areas for potential improvement or customization in existing software solutions.

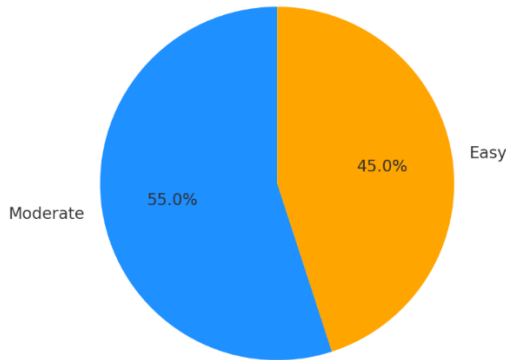
Fig N° 10: Frequency of Updating Accounting Software



The survey results indicate that a majority of respondents (82%) consistently update their accounting software whenever a new version becomes available, while 18% reported that they have never updated their software. This finding underscores the commitment of most accounting professionals to leveraging the latest features and improvements offered by updated software versions. However, the minority who do not update highlight the need for increased awareness regarding the benefits of staying current with technological advancements in accounting practices.

Fig N° 11: Difficulty of Initial Adaptation to Accounting Software

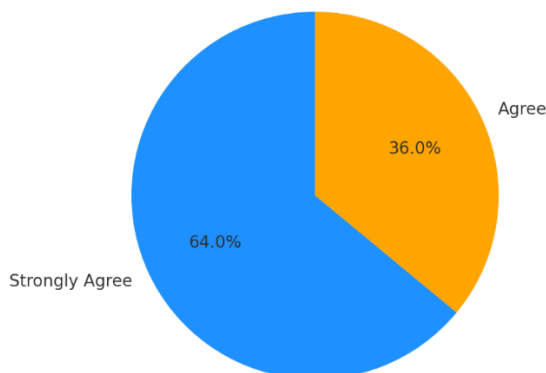
Question 11: Difficulty of Initial Adaptation to Accounting Software



The survey results indicate that 55% of respondents found the initial adaptation to accounting software to be moderately difficult, while 45% described the process as easy. These findings highlight that while the majority encountered some level of challenge during the onboarding process, a significant portion found it relatively straightforward. This underscores the importance of user-friendly interfaces and effective training programs, where accounting software is increasingly being adopted to streamline financial operations.

Fig N° 12: Contribution of Accounting Software to Business Decision-Making

Question 12: Does Accounting Software Aid Business Decision-Making?

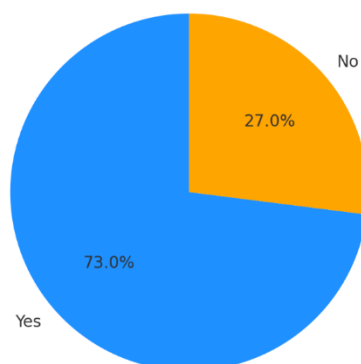


The survey results reveal that all respondents agree that accounting software aids in business decision-making. 64% strongly agree, while 36% agree.

These findings underscore the significant role that accounting software plays in supporting strategic decision-making processes. This is particularly relevant where technological adoption continues to enhance the efficiency and accuracy of financial management, facilitating informed business decisions.

Fig N° 13: Utilization of Additional Modules in Accounting Software

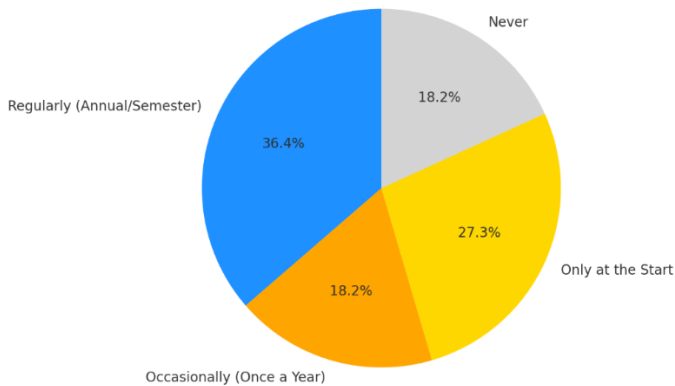
Question 13: Do You Use Additional Modules in Accounting Software?



The survey results indicate that 73% of respondents use additional modules in their accounting software, such as payroll management or inventory control, while 27% do not. These findings highlight the widespread adoption of integrated software functionalities that extend beyond traditional accounting tasks. This trend is particularly relevant where businesses increasingly rely on versatile digital tools to optimize their operations and decision-making processes.

Fig N° 14: Frequency of Training Provided for Accounting Software Usage

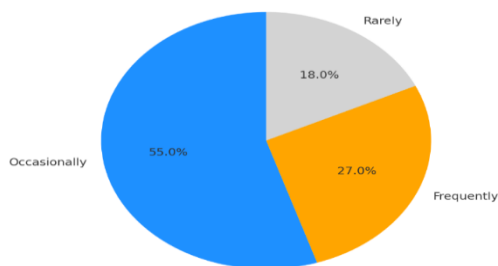
Question 14: Frequency of Training Offered for Accounting Software Usage



The survey reveals varying practices in the provision of training for accounting software usage. About 36.4% of respondents indicated that training is provided regularly (annually or semi-annually), while 18.2% reported that training is offered occasionally, approximately once per year. Another 27.3% received training only at the beginning of their software usage, and 18.2% stated they had never received training. These findings underscore the diverse approaches to training across organizations. They reflect the need for more structured and consistent training programs to ensure optimal utilization of accounting software.

Fig N° 15: Frequency of Needing Technical Support for Accounting Software

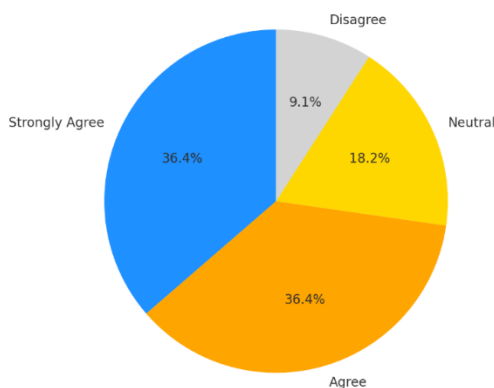
Question 15: Have You Needed Technical Support for Accounting Software Issues?



The survey results reveal that the need for technical support is common among respondents. A majority (55%) reported requiring technical support occasionally, while 27% indicated needing support frequently. Meanwhile, 18% said they rarely required such assistance, and no respondents reported needing technical support. These findings highlight the importance of accessible and reliable technical support services for accounting software users, where efficient issue resolution is essential for maintaining productivity and operational efficiency in accounting practices.

Fig N° 16: Impact of Accounting Software on Operational Cost Reduction

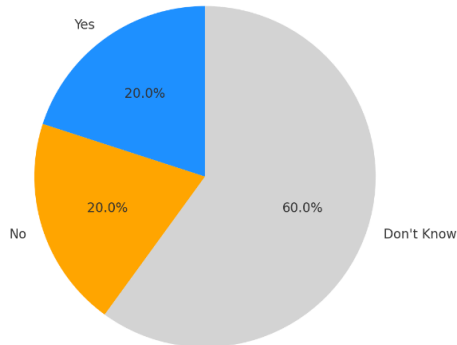
Question 16: Has Accounting Software Reduced Operational Costs?



The survey results reveal mixed opinions regarding the impact of accounting software on operational cost reduction. A combined 72.8% of respondents agree, with 36.4% strongly agreeing and another 36.4% agreeing. Meanwhile, 18.2% remain neutral, and 9.1% disagree with the assertion. These findings suggest that while the majority of respondents recognize the cost-saving benefits of accounting software, a significant minority perceive limited or no impact. This highlights the need for further exploration into how accounting software is implemented and utilized to maximize its potential for reducing operational costs.

Fig N° 17: Integration of Accounting Software with Other Systems (e.g., CRM, ERP)

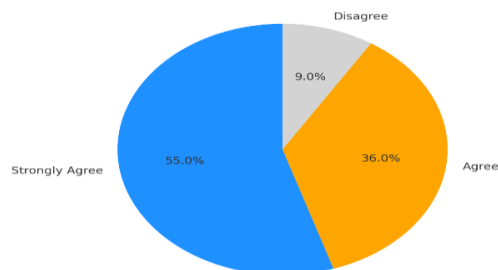
Question 17: Does Your Accounting Software Integrate with Other Systems (e.g., CRM, ERP)?



The survey results reveal that 60% of respondents are unsure whether their accounting software integrates with other enterprise systems, such as CRM or ERP. Meanwhile, 20% affirm that integration is possible, and another 20% indicate that their software does not support integration. These findings highlight a significant knowledge gap among users regarding accounting software's capabilities. This underlines the importance of training and communication from software providers, where the integration of digital tools is becoming increasingly critical for operational efficiency and cross-departmental collaboration.

Fig N° 18: Belief in a Predominantly Digital Future for Accounting

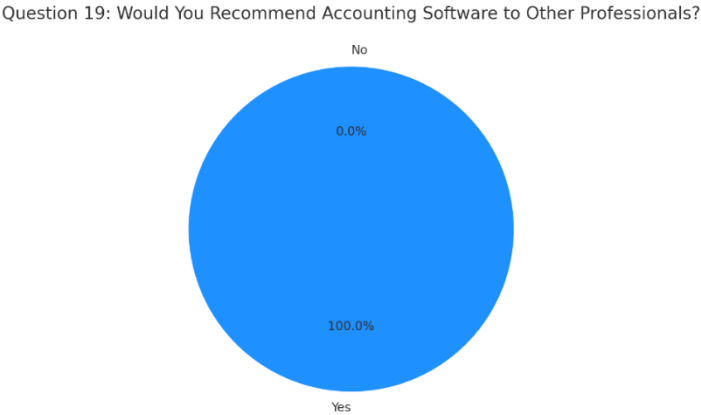
Question 18: Do You Believe the Future of Accounting Will Be Predominantly Digital?



The survey results indicate that the majority of respondents believe

that the future of accounting will be predominantly digital. Specifically, 55% strongly agree, while 36% agree with this perspective. A minority of 9% disagree with this assertion. These findings reflect a strong consensus among professionals regarding the ongoing digital transformation within the accounting field. This sentiment is particularly relevant, where technological advancements are increasingly reshaping the landscape of accounting practices.

Fig N° 19: Recommendation of Accounting Software to Other Professionals



The survey reveals unanimous agreement among respondents, with 100% stating that they would recommend using accounting software to other professionals in the field. This finding highlights the widespread satisfaction and recognition of the significant benefits that accounting software provides for streamlining tasks, improving accuracy, and enhancing overall professional efficiency, where the adoption of advanced tools continues to transform accounting practices.

5. Conclusion

The analysis of data from a questionnaire reveals key insights into the profiles of accountants and the application of accounting software in practice. All respondents possess a Bachelor's degree in Accounting, underscoring the high educational qualifications within the profession. Geographically, the majority of respondents are based in Suleimani and Halabja (63.6%), with the remainder in Erbil and Duhok (36.4%),

indicating a concentration of accounting professionals in these regions. Experience levels vary, with 63.6% of respondents having over ten years of professional experience, reflecting a solid base of seasoned professionals. The adoption of accounting software is nearly universal, with 90.9% of respondents reporting its use in their practices. Of these, 70% have been using such software for more than five years, suggesting a well-established integration of technology in the field. The primary motivations for using accounting software include error reduction (40%) and time savings (20%), emphasizing the importance of efficiency and accuracy. The perception of the benefits of software is overwhelmingly positive, with all respondents agreeing that it improves the accuracy of accounting data. Additionally, 70% express satisfaction with their software, and 90% confirm that it meets their professional needs. These results underscore the transformative role of technology in enhancing accounting practices, streamlining operations, and supporting decision-making (Kohn et al., 2012). Frequent updates to accounting software are common, with 90% of respondents ensuring that their systems are updated whenever a new version is available. While 60% of respondents report moderate difficulty in adapting to new software, 40% find the transition easy. This indicates that, while challenges exist, the majority of accountants successfully adapt to new technologies. The use of accounting software also positively impacts business decision-making, with all respondents agreeing on this point. Furthermore, 27.3% of professionals use additional modules, such as payroll management and inventory control, highlighting the versatility of these tools.

Training and technical support are crucial to the continued effectiveness of accounting software. Sixty percent of respondents receive regular or occasional software training, and 60% occasionally rely on technical support. Despite the robustness of accounting software, technical assistance remains an essential resource (Gillingham, 2014). Regarding operational costs, 80% of accountants believe that implementing accounting software has led to cost reductions, supporting the notion that digital tools enhance efficiency and cost-effectiveness. Additionally, 60% report that their software integrates with other enterprise systems, further boosting functionality. An overwhelming 90.9% of respondents believe that the

future of accounting is digital, and all would recommend accounting software to their peers. These findings highlight the growing significance of technology in the accounting profession. The research suggests that accounting curricula should incorporate emerging technologies to better prepare future professionals (Ruhle et al., 2018). However, the study's limitations, including its small sample size from four cities, may affect the generalizability of the results. Future research should explore the integration of technologies like artificial intelligence and blockchain into accounting practices, as these innovations hold the potential to reshape the profession (Rahman et al., 2013).

6. References

1. Agasisti, T., Frattini, F., & Soncin, M. (2020). Digital innovation in times of emergency: Reactions from a school of management in Italy. *Sustainability*, 12(24), 10312.
2. Alrikabi, H. T. S., & Hazim, H. T. (2021). Enhanced data security of communication system using combined encryption and steganography. *iJIM*, 15(16), 145.
3. ARRUDA, D. C. S., GOMES, E. Z., & SANTOS, C. A. (2013). An analysis of the perceptions of accounting professionals in Corumbá-MS regarding SPED. *Revista Semana Acadêmica*, Fortaleza. Accessed on September 21, 2023. Available at: https://semanaacademica.org.br/system/files/artigos/artigo_sped.pdf.
4. Bertelli, A. M., & Doherty, K. M. (2019). Retracted: Setting the Regulatory Agenda: Statutory Deadlines and the Conditions for Compliance. *Public Administration Review*, 79(4), 618-618.
5. BOMFIM, V. C. (2020). Technological advancements and the profile of accountants in the digital era. *Revista Trevisan*, 18(173).
6. BORGES, V. A. A. S., & MIRANDA, C. C. F. (2011). Accounting in the digital age. Presented at the XIII Latin American Meeting on Scientific Initiation and IX Latin American Postgraduate Meeting – UNIVAP, São José dos Campos. Accessed on September 21, 2023. Available at:

http://www.inicepg.univap.br/cd/INIC_2009/anais/arquivos/0243_0799_01.pdf.

7. FERREIRA, M. B. (2010). The effects of information technology on accounting. *Revista Contábil & Empresarial Fiscolegis*.
8. Fried, H. O., Lovell, C. K., & Schmidt, S. S. (2008). Efficiency and productivity. The measurement of productive efficiency and productivity growth, 3, 3-91.
9. Gillingham, P. (2014). Information systems and human service organizations: Managing and designing for the “occasional user”. *Human Service Organizations: Management, Leadership & Governance*, 38(2), 169-177.
10. Kohn, N. A., Blumenthal, J. A., & Campbell, A. T. (2012). Supported decision-making: A viable alternative to guardianship. *Penn St. L. Rev.*, 117, 1111.
11. Larasati, A. P., & Martono, S. (2020). Increase employee morale through transformational leadership, employee relation, and work environment. *Management Analysis Journal*, 9(1), 1-7.
12. Maurer, H. M., Moon, T., Donaldson, M., Fernandez, C., Gehan, E. A., Hammond, D., ... & Tefft, M. (1977). The intergroup rhabdomyosarcoma study. A preliminary report. *Cancer*, 40(5), 2015-2026.
13. Otto, A., & Battaia, O. (2017). Reducing physical ergonomic risks at assembly lines by line balancing and job rotation: A survey. *Computers & Industrial Engineering*, 111, 467-480.
14. PARDINHO, A. H. C., DE AQUINO, D. M., DOS SANTOS, G. P., & SILVA, M. de P. (2021). Digital Accounting: The challenge of the new era. *Tupã – SP*.
15. Prokopenko, O., Kurbatova, T., Khalilova, M., Zerkal, A., Prause, G., Binda, J., ... & Komarnitskyi, I. (2023). Impact of investments and R&D costs in renewable energy technologies on companies' profitability indicators: Assessment and forecast. *Energies*, 16(3), 1021.

- 16.** Qadir, A. M. A., & Arab, H. R. (2023). Revolutionizing accounting and assurance: the untapped potential of blockchain. *Journal of Survey in Fisheries Sciences*, 10(3S), 5852-5874.
- 17.** Qadir, A. M. A. (2023). How To Evaluate Electronic Accounting Literacy? Case Study: Halabja Technical Institute-Accounting Department/Second Stage. *Telematique*, 22(01), 94-117.
- 18.** Rahman, N., Aldhaban, F., & Akhter, S. (2013). Emerging technologies in business intelligence. 2013 Proceedings of PICMET'13: Technology Management in the IT-Driven Services (PICMET), 542-547.
- 19.** Ruhle, S., Siegrist, J., Süß, S., & Weiß, E. E. (2018). Challenging demands in the modern workplace. *Management Revue*, 29(1), 1-4.
- 20.** SIMAS, D. P., ALVES, H. E., & CABRAL, W. K. R. G. A. (2011). The importance of information technology in accounting. UNIRONDON. Accessed on September 21, 2023. Available at: <https://wordpress.com>.
- 21.** TESSMANN, M. O. (2011). The challenges of digital accounting for accounting professionals. Criciúma – SC: Universidade do Extremo Sul Catarinense – UNESC, 64 pages.
- 22.** Upton, J., Olsson-Brown, A., Marshall, E., & Sacco, J. (2017). Using QR codes to enable quick access to information in acute cancer care. *British Journal of Nursing*, 26(10), S4-S12.