ANALYZING THE ROLE OF DIGITAL TECHNOLOGIES IN REVOLUTIONIZING TAXATION: A LITERATURE REVIEW

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Abstract

This study encompasses a vast understanding of relevant and related topics in tax technology, such as Artificial Intelligence (AI), e-tax, digital tax, and tax automation. It looks at the effects of tax automation and artificial intelligence, detects new trends, and investigates the use of AI in the tax system. The implications for tax policy, governance, and socio-economics are considered carefully in the materials. The study uses a literature review to discover and retrieve pertinent research publications from the Scopus database and Google Scholar. Findings highlight the need for flexible regulatory frameworks, advanced tax systems, and a nuanced understanding of digital tax systems' social and economic implications. This study is an essential resource for policymakers, tax authorities, and academics, providing strategic insights for navigating the dynamics of technology and taxation in today's digital age.

Keywords: Tax Technology, AI in Tax, E-taxation, Digital Taxation, Tax Automation.

1. INTRODUCTION

In an era characterized by rapid technological advancements, integrating digital technologies into various facets of governance has become increasingly prevalent. Among these areas, taxation is a crucial domain where digital innovations hold immense potential to revolutionize processes and outcomes. Digital technologies have ushered in a new era of efficiency, transparency, and accessibility in taxation, offering government's novel tools to enhance revenue collection, combat tax evasion, and streamline administrative processes *(*Datta et al., 2020*)*. The present robust era of digital access is aided by tools such as artificial intelligence (AI), tax technologies, and processes such as e-taxes to help better tax management (Usman & Shaheen, 2023). A cursory look at the research trends shows that the scholarly discourse on these topics increases across disciplines. It reflects the interdisciplinary nature of technology and taxation, highlighting the potential of AI to enhance tax compliance, which has been enhanced by predictive analytics, meaning the use of real-time advanced technology in tax administration (Rejeb et al., 2023). Additionally, the pioneering work by Matiku et al. (2023) clarifies the complexities of e-taxation, highlighting its role in simplifying procedures and facilitating the taxpayer. Digital taxation, a relatively nascent field, has attracted scholarly attention, such as Bañez (2022), critically examining the challenges and opportunities of digitized

tax systems. The advent of digital technology has not only changed the way businesses operate but has also presented unprecedented challenges and opportunities for tax authorities (Hanna, 2010). The rapid development of digital technologies, including cloud computing, artificial intelligence, and blockchain, has facilitated borderless financial transactions beyond traditional geographical boundaries (Lu, 2021). This literature review also explores the subtle complexities of digital tax administration (DTA), its underlying principles, challenges, and its transformational potential for fundraising success to governments in the digital age. The mandate stimulates research to extract insights from the literature surrounding DTA, spanning a variety of academic, policy, and professional perspectives (Tan & Pan, 2003).

Tax automation and technology, an integral part of the modern tax system, have also stimulated considerable research (Adebiyi, 2023). Omosa (2022) emphasizes the transformational potential of tax automation in speeding up complex audits and reducing errors and demonstrates its direct impact on efficiency. Kayode-Ajala (2023) examines the evolving landscape of taxation technology, highlighting the need for a flexible framework to enable technological innovation and ensure that taxation systems can cope in times of rapid change.

We aim to increase the rigor of our research, providing a comprehensive and reliable resource for policymakers, tax authorities, planners, and analysts navigating the complexity of the digital tax process. We contribute insights to enhance taxation practices and guide future research in this critical domain.

2. RESEARCH QUESTION

The first task in conducting a literature review is to develop a set of research questions. This article summarizes the most recent research on e-invoicing, AI in taxation, e-taxation, digital taxation, tax automation, and tax technology from relevant published sources. With all this in mind, we formulated the following study questions:

a) How can E-invoicing improve tax administration by reducing tax compliance, administration, and associated costs?

b) To what extent can artificial intelligence (AI) be used in tax-related processes to increase accuracy, reduce error, improve decision-making, and ultimately improve tax compliance and productivity? This research question examines the potential impact of artificial intelligence (AI) on taxation.

3. METHODOLOGY

The study examines tax technologies and how they benefit taxation through a critical literature review. According to Carliner (2011), a critical review is a thorough review process that enables researchers to analyze, assess, and synthesize literature to identify research gaps, consistency issues, and discrepancies in earlier studies.

The researchers Webster and Watson (2002) adhered to recommendations, which state that a complete review needs to address four key areas: thoroughness ("well done?"),

contribution ("What's new?"), impact ("so what?"), and logic ("Why so?"). Using a qualitative sequential strategy (as utilized by Tofan and Bostan (2022)), the researchers were able further to increase the distinctiveness of this review article's contribution. The initial literature review for this study concentrated on tax technology, including digital taxation, e-taxation, artificial intelligence (AI), and tax automation.

Additionally, articles found using the SCOPUS database and Google Scholar search engine were used to analyze the literature. The researchers employed snowballing and citation mining (Mpofu, 2021b) to supplement this existing literature. Using the information taken from the reference list of the papers deemed appropriate, the researchers searched for pertinent papers. Moreover, forward and backward snowballing was employed to track the leading writers in the field forward and backward (Jalali and Wohlin, 2012; Mpofu, 2021b; Munoz et al. (2022).). This produced earlier and more recent research on tax technology, including publications on artificial intelligence (AI), e-tax, digital tax, and tax automation,

The literature was evaluated until saturation, at which time additional reviews produced no new material on the topic (Sebele-Mpofu, 2020b). The various tax technology headings served as a guide for the thematic discussion of the review literature.

4. DESCRIPTION OF THE ARTICLES USED FOR THIS STUDY

Of all the many industries touched by digital transformation, taxation is one of the most important ones, where digital innovations have the most significant potential to transform procedures, maximize results, and boost productivity. This review aims to elucidate the complex relationships between digital technology and tax administration through a comprehensive analysis and synthesis of a wealth of material written by distinguished experts spanning several years. From the ground-breaking discoveries, renowned authors and their publication years are presented below.
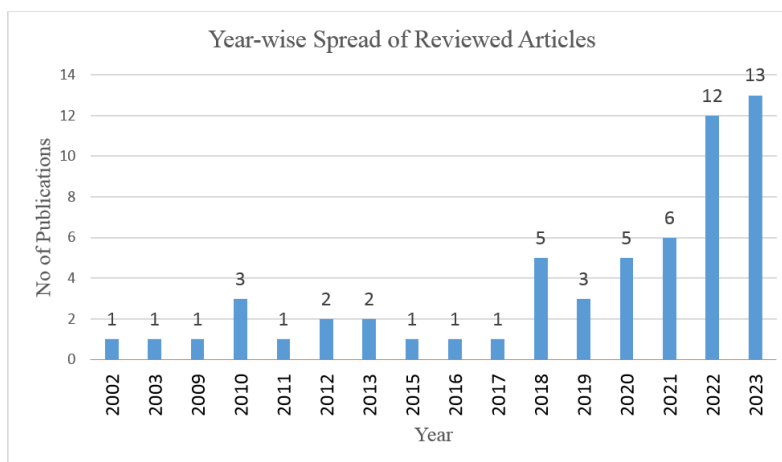

Figure 1: Documents Trend based on Publication Year

Source: Authors compilation

In the dynamic landscape of taxation, researchers have increasingly focused on integrating digital technologies to streamline processes and enhance outcomes. In the early years, notable collaborations like that of Abe et al. (2010) likely paved the way, exploring the initial forays into digital integration within tax systems. Their research may have laid foundational insights into the potential benefits of digitalization, ranging from improved data management to enhanced compliance mechanisms. As the years progressed, authors such as ADEGBIE, ENERSON, and OLAOYE (2022) delved deeper into the practical applications of digital tools in taxation, perhaps shedding light on the nuances of implementation and the transformative potential of technological advancements.

## Table 1: Categorical Summary of Documents Cited in this study

Roll no.	Focus Area	Number of Documents used
1	Use of Technology in Tax System	15
2	E-Taxation	10
3	Tax Automation	11
4	Digital Taxation Impact on Small and Medium Enterprises (SMEs)	4
6	Others	9
	Total	58

Source: Authors Compilation

The table above provides a categorical summary of documents cited in the study, categorizing them based on the focus area. This summary offers insights into the distribution of cited documents across different areas within the study's scope.

In parallel, recent years have witnessed a surge in research focusing on the challenges and opportunities posed by digital transformation in taxation. Works by Adebiyi (2023) and Akula & Yaseen (2022) likely epitomize this trend, offering insights into the evolving role of digital technologies in optimizing revenue collection, improving taxpayer services, and enhancing overall efficiency. This shift towards more focused inquiries reflects a growing recognition of the pivotal role digitalization plays in reshaping traditional tax systems for the digital age. With each publication, researchers continue to unravel the complexities and potentials of digital technologies, forging new pathways toward a more efficient and effective tax administration landscape.

This review attempts to shed light on the revolutionary potential of digital technologies and open the door to a deeper understanding of their impact on taxation methods through a literature examination. The literary compilation's wealth of various perspectives and collective expertise act as a beacon of guidance for us as we set out on this exploratory voyage, showing the way toward a future where technology will empower taxation.
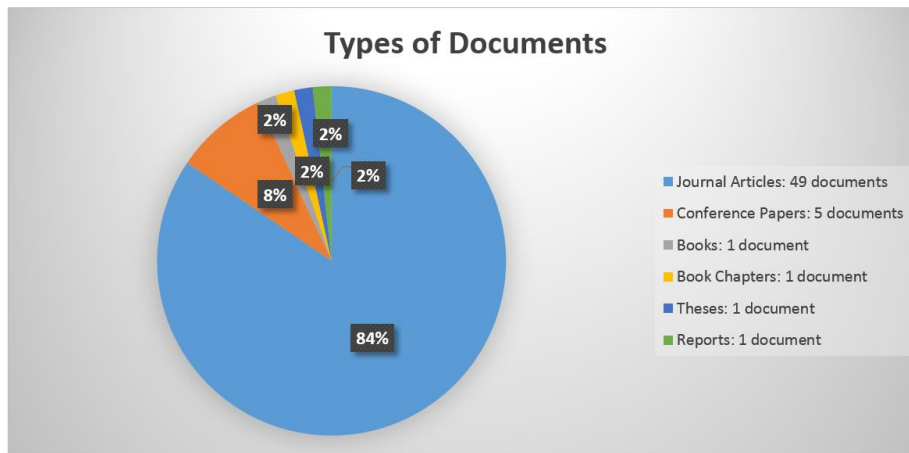
Figure 2: Categories of Documents based on their Type

Source: Authors Compilation

The pie chart (Figure 2) illustrates the dataset's document type distribution. Journal articles dominate the dataset with 84.48%, followed by conference papers (8.62%). Books, book chapters, theses, and reports each represent a smaller portion, with 1.72% each. This visualization highlights the predominance of journal articles as the primary source of literature in the dataset, with other document types making up a smaller proportion.

5. DISCUSSIONS

The evolution of taxation has witnessed a significant paradigm shift with the pervasive influence of digitalization, artificial intelligence (AI), and automation. It explores the impact of technological advancements on E-Taxation and Tax Technology, aligning with the broader objective of understanding the contemporary landscape of tax administration (Bentley, 2018).

In the following sections, we explore the profound impact of digital technologies on taxation, encompassing various aspects such as the use of technology in tax systems, theoretical frameworks of taxation, tax automation, the influence of digital taxation on Small and Medium Enterprises (SMEs), and the role of Artificial Intelligence (AI) in enhancing tax administration. Analyzing existing literature and research findings, we aim to provide insights into how digital innovations reshape global tax practices. We examine each subtopic to elucidate the opportunities, challenges, and implications of leveraging technology to revolutionize taxation processes, administration, and compliance practices.

5.1. Use of Technology in Tax System

Technology is emerging as a transformative force within taxation dynamics, reconfiguring traditional practices and seeking multidimensional meanings (Rosid et al., 2023). The study conducted by Okanga (2022) shows that the tax reporting obligations, specifically the Standard Audit File for Tax (SAF-T) and mandatory e-invoicing recognizing the

variation in these matters, the document emphasizes the importance of businesses changing their structures and roles of tax professionals to evolve beyond traditional technical competencies. According to Lang & Risse (2022), the importance of integrating ICT and communication skills into the tools of the SAF-T and e-invoicing marks a paradigm shift in response to the challenges posed by the traditional tax.

Studies have revealed that tax technology positively impacts managing environmental taxes. The survey conducted on China's ecological taxation shows the role of fostering technological innovation and balancing economic and environmental interests. Based on evidence from heavily polluting industries, the study reinforces Porter's hypothesis and demonstrates the positive impact of environmental taxes on innovation and economic returns for firms (Yu & Cheng, 2021). The nuanced findings highlight local variation in the effects of innovation efficiency and the complementary role of environmental subsidies and R&D subsidies in the environment, highlighting the positive impact of environmental tax policy (Miao et al., 2023). This article paints a broader picture of tax technology as a global catalyst for change. The literature frames the modern tax landscape from the passage of new reporting responsibilities to MNCs to the formation of cross-sector collaboration to the challenges SMEs face in a developing environment and the use of environmental tariffs for industrialization. It addresses the growing role of technology.

The current situation calls for a radical change in the tax landscape and a rethinking of individual roles, processes, and technologies that will lead to a transformation of taxation (Adebiyi, 2023). In summary, technology is revolutionizing the tax landscape, reshaping traditional practices, and redefining the roles of tax professionals. From adapting to new reporting obligations to integrating ICT skills into tax tools, the shift is evident. Studies on environmental taxation in China highlight tax technology's positive impact on innovation and firms' economic returns. Overall, embracing technology is crucial for navigating the complexities of modern taxation and ensuring sustainability in the ever-changing tax environment.

5.2. E-Taxation

E-taxation, an integral part of e-government initiatives, has received considerable attention in recent research literature. E-Government and Cost Savings in Slovenia examines the main characteristics of regulatory reforms, emphasizing cost savings, collaboration, and flexibility as crucial for improving government performance. Emphasis is placed on the role of Information and Communication Technology (ICT) in achieving regulatory objectives, reducing administrative burdens, and improving contextual performance (Dečman et al., 2010)**.**

The Impact of the e-tax system on state and local government revenue, as per Omar et al. (2009), addresses state and local government tax losses due to online transactions. They examined online transactions as one reason for non-compliance with business tax, revealed significant revenue losses, and discussed the challenges of changing the tax bases. A study entitled Impact of Electronic Taxation on Reducing Tax Evasion in Iraq proposes a model for electronic tax filing to prevent tax evasion by Iraqi companies. The

study contributes to understanding cyber taxes and tax evasion strategies (Al Baaj et al., 2018).

Revenue generation in Nigeria through e-tax examines the impact of electronic taxation on Nigerian states and highlights the implications of e-government and computer literacy. The study recommends further research on sovereignty issues and complements. The existing literature Okafor (2012) examines the perceived relationship between tax authorities' use of e-tax and the impact of e-tax use on taxpayer compliance and satisfaction. The study executed by Devano et al. (2023) highlights the positive effect, emphasizing the moderating role of taxpayer satisfaction and contributing to understanding the evolution of e-tax, satisfaction, and compliance. Electronic Taxation and Cybercrime in Africa examines the impact of ICTs on tax systems in Nigeria, Kenya, and South Africa and draws lessons from Europe and the United States. The study highlights the challenges posed by cybercrime in the electronic tax system, contributing to the discussion on safeguarding against cyber threats (Eboibi & Richards, 2019). The research entitled Local Government Transparency through E-taxation examines the impact of e-taxation on local governance in the Philippines (Canares, 2016). It emphasizes transparency and accountability in revenue generation by considering factors such as political leadership and technology. This study contributes to the overall understanding of ICT adoption in local government by reflecting a variety of topics, including cost, revenue impact, inspection process, prevention of tax evasion, and transparent governance. The survey contributes to understanding the challenges and opportunities in a developing landscape for electronic tax payment.

5.3. Tax Automation

Tax automation is a dynamic and variable phenomenon affecting tax planning and compliance (Bassey et al., 2022). The e-tax trend in the world has been the focus of governments as the e-tax journey in the Republic of Turkey shows the gradual integration of Information and Communication Technology (ICT) in the tax administration. VEDOP I and other initiatives were launched in 1998, followed by VEDOP II and VEDOP III initiatives, which established the legal basis for the electronic tax system in Turkey (Budak & Benk, 2020). This development highlights the Turkish government's commitment to digitalizing tax administration.

Additionally, the potential disruption of blockchain technology in the tax system has been investigated. While predictions of catastrophic disruption have yet to be fully realized, scholars emphasize the need to align regulatory frameworks with block chain technology to unlock its full potential (Lombardi et al., 2022). This requires collaboration where new technologies like block chain work within existing regulatory frameworks. In contrast, regulatory frameworks evolve towards automated outcomes, and again, legally, the standards of practice in tax and benefits law encourage a nuanced approach. Domain-specific languages developed for the automation of tax-benefit rules, Catala and Regelspraak, illustrate the complexity of translating rules into law (Merigoux et al., 2021) -Efforts to automate tax collections that require domain effort reflect innovative use of technology to solve real-world challenges. Using radio frequency identification technology

and mobile Android applications, the intelligent tax toll system offers more efficient alternatives for manual toll collection, reducing traffic congestion and fuel consumption (Salunke et al., 2013; Khan et al., 2018). This program demonstrates the technology's ability to streamline traditional processes and enhance the user experience.

Tax automation is a multifaceted and evolving phenomenon, with new solutions such as electronic tax systems, block chain technology integration, regulatory standards manufacturing, tax intelligent manufacturing, etc. The study emphasizes the importance of balancing technology in the existing regulatory framework.

5.4. Digital Taxation Impact on Small and Medium Enterprises (SMEs)

In exploring the evolving landscape of digital taxation, the research sheds light on the specific implications of these changes on Small and Medium Enterprises (SMEs) operating in developing economies (Akula & Yaseen, 2022). The study at the Department of Economics, University of Sao Paulo, Brazil, analyzes how digital taxation policies affect SMEs' growth, compliance, and competitiveness in this unique context. The findings suggest that policymakers should focus on creating an environment that facilitates SMEs' adoption of digital taxation, ensuring access to finance, skilled labor, and a competitive market. Additionally, tailored policies addressing SMEs' unique digital taxation needs across different business stages are necessary. Overall, this study underscores the pivotal role of SMEs in driving innovation, job creation, and economic growth, particularly within the framework of digital taxation.

Setting ourselves in the context of Indonesia, the case goes back to the government's efforts to encourage economic growth, mainly targeting the MSME sector among many strategies that call for including online tax payment technology to respond to the challenges of the Industrial Age is fundamental (Zulma & Hizazi, 2020). However, despite these developments, the study highlights the harsh reality of low tax evasion among SMEs in the Zembrana district. The study highlights the critical role of trust in the legal system and government through the strategic use of tax technologies and information to positively influence taxpayer behavior, especially in tax computation.

The research conducted by Stephenson (2021) examines technology as evolving rapidly, outpacing all other developments, with technology and internet accessibility becoming more widespread than ever. Its applications vary widely, from personal to corporate usage. However, this study focuses specifically on the perceptions of Small and Medium Enterprises (SMEs) regarding technology, particularly examining the adoption and usage of technologies such as Making Tax Digital (MTD). Through primary research, it was found that most participants were confident that IT aided their daily activities by streamlining business monitoring and control through centralized information (Stephenson, 2021). Moreover, technology provides SMEs with current and regulatory-complete information. In another study by Mbise & Baseka (2023), the impact of digital tax administration systems on compliance among SMEs in the Tanzania Revenue Authority, Tanga regional office, was investigated Employing a case study approach with a quantitative methodology, the research revealed that digital tax administration systems enhance SMEs business and tax compliance through technological utilization.

5.5. AI to Enhance Tax Administration

Exploring the role of artificial intelligence (AI) in tax administration and compliance has received increasing attention in recent years. Research efforts have spanned various aspects of this convergence, from optimizing cost recovery through enhanced reinforcement learning to agent-cooperative strategies in tax avoidance, which has shed light on local changes and challenges (Abe et al., 2010).

The literature also delves into the use of AI in tax administration and audits. Huang (2018) discusses the development of AI in taxation and its potential implications. The author argues that AI technology enhances tax auditing by providing advanced forecasting and statistical models, streamlining data processing, and offering systematic frameworks. AI tools enable the simulation of tax risks, aiding nuanced judgments and contributing to fraud detection, thereby improving supervision by government authorities. However, the fusion of AI and tax systems has its challenges. The author acknowledges the limitations and risks of AI deployment, emphasizing the need to carefully consider issues such as data privacy and algorithmic bias.

Hsu et al. (2015) provide a case study of a research project at the Minnesota Department of Revenue, illustrating the potential of data mining for selective tax estimation. The AI landscape in taxation is dynamic, with technological advances and discussions about ethical policies around corporate social responsibility and moral choices in tax policy (Sarker Ahmed, 2022).

Beyond traditional analyses, researchers have explored innovative methods such as agent-based models for tax compliance (Llacer et al., 2013), and the use of neural networks for tax fraud detection is evident in studies by Perez Lopez et al. (2019) showcasing the versatility of AI techniques in tackling tax-related challenges. In summary, the literature review reflects the diverse landscape of AI applications in taxation, covering aspects of fraud detection, compliance, administration challenges, and the ethical considerations associated with the integration of AI. The multidisciplinary nature of this field requires ongoing research and collaboration to address emerging challenges and harness the full potential of AI in tax-related domains.

6. RESULTS

Digital Tax: The adoption of digital tax concepts has demonstrated significant potential in augmenting tax revenue through more effective tax collection mechanisms and the reduction of revenue leakages. Moreover, digital tax systems have been instrumental in enhancing tax administration by automating processes, reducing administrative burdens, and facilitating real-time tax compliance monitoring. This, in turn, contributes to cost and time reductions for both taxpayers and tax authorities. Simplifying taxpayers' lives is evident through streamlined processes, more accessible access to tax-related information, and enhanced compliance through automated reminders and notifications. Additionally, the advent of digital tax solutions fosters an environment conducive to investment by providing greater transparency, predictability, and ease of business. The combined literature underscores the consensus on the transformative potential of digital

tax, with Fjord and Schmidt (2023) highlighting the transition from traditional paper-based processes to digital platforms, emphasizing efficiency and transparency gains. These findings resonate with the broader global trend of digitization in tax systems, as elucidated by Sabbagh et al. (2012), emphasizing its profound implications for government revenue generation and fiscal sustainability.

The literature review revealed that incorporating artificial intelligence (AI) in the tax system is emerging as an essential topic. Aziz and Dowling (2019) highlight the potential of AI using machine learning algorithms and predictive analytics for fraud detection and risk assessment. Veale et al. (2018) extend this discussion by extensively using AI to enhance the decision-making process in taxation. The literature results show that the integration of Artificial Intelligence (AI) within tax systems offers manifold benefits, enriching tax authorities' capabilities by facilitating the analysis of vast datasets, detecting instances of tax fraud and evasion, and bolstering the efficiency and efficacy of tax audits. Additionally, AI implementation streamlines tax administration processes, enhancing overall operational efficiency. From the taxpayers' perspective, incorporating AI provides access to updated tax rules, regulations, and procedures, fostering compliance and mitigating the risk of inadvertent non-compliance. Furthermore, AI-driven systems facilitate the organization and enhancement of taxpayers' tax files and documentation, thereby promoting accuracy and completeness in reporting obligations. These advancements underscore AI's profound relevance and significance within the realm of taxation, offering transformative solutions that benefit tax authorities and taxpayers alike.

E-tax represents a pivotal element in the modernization of tax administration, offering myriad advantages that underscore its importance in contemporary tax systems. Opiso et al. (2023) emphasize the significance of electronic invoice systems, elucidating how they contribute to reduced processing times, enhanced accuracy, and heightened convenience for taxpayers. ADEGBIE et al. (2022) further reinforce the efficiency gains associated with e-tax practices, emphasizing their transformative impact on tax administration processes. Additionally, the convergence of digital taxation and tax automation emerges as a critical frontier in contemporary tax systems, offering substantial benefits in terms of efficiency and compliance. Hesami et al. (2023) shed light on the transformative potential of tax automation, emphasizing its role in minimizing manual processes and streamlining compliance procedures. Rogers and Oats (2022) expand upon this discourse, comprehensively examining the diverse facets of digital tax compliance, thereby highlighting the nuanced complexities and opportunities inherent in this domain. Together, these concepts underscore the multifaceted importance of e-tax, digital taxation, and tax automation in modernizing tax systems, enhancing efficiency, and promoting compliance.

Tax technology: The diversity of tax technology is reflected in the literature. Olabanji (2023) examines technological developments in taxation, highlighting the multifaceted role played by software solutions, data analytics, and block chain. Atayah and Alshater (2021) provide insights into the specific use of block chain in taxation, bringing out the opportunities and challenges of this evolving technology. The findings indicate a significant shift in the tax system. Combining digitalization, AI, e-tax, tax automation, and

various tax technologies contributes to increased efficiency, accuracy, and transparency. These technological advances are interconnected rather than dependent on each other and lead to synergistic effects that occur in shaping the future of tax administration.

Furthermore, the literature highlights the need for policymakers and tax professionals to adapt to this changing environment. The success of integrating digital tax systems, AI applications, and technology depends on effective governance, strategic planning, and continuous adaptation to technological advances (Bughin et al., 2017). In conclusion, the literature review provides a comprehensive understanding of the impact of digital, AI, and automation on e-tax technology. The combined findings set the stage for informed decision-making, suggesting avenues for further research and strategic considerations for policymakers to navigate today's tax policy dynamics.

7. FUTURE RESEARCH AREA

Future research should investigate the evolving relationship between tax authorities and taxpayers in an increasingly digital and AI-driven fiscal environment. Specifically, studies could explore how digital tools and AI influence taxpayer behavior and compliance levels and the effectiveness of AI applications in enhancing compliance. Additionally, examining taxpayers' perceptions of digitalized tax systems in contexts undergoing reform can offer practical insights for policymakers and tax authorities. Ultimately, tailored digital tax systems can lead to more efficient and equitable tax administrations globally.

8. CONCLUSION

In conclusion, this literature review has provided comprehensive insights into the impact of e-tax technologies and digitization of taxes, artificial intelligence (AI), and automation on the tax system if we combine key observations from different sources that highlight the transformative nature of this technological development. As governments navigate this dynamic environment worldwide, policymakers and tax practitioners must adapt to evolving challenges and opportunities. Recommendations include adjusting policies to suit new digital tax innovations, investment in tax innovations, capacity building, and promoting cooperation between tax authorities and technologists. This literature review contributes to understanding the current state of digital tax systems. It serves as a basis for future research and strategic considerations regarding dynamic tax technologies.

Authors' Contributions

- **Adinew Erkeno:** As a full-time research scholar pursuing his Ph.D., the corresponding author contributed significantly to collecting and conceptualizing the articles, transforming them into a research paper.

- **Dr. K. Lubza Nihar:** As one of the first author's research supervisors, she helped with guidance and proofreading.

- **Dr. B. Padma Narayan:** As one of the first author's research supervisors, she assisted with Supervision, prepared the paper's figures and table, edited it, and then reviewed it.

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