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Review

A conceptual framework for digital tax administration - A systematic review

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ABSTRACT

Tax administrations worldwide have become highly digitised with a diverse and sophisticated array of e-services to enhance the taxpayer experience. Nevertheless, given the high rates of failure of e-government services, it is critical to understand the factors that are essential to the success of a digital tax system. Drawing on a systematic review of ninety-six publications across the digital taxation, taxation, and information systems (IS) literature, a comprehensive conceptual framework is developed to improve our success of digital services in tax administration.

The conceptual framework identifies fifteen themes for consideration by policymakers when designing digital services in tax administrations clustered around four categories – Context, Stakeholders, Technology and Demonstrated Results. The framework should also serve as a reference point in successfully developing strategies and measures to embed digital services in tax administrations. Future research directions are also proposed based on the conceptual framework that will help advance our understanding of digital services in tax administration beyond technology acceptance models.

1. Introduction

Tax administrations are reliant on their ecosystem to succeed. This ecosystem is an interdependent network of actors, technologies, and institutions. Although the form and practice of tax administration have evolved over the millennia, one thing remains constant, successful tax administrations can identify, understand, and leverage their ecosystem to generate revenue (Steinmo, 2018). Failure to leverage and understand that ecosystem can often lead to serious revolts and uprisings, notably the Magna Carta, the American Revolution, and the French Revolution, with significant consequences for society (Burg, 2004).

In recent times, tax administrations have become digital, with the application of Artificial Intelligence, Internet of things (IoT), Cloud computing, Blockchain technology, etc., to various tax activities (Bentley, 2019; OECD, 2016a).

The evidence bears this out. According to the OECD (2021), 80% of the fifty-nine tax administrations surveyed use data analytics tools, 75% have machine learning capabilities, and 50% have digital assistant tools, most notably 'Chatbots'. This is also matched by the spending, with ICT infrastructure comprising 50% of capital expenditure (OECD, 2019).

Nevertheless, there is no evidence to suggest conclusively that ICT development will achieve the pre-determined outcomes of efficiency, effectiveness, and taxpayer satisfaction (Mallick, 2021). According to a review by Omar, Weerakkody, and Daowd (2020), most ICT projects in the developed world fail to meet their objectives despite significant financial investment in such projects. A similar situation also occurs in developing countries (Heeks, 2005). Indeed, despite a high e-filing rate in the developed world, its e-filing rates continue to remain low (Mashabela & Kekwaletswe, 2020; Soulange, Soondram, Jugurnath, & Seedoyal, 2017).

For a tax administration heavily dependent on its ecosystem, some argue that technology alone will not lead to its success (Kochanova, Hasnain, & Larson, 2020). There is a need to understand how the recent digital reforms have influenced its broader ecosystem, which consists of the people, processes, and institutions behind the provision of digital services (Open e-Policy Group, 2005). This is particularly essential as literature reviews by Dada (2006) and Nkohkwo and Islam (2013) argue that leveraging the broader ecosystem in which ICT is applied is critical to understanding the reasons for failures or cost overruns that have plagued many e-services.

There has been some research on the digital Ecosystem in the broader information systems literature, notably the special issue of Diga & May

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(2016) which explored the ICT Eco-system as a tool for social development and addressing inequities. However, in the context of digital tax services, the majority of research in this area has focused on the application of models of technology adoption, acceptance, and use, such as Technology Acceptance Model (TAM), DeLone and Mclean IS Success Model, among others (see Table 3 for a more detailed breakdown), on the various stakeholders in the tax space such as the tax official, taxpayers or tax consultants. While necessary, these models explore phenomena that comprise only a small part of the broader digital tax administration infrastructure.

Except for the sole article by Canares (2016), which draws on the digital Ecosystem approach to explore tax administration in the Philippines, current research lacks an explicit understanding and integration of the approach to the e-tax[1] literature, as well as whether adoption of such an approach will provide clarity to the pre-existing research on digital taxation on the criteria for appraising digital taxation. Therefore, we provide a systematic review to bridge the gap with the following research objectives:

- To undertake the first systematic review of the available literature on digital taxation.
- To use a modified narrative synthesis to develop a conceptual framework for understanding the application of digital services in Tax Administrations.
- To identify the research gaps in the digital tax literature and provide some avenues for future research.

We conduct a systematic review to understand the various existing narratives as regards the adoption, usage, and effectiveness of various digital tax services as explored in different disciplines and to integrate them into a comprehensive conceptual framework for the study of digital taxation. The need for this framework arises from concerns about the high failure rate of e-government services (Heeks, 2005) and, therefore, the need to understand the factors critical to designing effective digital tax services.

This framework has several uses: First, it contributes to our understanding of the application of digital services in tax administration and critical factors that need to be considered in designing effective digital tax services. Second, for those interested in carrying out framework-oriented empirical research, it can provide a practical basis from which hypotheses can be developed to answer research questions in digital taxation. Third, from a policy standpoint, it can provide a helpful reference point for policymakers and e-government managers in designing digital tax services fit for purpose.

The rest of the paper is organised as follows: Section 2 explains what is meant by digital taxation, Section 3 discusses the research design and methodology which led to the retrieval of a systematic collection of studies, and Section 4 provides an overview of the findings, Section 5 discusses the results and makes some suggestions for further research and Section 6 makes concluding remarks.

2. Background

2.1. Digital taxation

Tax administrations are the lifeblood of any economy and critical to the success of the government's digital agenda. In line with the broader digital transformation of government, the core mission of the tax administration has also evolved alongside it. As Vasconcellos and Rua (2005) note, tax authorities see themselves not just as tax collectors but as providers of a range of tax services ranging from information provision, taxpayer assistance and tax education. The taxpayers are now increasingly seen as customers entitled to receive benefits in the form of public services in exchange for their tax obligations.

Success in implementing electronic taxation is necessary for any digital-friendly government due to the unavoidability of taxes and the fact that it provides the broadest reach of engagement between a government and its citizens regardless of demographic characteristics (Economides & Terzis, 2008; Wang, 2003). Due to the proliferation of e-commerce and mobile application tools they use daily, taxpayers have high expectations concerning the services they expect from their governments.

Nevertheless, while many in the literature have talked about the benefits of increased digitalisation, such as greater monitoring and supervision of financial expenditure, lower incidences of corruption, good governance, and lower income inequality, these benefits cannot be assumed and taken for granted (Robbins, Mulligan, & Keenan, 2015; Schuppan, 2009). Indeed, others in the literature have been critical of the high failure rate of e-government projects, of which digital taxation is not an exception. According to Mergel (2016), 94% of such projects are over budget in the United States, and 40% are never finished. For Heeks (2005), in developing countries, that figure could be as high as 85% (35% are total failures, 50% are partial failures).

Several reasons have been theorised in the literature for this failure; For Bakunzibake (2016), particularly for countries that came later to the digital revolution, it's a lack of technological readiness. As they put it, many of these countries which had hoped to leapfrog 'technological generations' to access cheap, subsidised and readily available technological options without going through the various stages in the technological life cycle may find it harder to adapt. For Gunawong and Gao (2017), it is the failure to integrate multi-stakeholder perspectives all through the process that's the problem.

Other concerns include corruption (Aladwani, 2016), design-reality gaps (Heeks, 2005), and issues relating to system implementation and organisational change (Al-Rashidi, 2010). They all have in common an acknowledgement that the technology itself is not the problem but rather the difference between the actual technology and the rather complex social context in which the technology will operate, such as people, political environment, and cultural differences, essentially the broader ICT ecosystem.

These different arguments in the literature suggest the need for a synthesis of digital taxation research to understand the broad spectrum of factors critical to its success. This paper contributes to this gap in the literature by providing a synthesis of research findings in the literature allowing us to identify the research gaps and develop a conceptual framework for future researchers on the subject.

2.2. Digital taxation ecosystem

Based on the e-government literature, we use the ICT[2] Eco-system model (see Fig. 1.1) to analyse the relevant literature. The concept of an 'ICT Eco-system' in the context of digital government was popularised by the Open E-policy group, which defines it as encompassing….

> …the policies, strategies, processes, information, technologies, applications, and stakeholders that together make up a technology environment for a country, government, or an enterprise. Most importantly, an ICT ecosystem includes people –– diverse individuals who create, buy, sell, regulate, manage, and use technology (Open e-Policy Group, 2005, p.3).

From this definition, It's clear that the 'technology' does not exist in a vacuum, and it's poorly served in a closed, technical system. Instead, the concept of an ecosystem recognises that ICT applications must be embedded in the wider environment, appreciative of the cultural,

[1] Digital taxation is used interchangeably with E-tax and E-taxation. E-taxation is a major part of the wider digital focus of this paper.

[2] ICT is used interchangeably with digital.

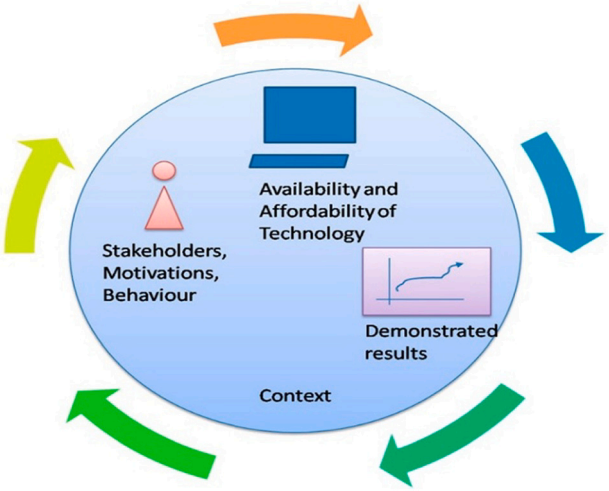

Fig. 1. The digital taxation ecosystem (Canares, 2016).

political, spatial, and economic characteristics where it finds itself (Smith & Elder, 2010).

Indeed, the interactions of ICT across various actors in different systems of political leadership, governance, innovation, economic systems, literacy, and citizenship means that inevitably the components of an ICT Ecosystem must vary from one country context to another. It's important to recognise these differences, particularly between the developed and the developing world (Diga & May, 2016). There is also a need to be mindful of the different players critical to the sustainability of a functioning ICT Ecosystem. This requires an appreciation of the social and demographic dynamics influencing the full participation of various groups in that particular country context. A proper ecosystem analysis must consider age, gender, social class, education, computer literacy, geography, and other characteristics (Diga & May, 2016; Pippin & Tosun, 2014).

Digital taxation is, therefore, a system that fits with the ecosystem approach given it arguably leans heavily on the engagement of actors outside of the revenue authorities to succeed. This is because of the wide-ranging impact taxation can have on the economy ranging from changing taxpayer behaviour, ease of doing business, inequality, poverty, and fiscal policy (Okafor, 2012; Petutschnig, 2017).

In keeping with this perspective, Chen, Jubilado, Capistrano, and Yen (2015) concur that the success of tax administration and its reforms depends on effective engagement between the tax authority and its stakeholders. Notably, there has been engagement by a range of international institutions such as the Platform for Collaboration on Tax which is a platform where the International Monetary Fund (IMF), the World Bank Group (WBG), the Organisation for Economic Cooperation and Development (OECD) and the United Nations (UN) come together to discuss international taxation issues.

Therefore, in line with Canares (2016), we argue that the digital taxation ecosystem must recognise the following – the role of stakeholders, their motivations, and behaviours both in their dealings with the tax authority and in their interactions with one another; the role of context, particularly concerning the process in which digital taxation is facilitated and encouraged in a local environment, the availability and affordability of the e-taxation services both in terms of software and hardware and finally, the results from the application of e-taxation through an exploration of its expected costs and benefits.

This digital taxation ecosystem will serve as the analytical model through which the literature on digital taxation for this study will be systematically analysed and will address the gap in the literature, which may then be explored by future researchers in exploring the success or failure of various digital services provided by governments.

3. Method

This paper follows a systematic literature review approach. This is defined by Fink (2019) as.

> A systematic, explicit, and reproducible method for identifying, evaluating, and synthesising an existing body of completed and recorded work produced by researchers, scholars, and practitioners.

In contrast to other literature reviews (narrative or scoping reviews), this review method, with strict inclusion and exclusion criteria, aims to ensure a replicable review process and minimise bias. In this vein, the authors apply the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) guidelines (Moher, Liberati, Tetzlaff, Altman, and Prisma Group, 2009).

Therefore:

- We decided on the keywords for the search
- We decided on the sources for the search
- Applied the keywords on the sources
- Used inclusion and exclusion criteria to arrive at the articles which were ultimately reviewed.

3.1. Search strategy

According to Twizeyimana and Andersson (2019), any structured literature review must focus on the major journals in that field. We collected academic articles from four international research databases: The Digital Government Reference Library (DGRL) 16.0 (of June 2020), Web of Science, Business Source Complete (EBSCO), and Scopus (Zuiderwijk, Chen, & Salem, 2021). These four databases were chosen because they are four large bibliographic databases covering social sciences, including the sub-disciplines covering e-government, taxation, and management information systems.

To ensure accuracy and the broadest inclusion in our search, the authors applied a broad definition of digital taxation which means the application of Information and Communication Technologies (ICT) to any tax function. This definition, therefore, includes tax matters which the 'revenue authorities' may not manage but would be considered a tax in other jurisdictions, e.g., customs duties that the Nigeria Customs Service receives as distinct from the tax authority (Okafor, 2012).

Therefore, to identify the articles that will be used for this review and given that digital taxation is made up of two domains – E-government and Taxation, the search terms were divided into two, and then keywords were combined using the AND/OR Boolean operators. The first domain focused on e-government and contained the keywords "*E-government, E-governance, Electronic Government, Electronic Governance, Digital Government, Mobile Government, Smart Government, Information Technology, Information and Communication Technology, One stop government, One Stop governance.* The second domain focused on Tax and contained the keywords "*Tax Administration, Taxation, Tax, Tax Official, Revenue Service, Revenue Administration*". The Boolean Operators were then used to have multiple combinations of the two domains such as "*E-government AND Tax OR Revenue Service", "Information Technology AND Tax Administration or Tax", "Mobile Government AND Tax*", and so on until all possible combinations had been exhausted.

In addition to the academic databases, we searched OECD Reports and working papers exploring the subjects focused on in this review. Backward references led to the discovery of some articles that were also included (Hassan & Hamari, 2020).

3.2. Study selection

Even with the application of the search terms, many articles will still be irrelevant, particularly in answering our research questions, regardless of whether the keywords appear in the abstract, title or both. Thus,

the authors have to set defined inclusion and exclusion criteria. Publications that meet the inclusion criteria were selected for the study.

3.2.1. Inclusion criteria

Publications that meet the following criteria are included:

- Published in English as a peer-reviewed journal between the years 2000–2020.
- That the subject of digital taxation is crucial to the theoretical development, methodology or results of the study.
- Discuss at least one of the components of digital taxation defined by Canares (2016).
- That the research output is accessible to the researcher for evaluation.

3.2.2. Exclusion criteria

Publications that meet the following criteria are excluded

- Studies that include some keywords but do not focus on digital taxation or any part of its ecosystem.
- Studies that focus on taxation of e-commerce.
- Studies that focus on digital taxation exclusively from a private sector management perspective.

To ensure scientific rigour, books, book chapters, conference proceedings, and other grey literature were excluded as they are often not peer-reviewed and/or not empirical (Dekker & Bekkers, 2015). Please see the PRISMA Flow Chart in Fig. 2 for our process for deciding on articles to be included in the review.

3.3. Data extraction and analysis

One of the authors extracted information from all included studies using a structured form containing the following fields: Authors, year of publication, Country of Focus, Research Aims and Objectives, Model-Framework and Findings (see Appendix A). The other authors then verified this extracted information. Extracted studies were then coded using the ICT Eco-system approach outlined in the literature review (see Fig. 2).

4. Results

4.1. Publication characteristics

The characteristics of the ninety-six publications that form the basis of the final review are shown in the tables below. As Fig. 3 shows, there has been a marked increase in the research on digital taxation, especially between 2016 and 2020, peaking in 2018, which shows the increasing attention being paid to this area by researchers in recent times.

In line with best practice, as shown in the systematic review by Tursunbayeva et al. (2019), we categorise our research based on geography and research methods. In Fig. 4, we can see that the bulk of the research was conducted with countries in Europe, Asia, and North America (N = 65; 68%), but research was based on countries in Africa, the Middle East, South America, and Australia are lacking (N = 17; 18%). Multi-country reports (N = 10; 10%), cross-country studies (N = 3; 3%) and no country focus (N = 1; 1%) make up the remainder.

Furthermore, Fig. 5 suggests that this obfuscates the picture a bit, as a significant bulk of the research in Asia is on developed and western friendly countries such as Hong Kong, Singapore, and Taiwan. All in all, developed countries comprise 58% of the research, with developing countries comprising just 31%.

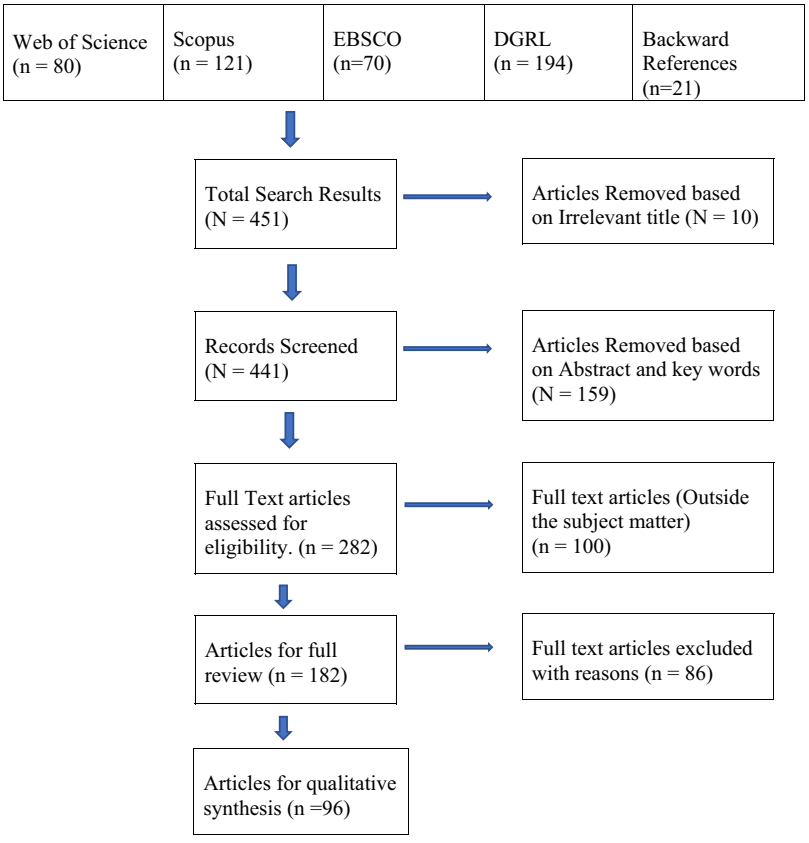

Fig. 2. PRISMA flow chart.

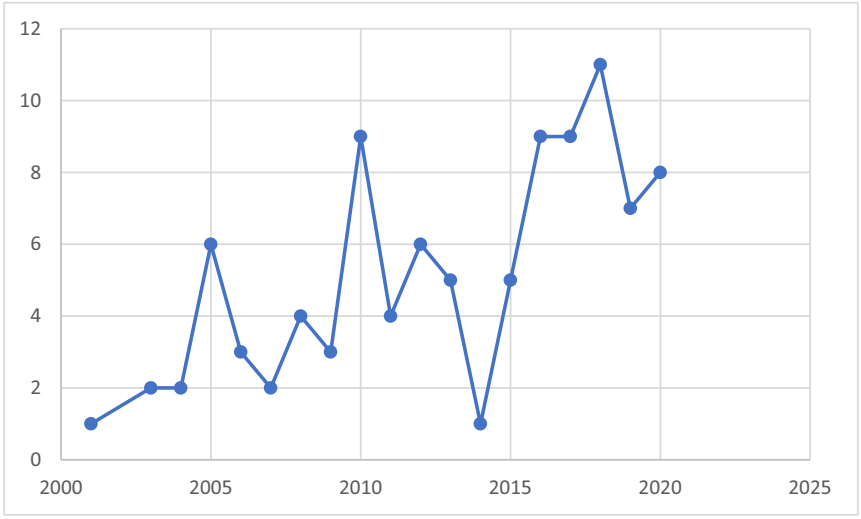

Fig. 3. Year of publication.

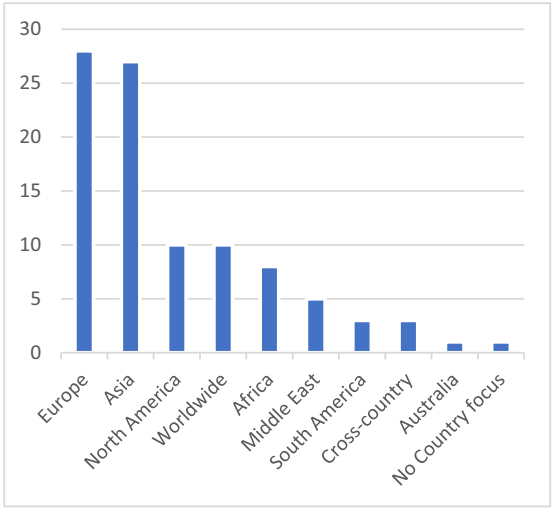

Fig. 4. Journal publications by region.

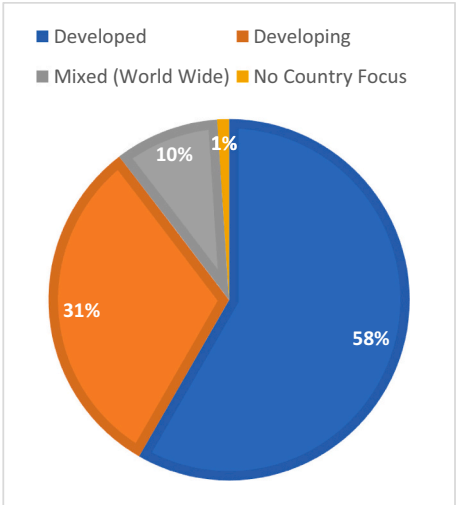

Fig. 5. Publications by country development status.

As Fig. 6 shows, Quantitative studies comprise a significant majority of research in this area (N = 56; 58%). The rest of the studies are either qualitative (N = 36; 38%) or mixed methods of quantitative and qualitative approaches (N = 4; 4%).

Among the publications under review, questionnaires comprise about 73% of the quantitative research studies and 43% of all studies. For qualitative studies, the majority were either case studies comprised 36% of all qualitative studies, and comparative or exploratory analyses, comprised 6% each. Interviews were never used exclusively except as a package of several qualitative methods known as Multi-Methods (N = 7, 7%). A detailed breakdown is provided in Figs. 7 and 8.

4.2. *ICT ecosystem*

The authors use the Ecosystem approach to review the literature on digital taxation as its framework of analysis, as depicted in Fig. 1. They are described below:

4.2.1. *Context*

Understanding context involves an examination of the domains of governance in which ICT initiatives in digital taxation sit (Davies, Perini, & Alonso, 2013). This may be taken to examine the policies and processes in the political governance realm (Gil-García & Pardo, 2005) and the political environment that influences these policies and processes (Davies et al., 2013).

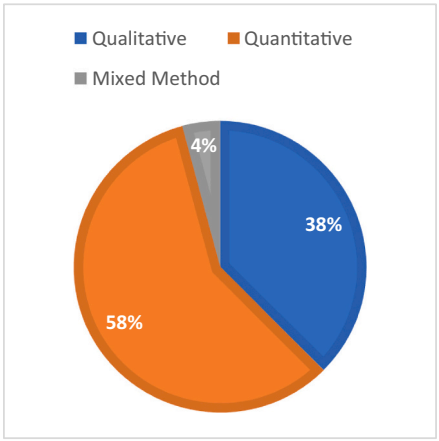

Fig. 6. Publications by methodology.

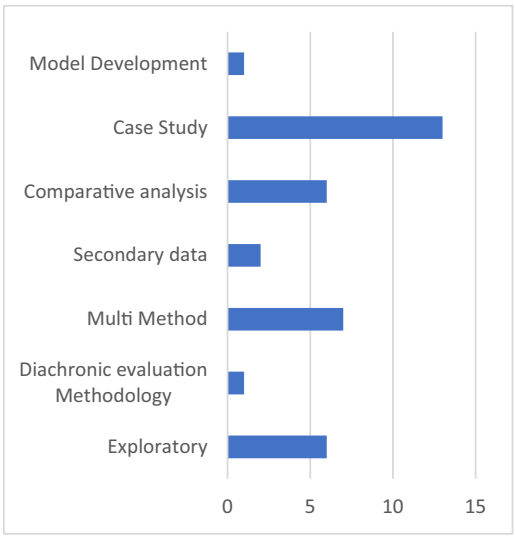

Fig. 7. Breakdown of qualitative studies.

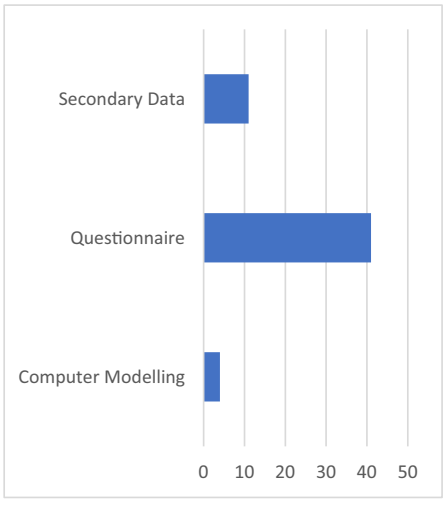

Fig. 8. Breakdown of quantitative studies.

In Table 1, context shapes the proliferation of digital taxation through five themes: Private Sector Advancement, multilateral institutions, and the domestic political environment, aid agencies and the legal framework.

The Internet boom of the 1990s and the corresponding digitalisation of the private sector and its associated benefits led to calls for E-government to transform the way civil servants work (Grönlund & Horan, 2005; Dečman and Klun, 2015). Adoption of digital taxation can therefore be seen to some extent as a need to keep up with the 'in thing' in the private sector and replicate the changes happening to the private sector.

Table 1
Themes and Explanations under the Context Category

Category	Themes	Explanations
Context	The impact of Private Sector Digitalization	Dotcom boom of the late 1990s; private sector ICT sophistication.
	The influence of Multilateral Institutions	The role of the Platform for Collaboration on Tax (IMF, UN, WBG and OECD); The International Tax Compact etc
	The Influence of Country Aid Agencies such as Australia Aid, DFID, USAID etc	The role of Australia Aid, UK DFID, USAID among others
	The Political Environment	The Influence of political actors, strength of political institutions and the role of political ideology
	Legal Framework	Laws on cybersecurity and data protection.

As Robbins et al. (2015) put so succinctly, this is particularly crucial for a tax administration as its success depends on a successful engagement with the private sector and computer-literate taxpayers. It is perhaps not surprising that significant e-filing programs were public-private partnerships such as the IRS E-file program and the Revenue Online Service of the Irish Revenue (Holden & Fletcher, 2005; Robbins et al., 2015). In addition, countries are increasingly seeing digital taxation as a tool for boosting private sector growth (Eboibi & Richards, 2019).

Additionally, the international environment has been very emphatic about its support for digital taxation capabilities. Perhaps unsurprisingly, given the highly advanced private sector, educational literacy and commitment to research and development that G7 countries are making advancements in digital taxation. However, support from multilateral institutions and national aid agencies has ensured that e-government is firmly on the agenda worldwide (Bentley, 2019; Prichard, Brun, & Morrissey, 2012).

Our review suggests that multilateral institutions, particularly members of the Platform for Collaboration of Tax such as the UN, IMF, WBG, and OECD have been at the forefront of digital government, conducting multiple reports and lobbying governments to improve their digital capabilities (Cotton & Dark, 2017; OECD, 2016a; OECD, 2016b). The International Tax Compact (ITC) is also doing critical work on improving tax administration in developing countries (Blume & Bott, 2015).

National aid agencies are not far behind; the German Technical cooperation, the US Agency for International Development (USAID), the UK Department for International Development (DFID) and Australian Aid are some of the notable agencies that are highly focused in providing aid for developing countries to engage in digital taxation services (Canares, 2016; Jimenez, Macant Sionnaigh, & Kamenov, 2013).

This focus is not just because e-government is seen as a good development by these agencies but particularly, in the context of tax, they are keen to impress that aid is not a substitute for tax and are engaging with political actors to create momentum for tax reform particularly through the use of conditionality with mixed results (Prichard et al., 2012). Ultimately, they are sensitive to the need not to create a moral hazard preventing developing countries from strengthening their tax systems.

On a national basis, the political environment also significantly influences E-Tax systems' development. Hale and McNeal (2011), supported by Bhuasiri, Zo, Lee, and Ciganek (2016), provide some interesting observations regarding the influence of political actors, the strength of political institutions and even differences in political ideology. According to them, the responsibility for tax collection rests in the executive branch. Still, the legislature's influence can be very significant depending on the amount of powers granted to it under the country's constitution and accompanying laws. IT development was more likely when the head of government had strong executive power either by strong will or backed institutionally. This is further enhanced if the executive branch party is strong electorally in the legislature and in other elected positions.

Interestingly, the impact of political ideology was inconclusive. IT development was more likely when the political environment had a 'long liberal' influence. However, neither the ideology of the elected officials in charge nor party leaders was significant. Political Instability also strongly impacts IT development, as environments plagued by constitutional crisis, war or squabbling executive-legislative battles have less room for stable IT development.

Despite influences from a wide range of sub-national, national and

international contexts, appropriate legislation on digital taxation remains an under-researched part of the literature. Only one research, Dečman and Klun (2015), highlight how the e-recovery act was essential to execute the electronic recovery system in Slovenia appropriately.

In recent times, given technological advancement, cyber security is becoming an increasing concern for citizens in developed and developing countries. For Hatfield (2018), this problem should not be seen as a technological problem but as a legal problem for parliaments to solve, for example, by tightening up data protection laws. Nevertheless, Eboibi and Richards (2019) notes with regret in their study that as at their time of writing, only eight African countries had signed up to the African Union Convention on Cyber Security and Personal Data Protection.

4.2.2. Stakeholders

As Walton (2013) puts it, there is a need to understand the various stakeholders involved in e-government development. This involves a cursory look at their motivations and behaviours within a digital environment, how they are affected by this environment, and how it affects them. Most articles under review focus on this section of the ICT ecosystem.

In the review, as shown in Table 2, the discussion of stakeholders consisted of three themes: Stakeholder Identification, Stakeholder Motivation and Stakeholder Equity.

Stakeholder identification is not always as straightforward as it looks. The literature is clear on two stakeholders: The tax administration (or more precisely, "tax officials") and citizens. This isn't surprising as they are the primary givers and receivers in the process of paying taxes, but the entire ecosystem is far broader. Nevertheless, the literature contains varying views on what other stakeholders are crucial to the tax process, as shown below.

While there is significant support in the literature of simply dividing stakeholders into taxpayers, tax officials, and agents (Mousa, 2013), this is perhaps simplistic because what constitutes an agent is itself vague as Pinho and Macedo (2008) finds, noting that certified accountants can be both user and agent at the same time. More importantly, as Canares (2016) argues, stakeholders outside government are essential if a citizen-centric vision of tax administration through technology is the goal. He provides an alternative description of the relevant stakeholders and includes taxpayers, tax officials, trade associations, scientists, academics, local media, and civil society organisations.

This somewhat exhaustive definition is also problematic because it seeks to identify all possible stakeholders in every context when this varies from country to country. Fedorowicz, Gogan, and Culnan (2010) address this much better, arguing that stakeholders are divided into primary and secondary stakeholders.

Primary stakeholders are those who provide or process taxpayer data and secondary stakeholders who do not. They identify stakeholders who fit into either of the two categories in their particular context: taxpayers, tax authorities, and data providers. Secondary stakeholders - legislators, professional or trade associations, public interest organisations, individual businesses, and the media, but what's important is the recognition of the two categories of stakeholders regardless of context.

Table 2
Themes and Explanations under the Stakeholder Category

Category	Themes	Explanations
Stakeholder	Stakeholder Identification	They span the gamut of tax officials, taxpayers, trade associations, scientists, academics, local media, and civil society organisations
	Stakeholder Adoption	Adoption models include Technology Adoption Model (TAM); Trust, Unified Theory of Acceptance and Use of Technology (UTAUT); Trust, Service Quality etc
	Stakeholder Equity	They include social inequity, geographical equity, cultural equity, and economic equity among others

Among users of e-tax services (broadly defined), there are many ways they could be grouped further. According to Liang and Lu (2013), one way is to divide the users based on receptiveness to technology. There are commonly five groups – innovators, early adopters, early majority, late majority, and laggards. This can be very useful for effective management, enabling a tax authority to understand how to tailor its technological packages better.

Another way is through understanding their purpose for using e-tax services – interactors and information seekers. Interactors prioritised feedback as opposed to information seekers who prized information availability leading to varying assessments of e-tax services by the two groups. A tax authority needs to be sensitive to this (Barnes & Vidgen, 2004).

Yet another approach is to evaluate based on their tax compliance disposition, and there are three groups - those for whom voluntary compliance is dependent on a perceived efficient tax administration; those who are made to fulfil their tax obligations under compulsion and those who refuse to fulfil their obligation regardless of the performance of the tax administration (Vasconcellos & Rua, 2005).

Holden and Fletcher (2005) provide a new innovative approach, seeking to link all tax stakeholders through the lens of a virtual chain. In their view, digital taxation could be perceived as the promoter of organisational change through a redesign of the delivery of services by the tax administration to a range of key stakeholders, including customers, suppliers, partners, and employees (Beynon-Davies, 2005).

For these theorists, the Tax authorities exist in a value chain that includes the tax preparers, transmitters, software developers and other third-party groups. They argue that a value chain analysis may be an essential way of examining greater adoption and responsibilities in the marketplace for e-government (Beynon-Davies, 2005). In an increasingly digital environment with more emphasis on partnerships between the public and private sector, government information exists in a virtual value chain. The increasing frequency of global tax authorities feeling the need to go out and market their services demonstrates a critical value chain activity.

The second conceptualisation in this section is the stakeholder motivation and behaviours. What motivates stakeholders to adopt digital taxation, as outlined in Table 1, forms the majority of research in the digital taxation literature. This area has been covered extensively in the broader e-government literature, and stakeholder adoption has been the subject of several reviews (Granić & Marangunić, 2019; Turner, Kitchenham, Brereton, Charters, & Budgen, 2010). As part of our systematic review, we highlight these models in Table 3.

Although there are several models, there doesn't seem to be a generally agreed upon model with researchers combining one or more models when evaluating stakeholder adoption in various country contexts. There is a need for a meta-analysis of all the models in the field to identify the factors which are or are not significant. While this is a worthy area, this paper instead focuses on understanding the life cycle through which electronic capabilities are developed and integrated into their activities. Stakeholder adoption is only a small subset of that.

The final conceptualisation is stakeholder equity. An ecosystem analysis of stakeholders requires not just identifying various ways stakeholders and users can be categorised and why, but also the inequities among stakeholders, especially users. As Pippin and Tosun (2014) opine, there is a lack of equal opportunity in the access and availability of e-tax services. This is best represented in the figure below.

As shown in Fig. 9, the literature has shown inequities in the access and availability of e-tax services on race, education level, age, geography, social class, whether the taxpayer is disabled or non-disabled, immigrant and/or native speaker, low-income or not. Gender differences are inconclusive.

Many recommendations have been provided to address this, including the government providing universal internet coverage and connectivity, establishing data points in rural areas, explanations to make the navigation clearer and avoidance of technical jargon or

Table 3
Papers Focused on Stakeholder Adoption in Tax Administration.

Model	Authors
Technology Acceptance Model (TAM)	Azmi, Kamarulzaman, and Hamid (2012); Azmi and Bee (2010); Carter and Bélanger (2005); Chang, Li, Hung, and Hwang (2005); Dorasamy, Marimuthu, Raman, and Kaliannan (2010); Fu, Farn, and Chao (2006); Hussein, Mohamed, Ahlan, and Mahmud (2011); Maiga and Asianzu (2013); Ojha, Sahu, and Gupta (2009); Sijabat (2020); Stafford and Turan (2011); Wang (2003).
Theory of Planned Behaviour (TPB)	Fu et al. (2006); Hung, Chang, and Yu (2006). Stafford and Turan (2011); Wang (2003); Zaidi, Henderson, and Gupta (2017).
Unified Theory of Acceptance and Use of Technology (UTAUT)	Bhuasiri et al. (2016); Carter, Schaupp, Hobbs, and Campbell (2011). Schaupp, Carter, and McBride (2010).
Delone and Mclean IS Success Model	Akram, Malik, Shareef, and Goraya (2019); Chen (2010); Chen et al. (2015); Floropoulos, Spathis, Halvatzis, and Tsipouridou (2010); Mellouli, Bouaziz, and Bentahar (2020); Shim and Song (2016); Veeramootoo, Nunkoo, and Dwivedi (2018).
Diffusion of Innovation (DOI)	Carter and Bélanger (2005); Dorasamy et al. (2010); Hussein et al. (2011); Liang and Lu (2013); Nurdin and Khairunnisa (2018); Valsamidis, Petasakis, Kontogiannis, and Perdiki (2019)
Service Quality (SERVQUAL)	Barnes and Vidgen (2004); Connolly, Bannister, and Kearney (2010); Pinho and Macedo (2008); Pinho and Macedo (2008). Saha, Nath, and Salehi-Sangari (2012).
Perceived Characteristics of Innovating	Hussein et al. (2011); Ojha et al. (2009)
Trust	Carter and Bélanger (2005); Carter et al. (2011); Mellouli, Bentahar, and Bidan (2016); Schaupp et al. (2010); Valsamidis et al. (2019).
Others include: Hoftstede Cultural Values (Zaidi et al., 2017), Technology Readiness Index (Dorasamy et al., 2010) and Expectance Confirmation theory (Veeramootoo et al., 2018).	

Note: Some references appear more than once as they use multiple models.

complicated features (Economides & Terzis, 2008), reducing the normal of advertisements which can clutter a web page (Escarfullet, Jantzen, Tucker, & Wei, 2010), making senior-friendly websites and software tools (Becker, 2004), improving visual capacity (Wu, Ou, Lin, Chang, & Yen, 2012) and setting up call centres (Abadi, Abadi, & Jafari, 2017).

For developing countries, there is the added issue of many of these e-payments incurring expensive transaction fees, which can be problematic for struggling households and make them less likely to use e-tax services (Denison, Hackbart, & Yusuf, 2013).

In conclusion, the importance of understanding the role of demographic characteristics in this digital era is more essential due to the evolution of western societies towards a "multicultural, more open and international society with changing common values, increasing levels of education, demographic involvement and adoption of new technologies" (Stojanovic, Stojanovic, & Apostolou, 2006). A tax administration can improve its effectiveness when stakeholders' issues are adequately addressed.

4.2.3. *Technology*

The type of technology developed needs to fit the context for which it is being designed for it to be effective. The affordability and availability of technology are critical to ensure execution and operational flexibility. This section, as shown in Table 4, focuses on three main issues: Tax data, decision-making regarding building E-tax applications in-house or outsourcing and appraising the quality and use of the various e-tax

Table 4
Themes and Explanations under the Technology Category

Category	Themes	Explanations
Technology	Tax data	Considerations include issues on error management, dealing with obsolete data and ensuring updates.
	Decision to build inhouse or COTS	Considerations include cost, government bureaucracy, stakeholder participation and ICT expertise
	Technology use	Considerations should be given to purpose, website quality, security and sophistication when deciding on the right technology application.

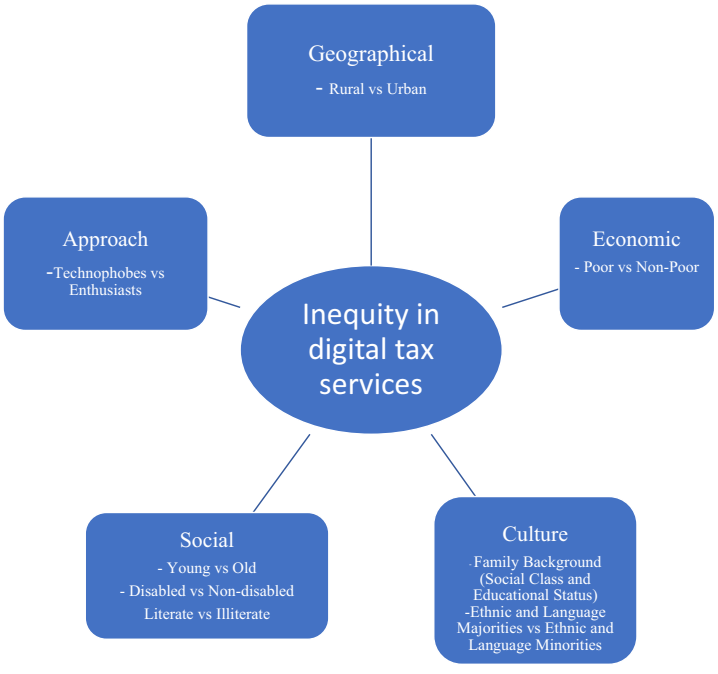

Fig. 9. Inequities in digital tax services.

services.

Data management and quality is an important issue for a tax administration. As outlined previously, one of the major reasons for the adoption of e-government in tax administrations is its large amount of data and the need for precision, which can also be problematic. As Missier et al. (2003) find, the quality of taxpayer data is by no means a settled issue and is affected in various ways. Furthermore, identifying problems stemming from the quality of data stored in databases can be difficult because of data volume and the variety of ways errors could have been introduced in a system (Boydens, 2011). Another issue which is overlooked but equally important is the ability of information to become stale due to a lack of updates which can erode trust (Kinder, 2010).

Some possible solutions include identifying obsolete and incorrect taxpayer address records and assessing the timeliness of the tax returns. It is argued that this might be insufficient. There is a case for conducting data cleaning without process analysis, but this is just a stopgap solution, with some going further, calling it a waste of money until processes that supplied the data are reengineered to avoid contaminating a freshly cleaned system.

There is also a considerable discussion in the literature on the decision process in developing technologies that tax administrations use. There are typically three options, according to Pierson and Thompson (2016) – Build in house, Commercial off the shelf (COTS) and transfer (this involves borrowing a bespoke system from another context or even country and making some alterations to fit a need with the aid of IT specialists). In addition, where a decision has been made to purchase off the shelf or transfer, a range of funding and ownership arrangements can occur, as identified by Shukla, Panchal, and Shah (2014). Most authors agree that it would have been preferable to build in-house in an ideal situation, but this might be undesirable.

As outlined in the private-public gap earlier, there are several reasons why E-tax development may not be desirable in-house, including but not limited to sprawling government bureaucracy, inability to hire highly skilled ICT experts and the simple fact that the public sector doesn't always yield itself well to innovation (Heeks, 2005). Consequently, many authors agree that government should contract out the design and operation of the IT systems in the tax administration to private sector professionals. In this school of thought, purchasing computerised off-the-shelf systems (COTS) from computer specialists with a proven performance will be ideal, where the productive efficiency of contracting out has support (Levin & Tadelis, 2010).

Canares (2016) outlines an alternative position, criticising the idea of COTS as optimal. Arguing that it makes digital taxation initiatives appear as a top-down approach, inhibiting participation of stakeholders in its conceptualisation and diminishing a sense of ownership. Also, particularly in the cost of public sector contracts, it can be more expensive in certain situations (Levin & Tadelis, 2010). Stakeholders' roles are relegated to the role of mere trainees, users, or beneficiaries. This is a view shared by Mousa (2013), who emphasises the importance of inhouse support and inhouse technical expertise and knowledge, especially after the initial e-government installation, to be essential for sustainability purposes.

Fortunately, even in this scenario, Pierson and Thompson (2016) ensure that an effective and engaging communication process during the launch of the COTS where stakeholders can ask questions and be carried along can help address this. Ultimately, Pierson and Thompson (2016) believe that decisions are best made through 'joined up' national governance planning committees, which can see the bigger picture rather than devolving this decision to a tax administration which often does not have that strategic, operational orientation.

Finally, appraising the quality and requirements of e-services dominates the rest of the literature in this part of the ecosystem. The most traditional digital taxation application is the various portals providing different kinds of e-tax services and how sophisticated it should be. Many criteria have been identified in the literature for assessing the quality.

For Barnes and Vidgen (2006), co-opting from the E-Qual model for e-commerce websites, six criteria are essential for assessing website quality – usability, design, information, quality, trust and empathy. Choudrie, Ghinea, and Weerakkody (2004) focus use of website diagnostic tools (e.g. WebXact, Netmechanic, Validator, Vizcheck). WebXact focuses on accessibility, privacy and quality, Netmechanic deals with broken links, Validator is responsible for validating the HTML code, and Vischeck examines how the colour schemes on websites affect people with some form of colour blindness.

There is also the website heuristic evaluation methodology developed by Hughes, Ahluwalia, and Midha (2013) and, specifically, its software quality assessment which is noteworthy as it is explicitly focused on the tax administration context, exploring, for example, the Singapore tax estimation tool and the US Income tax withholding estimation tool. Perhaps, a more comprehensive website quality index that encompasses the above two methods is used by Economides and Terzis (2008), which includes five criteria – Content, presentation, usability, technical, e-services and interactivity.

Although often overlooked, the quality of the website and its technical features can strongly impact user satisfaction aside from other social and human factors outlined in the previous section.

In choosing the technology, one must consider its use. For routine tax administration duties such as feedback, inquiries, and payments, then a website is desirable, and there is a need to improve what's already available. Still, other services require specialised services. For example, tax administrations interested in predictive capabilities to identify individuals who are least likely to pay their total taxes on time might look to data analytics, with automated audit selection processes, particularly prominent.

Data Mining and Business Intelligence software are particularly prominent, for example, in successfully predicting who is more likely to pay or default on estate taxes (Bakırlı et al., 2012). In Ireland, the PAYE system helps taxpayers pay their taxes online. Data mining also helps segment the population according to age groups, income levels and level of engagement (Clancy, Manai, & Cleary, 2010).

Notwithstanding the benefits of data mining, there are increasing concerns regarding privacy and security by citizens, and any new rollout might spark backlash. Hence, Fedorowicz et al. (2010) advise that a tax bureau carry out a privacy impact assessment before rolling out any new data mining initiative.

Ensuring a citizen-centric tax administration requires forward-thinking policy makers to not just excel in the provision of e-tax services but also to work towards engaging with advanced disruptive technologies such as blockchain, artificial intelligence and Internet of things and more innovations in their use of citizen participation platforms and mobile applications which are the technologies of the future (Mulligan & Ojo, 2019; Nawafleh, 2018).

4.2.4. Demonstrated results

Like any new public sector reform, it is crucial to appraise the success of digital tax services through its associated costs and benefits, as explored in this section. We divide them into three, as seen in Table 5.

Digital taxation has made notable gains, benefiting taxpayers and tax officials. There are efficiency gains such as the elimination of errors and less administration checking as well as effectiveness gains such as the availability of e-tax services anytime and anywhere, automatic confirmation of the receipts of returns and payments, ability to deploy more people to the front line, personal portals for taxpayers and completion of tax forms easier and faster (Beynon-Davies, 2005). Tax officials also report increasing work motivation due to the speed of the system (Dečman & Klun, 2015).

There are also risks to the tax administration – technology can provide a means for sophisticated individuals and firms to hide sensitive information or evade taxes. Zappers are used to evade taxes, and individuals may use cryptocurrencies to conduct business transactions

Table 5
Themes and Explanations under the Demonstrated Results Category

Category	Themes	Explanations
Demonstrated results	Net-benefits to taxpayers	This includes cybersecurity risks, effectiveness gains, efficiency gains and possible loss of human interactions
	Net-benefits to tax officials	This includes better work motivation, more accuracy, etc.
	Net-benefits to society	This includes possible benefits in terms of good governance, corruption control and citizen engagement
	Cost savings	Administrative costs, fixed costs, support costs etc.

without leaving any trace, for which criminals have been assiduous in circumventing new rules (IMF, 2018; Taplin, 2017).

For taxpayers especially, other risks persist regarding privacy and digital surveillance, theft of sensitive information due to hacking and a trust crisis due to eliminating a lot of human interactions (Hatfield, 2018).

Due to the centrality of taxation to the economy, the contribution of digital taxation to society is also critical. For Smith (2010), due to digital taxation being developed for efficiency benefits, improvement in citizens' trust may not be achieved even with a sophisticated e-tax system. This might be due to what's called 'noticeability', and indeed, one reason tax administrations focus on e-government in the first place is perception. If the taxpayers cannot perceive any noticeable change in political governance or their way of life, it might be a failure even if there are tangible results. Communication, therefore, is vital.

What taxpayers may be very likely to perceive is if digital taxation can make a notable contribution to society through good governance, as outlined by Schopf (2020). The contribution of digital taxation to regulatory quality and corruption control are also meaningful goals that will garner strong public support, especially in the context of developing countries facing high levels of corruption and inadequate regulation to address them (Bertot, Jaeger, & Grimes, 2010). Evidence from Okafor (2012) and García and Cuello (2017) suggests digital taxation reduces tax evasion. Still, Kochanova et al. (2020) find no evidence to suggest digital taxation reduced bribery to public officials.

Another noticeable result would be the quality of life. Maiga and Asianzu (2013) argue that the goal of e-government should not be to improve efficiency, a cost-cutting exercise or any other internal public administration reform but to the betterment of the average person on the street. Floropoulos et al. (2010) hold that improving the quality of life can be achieved by reducing bureaucracy and increasing transparency.

The contribution of digital taxation to another societal value, citizen engagement, is mixed. However, there was some fanfare, especially in the initial stages of e-government, about digital taxation leading to increased avenues for citizen engagement. Haider, Shuwen, Lalani, and Mangi (2015) find, that the tendency to distort and manipulate information in the public sphere is not helped by this new media (social media). If anything, this trend has been amplified by the new media applications. The contribution of e-services to a more informed citizen-led democracy has become a much more contested opinion in recent times as illustrated in a narrative-led literature review by Sundberg (2019).

Finally, although many e-tax projects are often engaged, at least initially as a cost-saving exercise, the evidence for significant cost savings is mixed, despite widely held beliefs about its financial benefits. In Romania, for example, the total costs of the e-tax project (hardware, software, labour, and support costs) stood at €189,500. The financial benefits stood at € 95,700 (Staff savings, quicker revenue collection and reduction in delivery time). The project's net present value over three years stood at a significant -€ 51,000 (Decman et al., 2010). A similar dynamic happened in Germany, where their electronic data interchange found no considerable cost reduction (Eichfelder & Schorn, 2012). On the other hand, Japan and Ireland found significant cost savings due to the switch to digital taxation (Chatfield, 2009; Robbins et al., 2015). There is a need for more research on this phenomenon and perhaps the need to consider national contexts.

Arguably policymakers need to be attentive to the possibility that tax authorities may be saddled with higher fixed and operating expenses as a result of ICT for a significant amount of time but if done well, should increase revenue collection and champion the democratic values under which all public sector organisations should carry out its duties.

4.2.5. *The connection of all four categories*

As Fig. 1 illustrates, the ICT Eco-system is a cycle. As such, these concepts influence and interact with each other as can be noticed in several of the case studies based on digital taxation in the literature.

Studies show that other factors influence demonstrated results. A good example is the emerging issue of cyber-security, which cuts across all four criteria. There is a need for significant legal backing on cyber security, such as adopting the African Union Convention on Cyber Security and Personal Data Protection by African countries (Eboibi & Richards, 2019) or the General Data Protection Regulation (GDPR) of the European Union. An appropriate legal framework on data privacy and cyber security could in turn smooth stakeholder adoption due to increased trust in the ICT system that is being provided, further providing efficiency gains.

5. Discussion

5.1. *Conceptual framework*

As shown in the analysis in chapter four, the literature on digital taxation and what is required for successful e-tax implementation is varied and lacks meaningful integration with an overt focus on technology acceptance models, which is only one strand in the e-tax umbrella. Therefore, we propose a conceptual framework that integrates the various parts of the digital tax literature and identifies fifteen considerations in designing effective e-tax systems and how they connect, as shown in Fig. 10.

According to Fig. 10, These fifteen considerations are clustered under four categories: 1) Context, 2) Stakeholders, 3) Technology and 4) Demonstrated results, as identified in Fig. 10.

A contribution of this conceptual framework to the research agenda is that it does help to address a critical limitation of the e-government literature, a significant focus on stakeholder adoption, which often leaves out the broader governance context. Focusing on context and stakeholders, in addition to technology and results, the approach recognises a key pitfall that has led to the failure of many government information systems, particularly in the developing world. As these themes are all critical to digital taxation, this model can help future researchers seeking to explore parts of the digital taxation literature.

5.2. *Research gaps and avenues for further research*

Mapping the digital taxation research through its Ecosystem, we can see that the extant research in this area has been primarily focused on technology adoption models. The categories have mostly existed in isolation with little exploration of their interactions. We identify several research gaps, and through this, we develop a research agenda for future researchers and a summary table is provided in Table 6:

5.2.1. *Context*

The tax environment is dynamic and constantly influenced by changing policies and legislative activities at the domestic and international levels. There has been some push at local and international levels to address privacy and data protection issues, but how and in what context this impacts taxpayer behaviour is unclear.

Fig. 10. Digital tax administration conceptual framework.

5.2.1.1. Avenues for further research. There is a need to explore taxpayers' views on various legislative initiatives such as those targeting privacy and data protection and how that improves satisfaction with e-tax services (Chen et al., 2015).

5.2.2. Stakeholder adoption

Stakeholder adoption, acceptance and use of technology alone make up a significant plurality of the phenomenon explored in the extant literature. However, there is still no agreement in the digital taxation literature on the appropriate model for investigating technology acceptance (Meijer & Bekkers, 2015). Indeed, a standard limitation of the various authors in the literature is that their model isn't exhaustive, and they often call for further research incorporating one or more variables that they didn't include (Azmi & Bee, 2010; Mellouli et al., 2016). This lack of standardisation makes it difficult for e-government managers and policymakers to know what factors to focus on when designing e-tax services.

5.2.2.1. Avenues for future research. We recommend future researchers explore the integration of all possible factors necessary for technological acceptance and use into a model. One way of doing this is to build on Fu et al.'s (2006) work, which involves using a combine and conquer strategy to combine the various models, thereby improving the overall fit or relative explanatory power. While an excellent idea, this approach might suffer from 'clutter' and 'overlapping' constructs, a much more efficient way might be to carry out a Meta-analysis of all the variables in the research.

5.2.3. Stakeholder equity

The effectiveness of the ICT Eco-system rests on all actors having an equal playing field. Still, while the issue of the digital divide is well known in the IS literature, the digital tax literature continues to have a low number of articles exploring the social, geographical, and cultural factors impinging on the practical usage of digital tax services by various actors (Economides & Terzis, 2008; Wang, 2003). Furthermore, the digital divide is often explored regarding access, while its effects on actual usage and information provision are scarcely mentioned (Veeramootoo et al., 2018).

5.2.3.1. Avenues for future research. Models of technological adoption should incorporate differences in stakeholders across gender, age, social class, education, and other socio-demographical criteria to have the full picture. More cross-country studies should also explore how culture (such as the Hofstede Cultural Values of Zaidi et al., 2017) influences adoption and actual usage. Finally, the digital divide is often only explored in the context of access, but usage and information seeking may also pose some barriers.

5.2.4. Technology

Despite the increasing sophistication of e-tax services using a range of disruptive technologies such as Artificial Intelligence, Data Mining, and Analytical tools and even innovations such as citizen participation platforms and mobile applications (Mulligan & Ojo, 2019), most of the research in this field has focused on E-filing and E-payment platforms. With existing studies skewed towards these 'traditional' tax platforms, gaps in the e-tax literature exist in terms of the range of digital technologies explored. This opens areas for future research.

5.2.4.1. Avenues for future research. Future Researchers should explore the adoption and usage of disruptive technologies such as Chatbots and blockchain technologies by taxpayers and tax consultants, as well as the use of sophisticated back-office functions such as Data Analysis and Mining tools by tax officials. Furthermore, the application of mobile technologies is becoming an emerging field and should be explored

Table 6
Avenues for further research.

Research theme	Future research directions
Context	• The role of cyber security and data protection in the broader digital taxation environment
Stakeholder: Stakeholder adoption	• Meta-Analysis of technological adoption models in taxation.
Stakeholder: Stakeholder Equity	• Impact of National Culture on cross-country studies of technology adoption and usage. • Exploring equity issues in the context of information seeking from tax authorities (not just access) • How do demographic characteristics such as gender, age, social class, and education influence digital taxation?
Technology	• The impact of blockchain and distributed ledger technologies on the E-tax ecosystem • The impact of chatbots and order digital communication tools on the e-tax ecosystem • How data mining and other data analysis tools is changing the e-tax landscape?
Demonstrated Results	• The impact of digital taxation on perceived and actual levels of corruption control?
ICT Eco-system Model for Digital taxation	• Cross-country studies exploring the differences between the ICT Eco-system model in a developing country vs a developed country. • How to navigate the tensions between a country's international e-tax ecosystem and its national e-tax ecosystem and the role of institutions such as multilateral institutions and aid agencies in mediating this. • Conflicts and tensions between various elements of the ecosystem such as between policymakers and tax officials.
Theoretical Advancement	• How can digital taxation help our understanding of the slippery slope framework? • How can digital taxation advance our understanding of the impact of fairness on tax compliance?

(Escarfullet et al., 2010). Such innovations represent a change from the typical platforms that tax stakeholders are used to and may encounter resistance, so more research may be required.

5.2.5. *Demonstrated results*

Although several impacts of digital taxation have been demonstrated particularly in relation to efficiency and effectiveness, for many stakeholders, particularly in economically developing and transitioning countries, low tax compliance is linked to poor government perceptions and high corruption levels (Kochanova et al., 2020). This raises areas for future research.

5.2.5.1. *Avenues for future research.*

There is a need for more research to explore the impact of e-tax services on perceived and actual levels of government corruption control, which will help spur voluntary compliance.

5.2.6. *Digital tax administration conceptual framework and its interactions*

There is a need for more research on the African, Middle East and South American regions, as evidenced by Fig. 4, as they may have different ecosystems from developed countries. Many of them are often faced with not one but two ecosystems, the ecosystem where the technology is being developed (usually in a developed country) and their own ecosystem, where the technology is being used. This can lead to mismatches if not correctly handled (Heeks, 2005). International organisations which overlap with both ecosystems may help to address these mismatches.

The interactions between various elements in the ecosystem also need further exploration. For example, if big corporate taxpayers can avoid tax, it could affect the behaviour of individual taxpayers and increase tax evasion (Gerbrands & Unger, 2021).

5.2.6.1. *Avenues for future research.*

Future research should adopt case studies exploring the application of an off-the-shelf E-tax service purchased from a developed country or service provider and its effectiveness in a developing economy. A SWOT analysis can help aid developing countries to navigate these two ecosystems, perhaps through the mediation of Multilateral Institutions or Aid agencies. Furthermore, the conflicts and tensions between various actors in the E-tax ecosystem need further exploration.

5.2.7. *Theoretical advancement*

The extant literature on digital taxation has had limited theoretical advancement other than those focused on technological adoption models such as TAM, UTAUT etc., which are provided in the Information systems literature (Maiga & Asianzu, 2013; Mellouli et al., 2020). We note that the application of deterrence and trust tax theories has been conspicuously ignored. This adherence to the technological adoption models as the only appropriate models in digital taxation has limited the theoretical understanding of the ICT Eco-system, particularly around compliance behaviours critical to any tax administration's effectiveness.

5.2.7.1. *Avenues for further research.*

We recommend that in future research, care is taken to incorporate theories of tax compliance that have already been well explored in the tax literature. The Fischer tax compliance Model (Chau & Leung, 2009) and the slippery slope framework (Prinz, Muehlbacher, & Kirchler, 2014) are some excellent examples.

5.3. *Implications for stakeholders and e-government managers*

This study has some implications for practice. Firstly, the conceptual framework from the study as shown in Fig. 10 suggests that ICT, despite its sophistication, will by itself not reform or solve prevailing issues existing in the tax administration before its application. It is simply a tool and should be treated as such. It is depicted by the technology and decisions around the technology occupying one of four strands in the conceptual framework in Fig. 10.

This means that tax officials and policymakers need to resist the urge to see ICT as a 'silver bullet' to problems they may be facing in the context of the effectiveness of their tax administration. Nevertheless, ICT reform can often provide a fresh start for the organisation, but this requires paying attention to the ecosystem's various elements. For example, an organisation that usually struggles with service delivery may switch to ICT. However, that alone will not resolve the problem without subsequent training of staff on ICT and educating taxpayers on filing returns online.

This also means that stakeholders outside the tax administration need to be wary of ambitious claims of policymakers and tax officials who suggest ICT will transform the previous way of doing this and for them to call attention instead to change management issues which are far more critical.

Furthermore, E-Government managers need to be aware of cybersecurity risks that can disrupt the entire ecosystem and undermine stakeholder trust, or ICT application will not be effective. They must coordinate with policymakers to develop appropriate legislation that addresses these issues without stifling innovation. They also need to recognise that they are not islands to themselves and must ensure that there is sufficient stakeholder input in the design of digital tax services from tax officials, taxpayers, and agents but also, where necessary, multilateral institutions and aid agencies, such as in the case of developing countries. This will ensure that digital services designed in tax administrations are appropriate for the cultural context and will provide the desired benefits.

As the conceptual framework is an ecosystem, tax officials must resist piecemeal changes that might not provide desired benefits. This is because marginal changes that don't offer results can stall momentum

for much more significant change.

Finally, using cost-cutting narratives that tend to dominate many narratives around taxpayers' money for support for ICT is fraught with risks, especially due to high upfront costs with often unclear financial gains in the short and medium term. Good governance and/or service delivery narratives may provide more enduring justifications.

5.4. Limitations

This study has several limitations. Like all literature reviews, there is always the issue of coverage. There is no doubt some papers on this subject that our review has not identified. Nevertheless, we believe that the four databases used and the reports of Multilateral Institutions constitute a comprehensive coverage of digital tax research in the field. Another limitation is the vagueness/ambiguity around the term digital taxation, and accordingly, there will almost certainly be papers discussing the subject that our search terms will not cover. Finally, there is the issue that the exact digital ecosystem analysis framework used in this research has only been used once. There will undoubtedly be avenues for future researchers to validate the framework in whole or parts in other digital tax contexts.

6. Concluding remarks

ICT have become a dominant fixture in tax administrations and tax officials' work worldwide. Over the last decade, the variety and velocity of these applications have only become ever more significant. However, given the high rate of failure of e-government projects globally (Heeks, 2005), there must be a mechanism to understand what makes digital services succeed in one tax administration context and struggle in another.

This is also important as a majority of the studies in this area are country case studies and there is a need to understand the commonalities among them to provide best practices. Addressing this knowledge gap will be essential given the high prevalence of e-services in the work of tax administrations. Therefore, this study seeks to contribute to our understanding of what drives the successful integration of digital services in tax administration by examining them in a conceptual framework through a systematic literature review.

This integrated digital taxation administration framework (see Fig. 10) shows in a detailed manner fifteen themes influencing the success of a digital services in tax administrations structured around four categories – Context, Stakeholders, Technology and Demonstrated Results and how decisions made on these themes can influence how digital tax services are provided. By so doing we address two research objectives for the study: first, synthesise the literature on digital taxation and second, integrate the findings from the review into a conceptual framework.

The conceptual framework also helps to identify areas for theoretical development within digital taxation research by identifying areas that need more empirical investigation. This helps provide a more integrated understanding of how the digital taxation research field can be advanced, addressing the third research objective, which focuses on identifying research gaps in the literature and areas for future research discussed in Section 5.2.

Overall, the conceptual framework is described as an ecosystem, which intends to suggest thinking of each theme and category as part of a wider whole, in which each theme is interdependent. Furthermore, the arrows in the conceptual framework reflect that digital services in tax administration is constantly changing and that changes in one part of the framework due to new laws or technological development in a particular country context will have spillover effects on other parts of the framework. The study is one of the first to develop a conceptual framework to integrate themes in designing effective digital services in tax administrations. Thus, contributing to the literature on digital taxation and provide a good reference point for future researchers and policymakers as discussed in Section 5.3.

Declaration of Competing Interest

None.

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Appendix A. Supplementary data

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