Adoption of ZakaTech in the time of COVID-19: cross-country and gender differences

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Abstract

Purpose – Despite the significant growth in Islamic economies and the increasing number of Muslim youths inclining digital services, empirical-based research addressing the adoption of digital Islamic services is still limited. ZakaTech is a new phrase that has recently emerged as a modern term describing novel technologies adopted by zakat institutions; yet, it has been largely neglected in the literature. Therefore, this study aims to provide an integrated model that scrutinizes the determinants of acceptance and use of technology (UTAUT) of ZakaTech, combined with social cognitive theory (SCT), in the midst of the COVID-19 crisis where social distancing is the norm in conducting economic activities.

Design/methodology/approach – Based on cross-national evidence from two Muslim-majority countries, a total of 1,006 valid responses were collected from zakat payer users in Saudi Arabia and Egypt using a Web-based survey. To validate the research model and draw significant insights, SmartPLS structural equation modeling was used.

Findings – By analyzing both Saudi and Egyptian samples, the authors found that all UTAUT constructs are statistically significant, except for effort expectancy in Egypt. The effects of self-efficacy and social isolation on ZakaTech adoption are supported across both countries. Trust in technology reduces users' inherent risks and increases their likelihood of adopting ZakaTech services in Saudi Arabia, while this is not the case in Egypt. However, the study revealed that trust in electronic-zakat systems (EZSs) is a vital predictor for mitigating perceived risk among Egyptian users of ZakaTech, but it is not the case in Saudi Arabia. Moreover, significant gender differences were found between males and females in the adoption of such digital services in both countries, particularly regarding self-efficacy, trust in EZSs, social isolation and social influence.

Practical implications – The results provide meaningful insights for policymakers to find ways to develop strategies to escalate the adoption of technology in zakat administration and also to create awareness among the users of ZakaTech in a gender-balanced manner that will include zakat payers and recipients as well in the hope that the digital gender divide will be bridged. Bridging the digital gender divide in this regard is imperative for sustainable inclusive development of zakat. Further, strategies need to be developed to provide incentives to zakat authorities and zakat organizations that adopt technology in managing zakat. This is important to escalate the process of fusing technology with zakat, which is an important social finance tool to eradicate poverty in the world.

Originality/value – This research serves as a building block for literature by empirically testing an integrated model of UTAUT-SCT within a modern and unique related context like ZakaTech. Also, it adds value by testing gender disparities in ZakaTech adoption among Muslims.

Keywords ZakaTech, Social finance, Islamic FinTech, Technology adoption, COVID-19

Paper type Research paper

1. Introduction

Globally, the Middle East and North Africa (MENA) region is one of the fastest-growing emerging markets not only economically but also demographically and digitally as well (Ameen *et al.*, 2020). With consistent enhancements in digital readiness and connectivity, intense interest in digital services has begun to take hold in the MENA region (Yusof, 2019). Despite the fact that the computerized economy remains in its infancy, Islamic economies continue to grow and develop at a rapid pace (Mohamed and Ali, 2018). Over the past few years, stars have naturally aligned with changes in the needs of Muslim consumers, driving the innovation behind deployment and adoption of new digital solutions for Islamic communities, regionally and internationally (Yusof, 2019). In essence, information technology has become a hotbed for more effective and powerful activity than anything in the past, and its effect can be inevitably felt all through Muslim society today more than ever.

Currently, in the midst of the COVID-19 outbreak, governments worldwide have, in response, compelled to tighten preventive measures, such as quarantine, social isolation and social distancing (Arli *et al.*, 2021), leading to extraordinary economic and psychological consequences in all aspects of life. Several million people have been forced to stay at home in isolation or quarantine to prevent the virus from spreading. Even in the Islamic world, this crisis has disrupted the way most Islamic Finance institutions (IFIs) used to communicate with each other as well as with their stakeholders including customers (Damak, 2020). The same change is evident in all business communities, where the adoption of FinTech has been escalated to have business continuity in the midst of the pandemic, which has disrupted classical ways of conducting business.

In this unprecedented situation, IFIs are empowering their entities and agencies to stay relevant during the crisis time by assisting them in the digital transformation process so that both institutions and users or customers can obtain the service without interruption by enjoying the new digital Islamic services (Syed *et al.*, 2020). Given the scale of growth in Islamic economies and the large number of Muslim youths inclining digital services, including digital Islamic services, in particular, are a largely untapped segment (Haider *et al.*, 2018). This presents great promise and a wealth of opportunities for such services to flourish. One of the IFIs that has recently witnessed an unprecedented digital change in its services is zakat institutions. Indeed, a zakat institution can play a vital role in developing a supportive and complementary body to the Islamic social finance system. In light of this crisis, it can present itself as an important solution and tool to provide ways that could help in enhancing financial inclusion, which, in turn, supports economic recovery and welfare.

ZakaTech [1] – a novel term in the Islamic finance industry – has recently emerged as a modern term describing novel technologies adopted by zakat institutions (Widiastuti *et al.*, 2021; Syahbudi and Moertiono, 2021; Budi, 2022). This new term has been introduced at the 4th International Conference of Zakat (ICONZ), Indonesia, October 7th–8th, 2020. Also, it has recently been familiarized by the International Shariah Research Academy for Islamic Finance (ISRA, Malaysia). With the current outbreak of COVID-19 and its implications on all walks of life, zakat institutions are forced to restrategize their business model, shifting to

digital services to ensure adjustment to the new normal at the precise moment when their contribution to society becomes vitally important. The notion of ZakaTech services has recently received increased interest from relevant stakeholders, e.g. industry practitioners and scholars (Syed *et al.*, 2020; Mohamed and Ali, 2018; Hudaefi *et al.*, 2020; Yahaya and Ahmad, 2018). In the Islamic world, the traditional technique of paying zakat is either through counters within zakat agencies or through representatives in mosques. Yet, due to the rapid advances and growing reliance on technological innovation, the business models of zakat institutions in several Muslim-majority countries are transforming to cope with such changes by adopting ZakaTech patterns, as a significant service for zakat institutions themselves and payers (users) alike. Such a Web-based platform aims to build a sort of zakat ecosystem that can connect all stakeholders, zakat payers, zakat institutions and zakat recipients (Asnaf). A successful ZakaTech model is indeed more than just a digital innovation, and it contains establishing, rethinking and redesigning the way in which zakat systems deliver Shariah-compliant and digitally aligned services.

Recently, a number of Muslim-majority countries, such as Saudi Arabi, Indonesia, Egypt, United Arab Emirates, Kuwait and Malaysia, have embraced electronic-zakat systems (EZSs) initiatives with the aim of delivering a wide range of services online for people use. These services include zakat calculators, fatwa, online payments, zakat reminders and comprehensive information on zakat and other relevant statistics. On the other hand, other countries, e.g. Yemen, still persist in using the traditional pattern. There are relentless attempts to digitalize governmental and institutional agencies, including zakat institutions; however, innovation and advancement are relatively small in scale (Bin-Nashwan *et al.*, 2020). The significance of EZS is that it enables zakat administration by creating online platforms that do not require the physical presence of zakat payers or receivers in a specific office to deal with zakat.

Zakat funds and ZakaTech during the pandemic are more relevant than ever. In a Muslim country like Saudi Arabia, "ZAKATY" is a newly launched e-system for zakat collections and a novel initiative facilitating all ZakaTech services in a modern fashion, which are related to optional zakat types for individuals (General Authority of Zakat and Tax [GAZT], 2020). In a time of social distancing, the GAZT through its EZS via an online portal and smartphone app increasingly urges zakat payers (individuals) to adopt quality ZakaTech services offered by ZAKATY to smoothly perform their optional types of zakat, such as zakat on business, money zakat, gold and silver zakat and zakat on shares and investment funds (GAZT, 2020). To relieve the pandemic-affected people, zakat funds collected through ZAKATY are immediately geared toward the entitled vulnerable groups under the supervision of the Ministry of Labor and Social Development, according to GAZT (2020). Likewise, the Egyptian Zakat and Charity House (EZCH), under the supervision of Imam of Al-Azhar, has launched Baitzakat e-portal and app to allow zakat payers to pay their zakat in an easy, fast and reliable way (EZCH, 2020).

In the Saudi scenario, for example, just in a single month (the fasting month of Ramadan, 2020), the available statistics indicated that the collected zakat funds via ZAKATY passed SAR 40m (US$10.65m); over 111k users have downloaded the ZAKATY smartphone app during the month of Ramadan, as well as there are more than 341k visits to the online portal, as reported by GAZT (2020). Nevertheless, one might wonder if simply disseminating such information and designing online services could be a guarantee of EZSs' success. We could argue that the underlying issue is not merely associated with establishing digital services within zakat systems, pushing users (zakat payers) to accept and use such services is likely the lingering challenge, particularly amid a crisis of social isolation and uncertainty caused by the pandemic. Another issue is related to whether Muslims indeed would trust these

electronic platforms to perform an essential religious obligation, such as zakat. As such, providing a thorough understanding of zakat payers' acceptance and adoption of ZakaTech warrants investigation.

People's acceptance of new technologies remains a focal point of the literature. In this context, the literature indicates that behavioral intention to adopt technology is a common ground for researchers from various domains (Ye *et al.*, 2020; Venkatesh *et al.*, 2003; Schaupp *et al.*, 2010; Bawack and Kamdjoug, 2018). The literature from various spheres shows that the unified model of acceptance and use of technology (UTAUT) is a viable and most predictive model. Over the years, previous research has explored this model by incorporating other predictors of the context being researched (Casey and Wilson-evered, 2012; Al Mansoori *et al.*, 2018; Bawack and Kamdjoug, 2018; Schaupp *et al.*, 2010; Ye *et al.*, 2020; Al-Saedi *et al.*, 2020; Shah *et al.*, 2020).

Prior research has also contended the relevance of examining gender differences in adopting technology (Ameen *et al.*, 2020; Venkatesh *et al.*, 2003), revealing significant differences between men and women in technology acceptance. Thus, within the new normal, an extended model of UTAUT through the integration of social predictors derived from social cognitive theory (SCT) is likely to help understand the users' behavioral intentions to adopt ZakaTech services during the COVID-19 pandemic. Additionally, studying gender differences in ZakaTech adoption from a cross-cultural context is significant both practically and theoretically. As such, the present study aims to explore the determinants that affect the acceptance of ZakaTech services from the zakat payer's perspective and proposes a model aims to provide a sound understanding of EZS adoption in two typical Islamic settings like Saudi Arabia and Egypt. By investigating the moderating effect of gender, we provide further and novel insights into how male and female differences influence the adoption of ZakaTech.

The remaining part of this work is categorized into the following sections. Section 2 presents the theoretical basis and hypotheses development. In Section 3, the authors describe in detail the methodology designed. The research results and discussion and implications are provided sequentially in Sections 4, 5 and 6. Conclusions, limitations and agenda for future studies are finally formed in Section 6.

2. Theoretical analysis

2.1 ZakaTech initiatives in Saudi Arabia and Egypt

Over recent years, many Muslim governments have legally institutionalized zakat, adopting an extensive variety of innovative frameworks as a form of welfare and taxation management system (Bin-Nashwan *et al.*, 2021). Egypt and Saudi Arabia are among the largest economies in the MENA region with a large youth population (almost half of the population is aged under 24 years old) and are among the fastest-growing markets digitally (Chance, 2017). The internet penetration rates (% of population) in Saudi Arabia and Egypt stood at 88% and 53%, respectively. In terms of the Global Fintech Index, they have placed 232nd and 106th, while 7th and 3rd in the MENA region, respectively, as illustrated in Table 1.

The zakat administration followed in Saudi Arabia, and Egypt is somewhat different. In Saudi Arabia, establishments and registered enterprises and companies engaged in business activities owned by Saudis or citizens of the Gulf Cooperation Council countries are subject to mandatory zakat (GAZT, 2016). However, individuals are subject to optional zakat types, such as zakat on gold, silver, shares, investment funds, business and money. The GAZT is the official responsible channel to collect zakat funds, chaired by the Minister of Finance, corresponding to Royal Decree No. A/133 of 2016. While in Egypt, the Republic

Criteria	Saudi Arabia	Egypt
1. Area/capital	– A Western Asia country constituting the bulk of the Middle East – Surface Area: 2,149,690 km^2 – Capital: Riyadh	– A transcontinental country in the northeast corner of Africa – Surface Area: 1,001,450 km^2 – Capital: Cairo
2. Population	34.2 million	100.3 million
3. Economic status	– The largest economy in the MENA region – GDP US$700.1bn, World rank 19th – Currency: Saudi riyals (US$1 = SAR 3.75)	– The second-largest economy in Africa – GDP US$363bn, World rank 39th – Currency: Egyptian pounds (US$1 = EGP 16.77)
5. Internet penetration	88% (2020)	53.5% (2020)
6. Global and MENA Fintech ranking	232nd globally; 7th in the MENA region (2020)	106th globally; 3rd in the MENA region (2020)
7. Zakat institution	General Authority of Zakat and Tax (GAZT), under the Ministry of Finance	Egyptian Zakat and Charity House (EZCH), under the supervision of Imam of Al-Azhar
8. E-Zakat system	ZAKATY app and e-portal	Baitzakat e-portal and app
9. Web homepage	https://zakaty.gov.sa/en/Pages/default.aspx	www.baitzakat.org.eg/

Sources: Criteria 1–4 (The World Bank, 2020); 5–6 (Internet World Stats, 2020; Findexable Limited, 2020); 7–9 (GAZT, 2020; EZCH, 2020)

Table 1.
Background
information on Saudi
Arabia and Egypt

Decree No. 123 of 2014 was issued to establish the EZCH as an independent body under the supervision of the Imam of Al-Azhar (EZCH, 2020). All types of zakat in Egypt are voluntary.

Given the significance of collecting zakat through the respective channels to the national economy and community development, the EZCH and GAZT have recently introduced EZSs (e.g. ZAKATY and Baitzakat), declaring the intent to build trusted ZakaTech services (Figure 1), for instance, zakat calculator, statistics and fatwa and zakat-related information, statistics and fatwa, finding out Nisab (quorum of zakat) through daily update of gold and silver prices, record-keeping, online payment service and reminders of zakat dates when a full cycle of Haul (one lunar year) is completed.

With the governments' struggles containing the pandemic, zakat payers are encouraged to use these innovative systems to have e-services in a fast and convenient manner. The target audience of ZAKATY platform is zakat payers who are eligible to pay their zakat whether they are citizens, residents or visitors (GAZT, 2020), while both individuals and companies can use e-services offered by Baitzakat.

2.2 An integrated unified model of acceptance and use of technology – social cognitive theory model
There are more than 440 research papers published covering zakat and technology (Kasri and Yuniar, 2021; Widiastuti *et al.*, 2021; Fauzia, 2020; Budi, 2022; Hassan and Muneeza, 2021; Hudaefi and Beik, 2021; Khatiman *et al.*, 2021; Mohd Nor *et al.*, 2021; Omar and Khairi, 2021; Syahbudi and Moertiono, 2021; Rusydiana and Nailah, 2020; Salleh and Chowdhury, 2020; Sulaeman and Ninglasari, 2020; Muneeza and Nadwi, 2019; Shaari *et al.*, 2019). Muneeza and Nadwi (2019) observed that apart from using online platforms to enhance
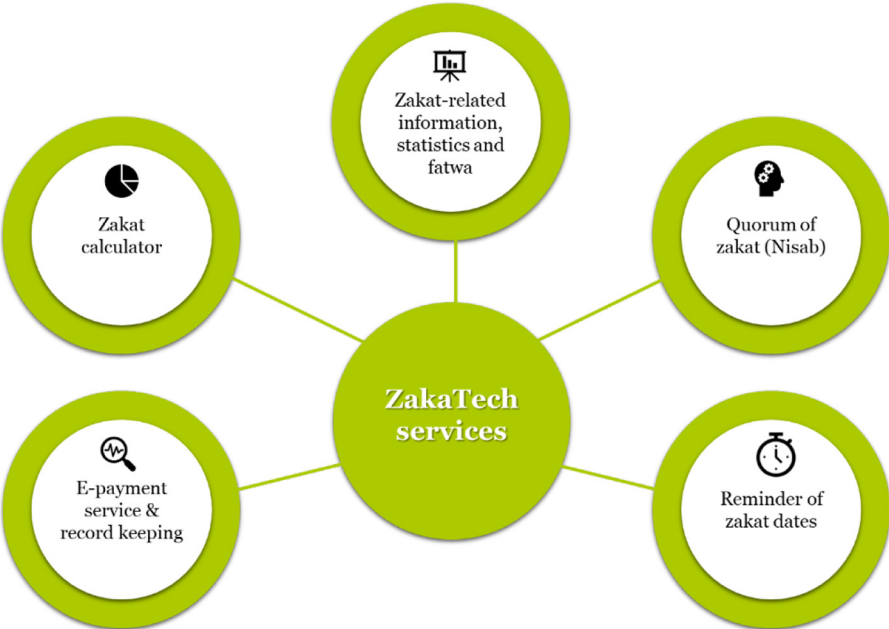
Source: Authors' own

zakat administration using technology: rice automated teller machines are used to disburse zakat in-kind to the needy recipients; mobile applications are also being used; and blockchain platforms are also being used. Further, artificial intelligence and big data technology can also be used to enhance the zakat administration (Muneeza and Nadwi, 2019; Muneeza, 2021; Yunita, 2021; Omar and Khairi, 2021; Zulfikri *et al.*, 2021). It has also been observed that Internet of Things also can be used to identify the household poverty level to assist the zakat distribution for the most deserved recipients of it without them registering themselves every time they intend to receive zakat (Hassan and Muneeza, 2021; Muneeza, 2021).

Drawing on eight dominant theories, the theory of planned behavior (TPB), the theory of reasoned action, technology acceptance model (TAM), personal computer utilization model, SCT and innovation diffusion and TAM-TPB model, Venkatesh *et al.* (2003) suggested an unified and comprehensive model for technology adoption, which is commonly known as UTAUT model. Since then, UTAUT has become a crucial and viable framework, acquiring wide application in the literature (Ye *et al.*, 2020; Lian and Yen, 2014; Bawack and Kamdjoug, 2018; Schaupp *et al.*, 2010). Empirically, this model has demonstrated a robust predictive capability, explaining a strong level of variance in shaping technology acceptance (Venkatesh *et al.*, 2003; Lian and Yen, 2014).

Performance expectancy (PE), effort expectancy (EE), social influence (SI) and facilitating conditions (FC) are the four key factors that can shape usage intention, as suggested by Venkatesh *et al.* (2003). In the Muslim context, despite the abundance of literature on UTAUT investigating specific technologies, such as e-government services (Al-Sobhi *et al.*, 2011; Al Mansoori *et al.*, 2018; Al-Awadhi and Morris, 2008); internet banking (Tarhini *et al.*, 2016);

e-learning (Ramadan, 2016; Salloum and Shaalan, 2018); and mobile health (Hoque and Sorwar, 2017) studies into the ZakaTech initiative and users' acceptance behavior are very scarce.

The attempt is made in the present study to explore the determinants influencing inclinations to use ZakaTech by integrating SCT and UTAUT. Some scholars (Ratten, 2015; Raza and Standing, 2010) have argued that technology acceptance models have been criticized for not considering different perspectives of stakeholders that influence the social-cognitive process of technology acceptance. As a result, SCT is also integrated as a theoretical angle to help understand people's intentions. SCT was advanced by Bandura (1986), holding that parts of the acquisition of people's knowledge could be strongly related to the observation of the surrounding environment in the field of social interactions, outside experiences and influences. Hence, SCT can describe how new behaviors diffuse among people in society through sociopsychological factors governing the adoption and acquisition of the behavior in question (Bandura, 1986). Thus, in this study, we argue that people's intentions to adopt ZakaTech during the new normal could also be related to other social factors (perceived trust and social isolation, perceived risk and self-efficacy), which are used alongside UTAUT. As digital zakat systems are still in their infancy, particularly in the MENA region, it is anticipated that the use of ZakaTech services could be bounded by perceived risk, trust in technology and TZ, as well as the moderating role of gender differences in technology uptake.

PE is about the degree of the individual perception that the deployment of a specific system or innovation can provide performance enhancements (Venkatesh *et al.*, 2003). In terms of IT services, the ultimate driver of electronic service usage is to accomplish tasks at profound utilities, such as higher time and effort savings, fast tranquility, payment convenience and superior service effectiveness (Odoom and Kosiba, 2020). In the ZakaTech context, PE can be defined as the extent to which zakat payers perceive that using EZSs can overwhelm their efficiency (lower time and effort investments), especially in terms of zakat payment.

In reviewing the literature, Yu (2012) found that intention to use system is significantly driven by the higher PE. Likewise, Tarhini *et al.* (2016) revealed that perceived usefulness has a considerable impact on people's perception to adopt internet banking. In the zakat environment, Sulaeman and Ninglasari (2020) suggested that PE has a positive influence on zakat-based crowdfunding. Recently, Kasri and Yuniar (2021) reported that PE significantly shapes payers' intention to adopt online zakat services. Thus, we can predict that the higher the expectations of zakat payers in ZakaTech services' benefit, the stronger the adoption of such platform:

H1. The level of PE positively influences intention to adopt ZakaTech services.

As the main construct of UTAUT, EE describes how easy for people to use technology (Venkatesh *et al.*, 2003). When technology does not require an excruciating investment of time and effort, there will be a huge turnout of people to adopt it. Hence, in our study, we can define EE as the level of ease required to learn and comprehend digital platforms' usage in meeting zakat obligations. The findings of EE-investigated studies are inconsistent, that is due to the context and sample size discrepancies. For instance, Martins *et al.* (2014) indicated that EE has a positive impact on adoption intention of technology. In the framework of digital payment, using a sample of 316 responses from users of the Tencent charitable crowd-funding platform in China, Li *et al.* (2018) revealed that the ease to use a digital platform to collect donations has a positive impact on donors' perception to use such of payment. Earlier literature had demonstrated a significant effect of EE on technology

acceptance (Al Mansoori *et al.*, 2018; Al-Sobhi *et al.*, 2011; Shah *et al.*, 2020; Talukder *et al.*, 2019). Recently, scholars such as Raza *et al.* (2019) revealed that when Muslims feel that mobile banking services in Islamic banks are easy to use and required less effort, their propensity to adopt mobile banking would be high. In contrast, some studies did not report such an effect (Schaupp *et al.*, 2010; Lian and Yen, 2014). Hence, the significance of EE among zakat payers for EZS adoption may be manifest, particularly in the case of the introduction of the ZAKATY system in Muslim society during the pandemic, and how easy its ZakaTech services are to be adopted:

H2. EE positively influences intention to adopt ZakaTech services.

As the third core construct of UTAUT, Venkatesh *et al.* (2003) portray SI as a form of normative subjective reflecting the degree to which the individuals are intentionally influenced by their relevant people's attitudes toward technology. SI is the main leading factor in turning the users' intention to accept technology. In supporting such an argument, abundant empirical studies (Martins *et al.*, 2014; Odoom and Kosiba, 2020; Venkatesh *et al.*, 2003) state that SI has a positive and significant impact on the intention of people to adopt new technology. In the context of Islamic financial technology acceptance, Haider *et al.* (2018) outlined that SI has a significant impression on the customers' propensity to adopt fintech products and services in Islamic banks. On the other hand, Raza *et al.* (2019) stated that the client's intention of using M-banking is not driven by subjective norms. Kasri and Yuniar (2021) exhibited that zakat payers are not intentionally influenced by social pressures to use online platforms in paying their zakat obligations.

Inconsistent empirical evidence in determining the explanatory power of SI in people's intention to use technology (e.g. ZakaTech) can be inspired by community-based differences in many domains. Due to the massive ramifications raised by COVID-19, the status of uncertainty related to payment of zakat via digital platforms can be demonstrated and, in turn, this encourages zakat payers to intermingle with their social networks to consult on their adoption decisions:

H3. SI positively influences intention to adopt ZakaTech services.

FC is the final construct of the UTAUT. Based on perceived compatibility and behavioral control, Venkatesh *et al.* (2003) operationalized FC as the degree to which a person perceives that the accessibility level to organizational and technological resources that validates technology usage is highly supported. The focal point of FC is to eliminate barriers to the use of online technology (Odoom and Kosiba, 2020). Within the framework of EZS, FC demonstrates the extent to which zakat payers have the resources necessary to use ZakaTech services. Such resources could be in form of knowledge and skills and IT infrastructure that promote their adoption of EZS in a context suitable to their lifestyle and religious principles.

While FC is a less leading construct that affects people's intention to use technology due to the actual use of technology (Venkatesh *et al.*, 2003), many empirical studies have found controversial evidence. Some previous studies found that intentions are insignificantly predicted by FC, especially when EP and EE are included in the research model (Venkatesh *et al.*, 2003). However, other studies revealed a positive association between FC and technology adoption intention (Foon and Fah, 2011; Raman *et al.*, 2014; Afshan and Sharif, 2016; Bawack and Kamdjoug, 2018). This construct is important due to the argument that Muslim authorities aim to establish regulatory models for Islamic financial technology

allowing individuals and agencies, including zakat institutions, to develop innovative platforms, such as EZSs, according to Mohamed and Ali (2018):

H4. FC significantly influences intention to adopt ZakaTech services.

2.3 Self-efficacy

Self-efficacy (SE) is one of the core traits of consumers' differences that was supported by SCT as a crucial component. SE is a personal belief or expectation with regard to an individuals' engagement in a certain behavior if they believe that they possess the ability and competences to accomplish it (Bandura, 1986). SE regulates an individual by affecting his(her) motivations to persevere, and overcoming difficulties, and then accomplishing successfully intended tasks (Compeau and Higgins, 1995). Several scholars have asserted that SE is a major component of successful performance of tasks and activities, including computer and information system-based activities (Holden and Rada, 2011; Lew *et al.*, 2020). It is noted that people with low SE often perceive a new digital product as a threat, so they are likely to avoid perceived risks (Compeau and Higgins, 1995). In contrast, people with a higher SE will have a favorable belief in their capacity to engage in adopting such new technology and reduce their resistance to technology acceptance (Holden and Rada, 2011).

Previous studies have demonstrated that SE can foster individuals' intentions to adopt technology (Holden and Rada, 2011; Lew *et al.*, 2020; Reddy *et al.*, 2021). Internet SE levels of individuals are related to their attitude toward websites or e-system they use, which, in turn, reflects their perceived ability to engage in such systems to perform intended tasks (Reddy *et al.*, 2021). Thus, in the ZakaTech context, we assume that zakat payers' perceived capability to use EZSs to successfully perform their religious duty like zakat will considerably boost their intentions and decisions to adopt ZakaTech services:

H5. SE positively influences intentions to adopt ZakaTech services.

2.4 Perceived risk

Although digital services could be rapid and convenient to people, their users are reluctant to adopt online transactions if there are relative aspects of uncertainty-related, thus, innovative technology (Tan and Leby Lau, 2016). Predominately, it was argued that online services suffer from implicit uncertainty and have less objective reality due to their impersonal and virtual nature that renders an inevitable risk perceived by their users (Pavlou, 2003). Perceived risk (PR) is the undesirable feelings derived from the combination of uncertainty and the acuteness of arisen results of a given behavior (Zhang *et al.*, 2018).

The influence of PR on the users' intention in adopting new innovative technology in terms of different behavioral models (e.g. UTAUT) has been demonstrated in prior studies. Among other extraneous constructs, the embodiment of PR in the extended UTAUT model improves empirically the elaboration of the variance of adoption intentions of mobile banking (Sobti, 2019). Chen (2013) claimed that PR is a key barrier that would dishearten people from embracing the online payment system. Using a sample of banking customers, Tan and Leby Lau (2016) revealed that PR is negatively and significantly related to the inclination to use mobile payment. Liébana-Cabanillas *et al.* (2018) highlighted that the higher risk to use the internet payment mechanism is to be deemed, the lower users' pursuit to adopt them. However, Ling *et al.* (2011) and Wang and Yi (2012) provided contradictory findings stating an insignificant association between PR and the adoption intention of mobile payment. Recently, in Oman, Al-Saedi *et al.* (2020) argued that consumers have

become more familiar with the new innovative technologies and therefore provide less attention to the PR related to mobile payment use.

As digital zakat systems are still in their infancy, particularly in developing Muslim-majority countries, it is anticipated that the use of ZakaTech services could be bounded by the potentially extensive risk perceived by the zakat payers about the uncertainly and serious results arising from the adoption of such system:

H6. PR significantly influences intentions to adopt ZakaTech services.

2.5 Trust in technology

In the digital business environment, trust and PR are considered crucial predictors in understanding users' acceptance of technological innovation (Featherman and Pavlou, 2003). Schaupp *et al.* (2010) argued that PR comprises behavioral and environmental uncertainty. Consumers' PR refers to beliefs about the potential uncertain negative outcomes caused by digital transactions (Kim *et al.*, 2007). There are two kinds of predominantly PRs identified: privacy risk and security risk (Murkherjee and Nath, 2007; Ling *et al.*, 2011; Chen and Barnes, 2007). Schnall *et al.* (2015) stated that trust is considered a behavioral belief that has been related to research conducted on e-commerce, where the findings indicated that there is a favorable impact on consumers' intent to the utilization of technology. Pavlou (2003) defined trust as the belief of the first party that the second party will act responsibly without taking advantage or exploiting him/her. In this regard, Schnall *et al.* (2015) observed that trust has two types, namely, trust in the credibility and benevolence of a specific party which is known as party trust; and trust in the integrity of the medium of the transaction, which is known as control trust.

It is said that the significance of trust alleviates cases, where there are high levels of uncertainty in the use of technology if users fail to understand the place, where the information is being stored and how it is being transmitted (Schnall *et al.*, 2015). There is much literature indicating that the adoption of technology in human interactions, including commercial transactions positively related to trust. Mohd Nor *et al.* (2021) claimed that the first thing that ought to be done in the adoption of technology is to build trust in it and it will take time for that. Davis (1989) stated that one of the main reasons for adopting new technology is the belief that technology uptake will lead to simplicity in usage. According to Qureshi *et al.* (2008), the use of technology will improve privacy and security. Lee and Song (2013) in their research found that trust can considerably decrease PR related to technology adoption. Conversely, Schaupp *et al.* (2010) found no relationship between trust in technology (TT) and perceived risk. Hence, we assume that TT will help reduce PR related to ZakaTech adoption:

H7. TT negatively influences perceived risk of ZakaTech services adoption.

2.6 Trust in E-Zakat system

E-Zakat system (EZS) is an information technology-based zakat administration system that is adopted by the zakat authorities for zakat management purposes, including zakat collection, disbursement, registration of recipients (*asnaf*) and management of historical data on zakat. Technology can also be used to provide correct information about the zakat authorities in a timely manner to the public, as it is found that one of the reasons why mistrust of the public about zakat authorities exists due to the feeding of wrong information in social media about them (Shaari *et al.*, 2019). Salleh and Chowdhury (2020) also state that

the use of technology in zakat administration will increase the trust of the public toward zakat institutions. Likewise, Khatiman *et al.* (2021) also state that blockchain-based zakat collection will overcome the trust issues of zakat payers and the issues identified in this regard include zakat payers not being satisfied with the zakat distribution, and lack of transparency in the zakat management leading to mistrust. In a similar vein, Mohd Nor *et al.* (2021) argued that the use of blockchain technology in zakat administration can provide a positive impact on enhancing zakat administration, but some concerns need to be addressed before adopting such technology.

Traditionally, zakat administration is handled by pious officers and despite them from time-to-time news about mismanagement of zakat funds has been reported (Haji Ahmad and Ma'in, 2014). Recently, Hudaefi and Beik (2021) studied the means of e-zakat campaigns during the pandemic, and they did not state a positivist perspective on the association between e-zakat campaigns and zakat collections at the time of the pandemic. They suggested that future research examine such phenomena either qualitatively or quantitatively. IsDB (2020, p. 32) observed that FinTech has been applied in zakat, which can considerably lessen information asymmetry between donors and beneficiaries, as well as ensure due diligence and monitoring with complete transparency. It is also said that there is a significant positive effect in mitigating the trust deficit between donors and zakat management organizations and reducing potential risks (IsDB, 2020). Shaari *et al.*'s (2019) study theoretically suggested that trust in EZSs (TZs) could have a negative influence on PR and therefore, building trust EZSs is a crucial factor:

H8. TZ negatively influences perceived risk of ZakaTech services adoption.

2.7 Social isolation

Social isolation (ISO) can be defined as the absence or inadequacy of social relations, either qualitatively or quantitatively, with other people at different scales where human interactions take place (social environment, community, group and individual), according to Zavaleta *et al.* (2017). Alibhai (2017) argued that it is possible to use technology in reducing ISO among older adults in British Columbia and the ways to do so suggested include: via telephone, ICT, digital games, video conferencing, mobility tools and social networking sites. OECD *et al.* (2020) observed that digitalization and adoption of technology can lead to financial inclusion among the youth. In general, SIs among other factors that significantly related to technology adoption intentions (Schaupp *et al.*, 2010).

The COVID-19 pandemic has created ISO due to the containment measures taken by countries around the world, where lockdown or movement control measures were taken forcing the world population to restrict themselves within the households by physically distancing themselves from meeting people, except through internet-based platforms (Wilder-Smith and Freedman, 2020). Due to the pandemic, it is stated that zakat organizers have escalated the use of technology indicating that forced ISO created by the pandemic has motivated the escalation of the adoption of technology in zakat (Hassan *et al.*, 2021; IsDB, 2020). Yahaya and Ahmad (2018) found that FinTech and mobile banking could be used for effective zakat administration for financial inclusion in Malaysia. They observed that in Malaysia, for instance, zakat Selangor has enabled four ways in which zakat payment could be made using technology and they are via internet banking, swiping of debit or credit card, MyClear Financial Process Exchange and salary reduction scheme, directly through any zakat counter, through Postage, SMS and others (Yahaya and Ahmad, 2018). Fauzia (2020) found that the zakat collection in Indonesia during the pandemic increased and one of the reasons for that is the use of online or digital fundraising of zakat. As such, it can be asserted

that ISO has escalated the process of adoption of technology in zakat where the zakat collection and distribution process has been changed in ways where the stakeholders could interact in a socially distant manner:

H9. ISO caused by the pandemic significantly predicts intentions to adopt ZakaTech services.

2.8 The moderating role of gender

The literature devoted to psychology and social sciences has examined gender differences (GDR) in processes of decision-making and realized considerable differences between males and females (Tosuntaş *et al.*, 2015; Al Mansoori *et al.*, 2018; Ameen *et al.*, 2020). For instance, women usually engage in more social activities than men, weighing the opinions of others to a greater degree than do males (Ameen *et al.*, 2020).

In the context of technology acceptance, there is a burgeoning body of research that has focused on examining GDR (Venkatesh *et al.*, 2003; Moghavvemi and Akma Mohd Salleh, 2014; Ramadan, 2016; Rabaa'i, 2017; Ameen *et al.*, 2020). They argued that males may have stronger levels of technology SE and favorable perceptions of digital services than males. Within the framework of FinTech acceptance, Muslim men weigh it to greater levels compared to women when it is related to perceived self-expressiveness. On the other hand, female Muslims are more greatly influenced by social orientations, and thus female FinTech acceptance is triggered by social norms and perceived usefulness (Goh and Sun, 2014). Generally, in exploring GDR in adopting a new digital product, Venkatesh *et al.* (2003) contended that perceptions of men are easily influenced.

From the foregoing discussion, we assume that GDR is a crucial factor to understand Muslims' adoption of a novel pattern like ZakaTech. This study is the first of its kind to explore how genders differ in digital services acceptance offered by EZSs in Muslim-majority countries. Hence, this study proposes that all direct relationships in the integrated research model are moderated by GDR (Figure 2):

H10–H18. GDR moderates the relationships between PE, EE, SI, FC, SE, PR, TT, TZ and ISO with adoption intention of ZakaTech.

3. Research methodology

3.1 Sampling and data collection

As the adoption of technology in zakat systems is still in its infancy, the first model of UTAUT is the most applicable and useful theory for assessing the introduction of new technologies and understanding acceptance factors that can contribute to the effective design of such systems, according to Kasri and Yuniar (2021). As there is a pressing need to provide a thorough understanding of the extent to which Muslims can adopt ZakaTech services in a time of COVID-19 social distancing, this study followed a multinational perspective among zakat payers in two of the fastest-growing markets in the Muslim world digitally (Saudi Arabia and Egypt). In this research, a quantitative approach through a Web-based online questionnaire was adopted as a suitable instrument (Evans and Mathur, 2005). Invitations were individually sent using online platforms, such as e-mail and social networking sites, to individual zakat payers in both Saudi and Egyptian communities. A purposive sampling method was chosen to draw the sample of analysis as an effective method proved in prior studies (Agostini *et al.*, 2017). This technique allows researchers to
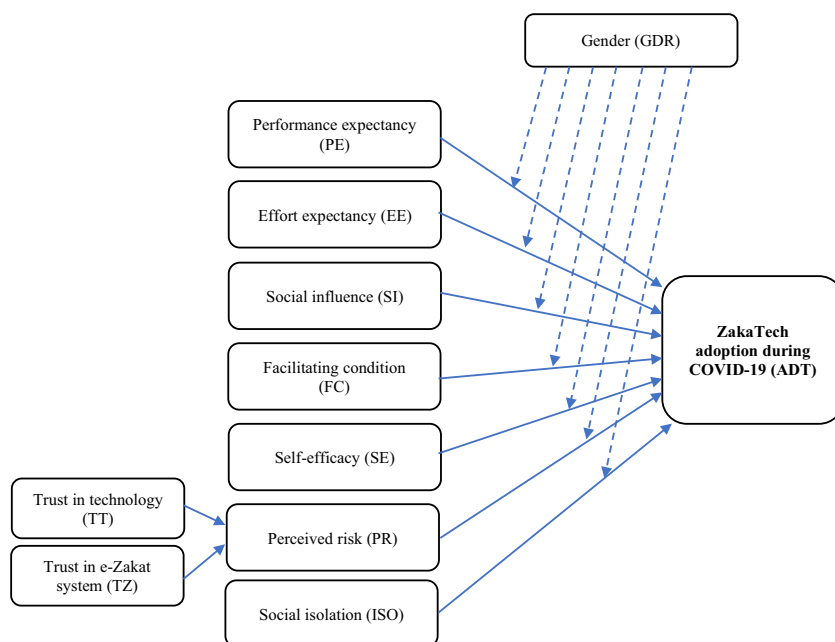
Figure 2.
Research model

identify the target sample that has met certain criteria and characteristics, reflecting the aim of the research (Short *et al.*, 2002; Etikan *et al.*, 2016). To be qualified participants in the present research survey, respondents had to meet two main criteria. First, respondents who had previously paid any type of zakat (e.g. gold and silver zakat, zakat on money, shares, business and investment funds). Second, zakat payers who had ever heard of the EZSs (e.g. ZAKATY and Baitzakat e-portal or app). The reason for using these criteria is to ensure that the survey reaches the target respondents (eligible participants) in line with the objective of the study.

   Prior to undertaking the main data collection, a pilot study of 36 sampled key informants to assess sentences' clarity and suitability was surveyed. As a result, some changes were made to the syntax of some sentences to verify the validity and reliability of the survey. Furthermore, three experts – two academics (one from the Umm Al-Qura University, Saudi Arabia and the other from Sohag University, Egypt) and a practitioner in the Saudi Arabian Monetary Authority as one of the ZAKATY system partners (https://zakaty.gov.sa/ar/Pages/default.aspx) – were consulted to evaluate the instrument and no changes were suggested. A checkbox was included for respondents to sign informed consent to participate in this study. All respondents were informed about the research purpose and nature, as well as ensured their responses would be maintained confidentially and used only for research purpose. After eliminating incomplete and problematic questionnaires, 510 valid responses were retained from the respondents in Saudi Arabia and 496 in Egypt from the target group and were involved in the analysis.

3.2 Measurements
The survey was originally written in English, while a back-translation procedure was used for validation, following Wilson's (2014) recommendation. To this end, two bilingual experts

(fluent in both English and Arabic) were consulted. In the questionnaire, there were two main sections:

(1) demographic factors; and

(2) eight latent constructs using a five-point Likert scale.

Prior studies, such as Schaupp *et al.* (2010) and Venkatesh *et al.* (2003), were sources of measurement for the original factors of UTAUT. We adapted three items to measure each factor of PE, EE and SI, while a two-item scale for FC. For the dependent variable, we adapted four items to measure behavioral intention of ZakaTech acceptance (see Table 2).

Several previous research extended the original UTAUT model to match research objectives (Bawack and Kamdjoug, 2018; Ye *et al.*, 2020; Schaupp *et al.*, 2010; Casey and Wilson-evered, 2012; Al Mansoori *et al.*, 2018). Given the zakat nature and its business model, as well as the current conditions caused by the pandemic, SE, PR, online trust (TT and TZ) and ISO were integrated into the extended research model. To measure SE, PR, TT and TZ, three items for each variable were adapted from the literature (Schaupp *et al.*, 2010; Carter and Bélanger, 2005). ISO describes the absence of social relations and the lack of social gatherings while practicing social distancing and stay-at-home orders for containing the COVID-19 outbreak. A five-item scale was adapted from Zavaleta *et al.* (2017) to measure ISO.

3.3 Data analysis

Using the SmartPLS variance-based structural modeling equation (PLS-SEM), the research model and hypotheses of this study were built and tested. Unlike covariance-based SEM, SmartPLS has the advantage that it is a more suitable technique and effective tool for the prediction-oriented strategy that characterizes this study. In contrast to covariance-based-SEM, PLS-SEM can perform better and possesses more statistical power with the non-normal data as reported by Hair *et al.* (2017). To ensure that the most appropriate data analysis tool is used, we performed Mardia's analysis for potential multivariate normality using online software called WebPower (Hair *et al.*, 2017). We found that data to be non-normal distributed. The multivariate skewness and kurtosis measures were 11.884 and 62.942 for the Saudi sample vs 11.402 and 137.704 for the Egypt sample at a significance level of 0.000. Consequently, as nonparametric analytical instrument, we continued to use PLS-SEM.

To ensure statistically that our results are not biased by common method variance, we tested a bivariate correlation matrix to evaluate the connection between the latent constructs. We found that all bivariate correlations in both samples fell within the acceptable levels (Table 3).

4. Empirical results

4.1 Sample characteristics

For the Saudi Arabia sample, the descriptive analysis indicated that 63% of the respondents were male and 37% were female. 65% of the respondents were aged 20–40 years old. As for education, almost two-thirds of the participants were holders of bachelor's degrees and above. The sample also showed that 34% of the respondents in Saudi Arabia had previously paid money savings zakat; 33% paid zakat on business; 12% paid gold and silver zakat; shares zakat (11%), and investment funds zakat (10%).

The characteristic of the Egyptian sample showed that the gender split was fair (see Table 4), demonstrating that 57% of the respondents were male and 43% were female. The majority of the respondents (76%) were aged 20–40 years old. In terms of educational background, the study

Construct	Measurement items	Source
PE	ZakaTech services are helpful for me to pay my zakat due quickly The advantages of ZakaTech would outweigh its disadvantages Overall, ZakaTech would be advantageous	Schaupp *et al.* (2010) and Venkatesh *et al.* (2003)
EE	I would find ZakaTech services easy to be used Learning how to use ZakaTech services would be easy for me Input and modifying data when I use ZakaTech services would be easy for me	Schaupp *et al.* (2010) and Venkatesh *et al.* (2003)
SI	My friends think that I should use ZakaTech services People who are important to me believe that I should use ZakaTech services I would use ZakaTech services if people around me use them	Venkatesh *et al.* (2003) and Schaupp *et al.* (2010)
FC	I have the resources necessary to use ZakaTech services I have the knowledge to use ZakaTech services	Schaupp *et al.* (2010) and Venkatesh *et al.* (2003)
SE	I can pay zakat using E-Zakat system, even if there is no one around to guide me I can pay Zakat using E-Zakat system, if there is someone I can call if I get stuck I am confident that I could deal efficiently with most problems I could face using E-Zakat system	Carter and Bélanger (2005) and Schaupp *et al.* (2010)
PR	I would feel psychologically uncomfortable if I use the internet to pay my due zakat I do not think it is safe to use E-Zakat system because of security and privacy concerns	Carter and Bélanger (2005) and Schaupp *et al.* (2010)
TT	The internet technology has safeguards to make me feel comfortable using it to pay my zakat due I feel assured that legal and technological structures adequately protect me from problems Overall, internet technology is a robust and safe environment in which to complete transactions	Carter and Bélanger (2005) and Schaupp *et al.* (2010)
TZ	I believe that I can trust the E-Zakat system The E-Zakat system can be trusted to carry out online transactions faithfully I think the E-Zakat system will keep my electronic information secure	Carter and Bélanger (2005) and Schaupp *et al.* (2010)
ISO	I feel isolated from other people I have someone to share my feeling with I find it easy to get in touch with others when I need their help Recently, when I have been with other people, I feel separated from them	Zavaleta *et al.* (2017)
ADT	I intend to use ZakaTech services to pay the zakat due in the future Paying the zakat due via ZakaTech services is something that I would do, especially with the spread of COVID-19 I plan to continue using ZakaTech services in the future even after COVID-19 ends I would use digital services to pay my zakat due	Venkatesh *et al.* (2003) and Schaupp *et al.* (2010)

Table 2.
Measurement items
of variables

found that a large proportion (79%) of the respondents reached a higher level of education (bachelor's degree and above). Among the 496 zakat payers, more than half (52%) had previously paid zakat on business, followed by 27% who paid zakat on savings, 9% for zakat on investment, 7% for zakat on gold and silver and 5% of the respondents paid zakat on shares. In general, we deduce that both samples from these two countries showed to be well-diversified in terms of zakat types, gender, age and educational background.

	PE	EE	SI	FC	SE	PR	TT	TZ	ISO	ADT
Saudi Arabia										
PE	1									
EE	0.679**	1								
SI	0.652**	0.434**	1							
FC	0.542**	0.418**	0.556**	1						
SE	0.657**	0.705**	0.591**	0.495**	1					
PR	0.288**	0.113*	0.172**	0.086	0.199**	1				
TT	0.730**	0.760**	0.643**	0.596**	0.703**	0.216**	1			
TZ	0.633**	0.715**	0.639**	0.647**	0.643**	−0.007	0.845**	1		
ISO	0.000	0.009	0.061	0.077	0.020	−0.100*	0.062	0.096*	1	
ADT	0.663**	0.471**	0.744**	0.613**	0.590**	0.029	0.713**	0.730**	0.122**	1
Egypt										
PE	1									
EE	0.670**	1								
SI	0.649**	0.426**	1							
FC	0.530**	0.399**	0.551**	1						
SE	0.649**	0.697**	0.587**	0.482**	1					
PR	0.294**	0.118**	0.174**	0.091*	0.204**	1				
TT	0.724**	0.753**	0.639**	0.585**	0.696**	0.222**	1			
TZ	0.624**	0.706**	0.636**	0.636**	0.633**	−0.004	0.840**	1		
ISO	0.287**	0.178**	0.375**	0.377**	0.273**	0.027	0.332**	0.362**	1	
ADT	0.656**	0.458**	0.742**	0.604**	0.582**	0.032	0.707**	0.724**	0.499**	1

Table 3.
Bivariate correlation
test

Notes: PE = performance expectancy; EE = effort expectancy; SI = social influence; FC = facilitating condition; SE = self-efficacy; PR = perceived risk; TT = trust in technology; TZ = trust in EZS; ISO = social isolation; ADT = ZakaTech adoption

Variables	Category	Saudi Arabia (%)	Egypt (%)
Gender	Male	64	57
	Female	35	43
Age	20–30 years	33	35
	31–40 years	32	41
	41–50 years	20	14
	51 and above	15	10
Education	Up to secondary school	24	13
	Diploma certificate	13	8
	Bachelor's degree	36	39
	Postgraduate (Master's degree or Doctoral degree)	27	40
Types of zakat previously paid	Zakat on gold or silver	12	7
	Zakat on money	34	27
	Zakat on business	33	52
	Zakat on shares	11	5
	Zakat on investment funds	10	9

Table 4.
Demographic
composition of retail
investors

A descriptive statistics test was used in the current study to illustrate the basic feature and levels of each variable (Table 5). This descriptive analysis reports the mean values, standard deviations and minimum and maximum values, using five-Likert scale criteria anchored by 1 = strongly disagree to 5 = strongly agree, for all latent constructs.

	n	Mini.	Maxi.	Mean	SD
Saudi Arabia					
PE	510	2.00	5.00	3.764	0.860
EE	510	2.00	5.00	3.935	0.856
SI	510	1.33	5.00	3.497	0.961
FC	510	1.00	5.00	3.842	0.802
SE	510	1.33	5.00	3.727	0.817
PR	510	1.00	5.00	2.875	1.291
TT	510	2.33	5.00	3.739	0.799
TZ	510	1.33	5.00	3.851	0.841
ISO	510	1.40	4.80	2.840	0.620
ADT	510	1.00	5.00	3.805	0.994
Egypt					
PE	496	2.00	5.00	3.785	0.863
EE	496	2.00	5.00	3.961	0.853
SI	496	1.33	5.00	3.511	0.970
FC	496	1.00	5.00	3.865	0.800
SE	496	1.33	5.00	3.748	0.819
PR	496	1.00	5.00	2.872	1.309
TT	496	2.33	5.00	3.760	0.800
TZ	496	1.33	5.00	3.875	0.840
ISO	496	1.00	4.80	2.992	0.779
ADT	496	1.00	5.00	3.828	0.999

Notes: PE = performance expectancy; EE = effort expectancy; SI = Social influence; FC = facilitating condition; SE = self-efficacy; PR = perceived risk; TT = trust in technology; TZ = trust in EZS; ISO = social isolation; ADT = ZakaTech adoption

Table 5.
Descriptive statistics

4.2 Measurement model

Data evaluations begin with an analysis of the reflective measurement model by estimating the convergent and discriminant validity and reliability of the proposed model. Convergent validity refers to "the degree to which a set of indicators measuring the same construct are in agreement" (Hair *et al.*, 2017). While discriminant validity is about "the extent to which indicators differentiate across variables or measure distinct concepts by empirical standards" (Hair *et al.*, 2017). This analysis is related to the extent to which variables of interest are truly unique and distinct from one another.

Table 6 illustrates the results of factors loadings, composite reliability (CR) and average variance extracted (AVE) for both samples (Saudi Arabia and Egypt). Loading results in both samples show that all indicators included in the model were higher than the ideal value of 0.60. The findings of both samples indicate that the CR values of all constructs were well-surpassed by the benchmark value of 0.70. The values of AVE analysis in the Saudi data ranged between 0.523 (ISO) and 0.908 (PR), exceeding the cutoff level of 0.50 (Hair *et al.*, 2017). Likewise, the Egyptian data indicate that the AVE values ranged between 0.652 (ISO) and 0.865 (FC). Our proposed model shows that each construct must at least have the ability to explain half or more of the variance of its indicators. Hence, the analysis outcomes establish a reliable and valid research model.

As shown in Table 7, the study also scrutinized the heterotrait-monotrait (HTMT) ratio to check the discriminant validity. In both samples, we concluded that the HTMT ratios were considerably less than the indicated 0.85 thresholds for all latent constructs (Henseler *et al.*, 2015). This evidences that the discriminant validity was affirmed. Generally, the

| Constructs | Items | Saudi Arabia | | | | Egypt | | | |
		Loadings	CR	AVE	VIF	Loadings	CR	AVE	VIF
Performance expectancy (PE)	PE1	0.841	0.890	0.729	2.203	0.893	0.921	0.796	1.689
	PE2	0.875				0.885			
	PE3	0.846				0.900			
Effort expectancy (EE)	EE1	0.884	0.920	0.793	2.382	0.906	0.914	0.781	2.493
	EE2	0.939				0.884			
	EE3	0.847				0.860			
Social influence (SI)	SI1	0.944	0.933	0.824	2.056	0.936	0.926	0.808	2.118
	SI2	0.940				0.944			
	SI3	0.836				0.786			
Facilitating condition (FC)	FC1	0.860	0.880	0.786	1.633	0.909	0.928	0.865	2.200
	FC2	0.913				0.951			
Self-efficacy (SE)	SE1	0.765	0.864	0.680	2.225	0.813	0.872	0.694	1.462
	SE2	0.858				0.855			
	SE3	0.847				0.832			
Perceived risk (PR)	PR1	0.982	0.952	0.908	1.098	0.872	0.925	0.860	1.017
	PR2	0.922				0.929			
Trust in technology (TT)	TT1	0.781	0.879	0.709	1.156	0.927	0.906	0.764	1.000
	TT2	0.788				0.885			
	TT3	0.946				0.807			
Trust in EZS (TZ)	TZ1	0.950	0.914	0.781	1.200	0.823	0.903	0.758	1.004
	TZ2	0.799				0.917			
	TZ3	0.896				0.869			
Social isolation (ISO)	ISO1	0.630	0.845	0.523	1.027	0.735	0.900	0.652	1.163
	ISO2	0.694				0.827			
	ISO3	0.764				0.838			
	ISO4	0.784				0.817			
	ISO5	0.733				0.816			
ZakaTech adoption (ADT)	ADT1	0.922	0.949	0.822	–	0.911	0.940	0.797	–
	ADT2	0.923				0.917			
	ADT3	0.933				0.922			
	ADT4	0.848				0.818			

Table 6.
Measurement model
assessment

results of the measurement model evaluation data confirm that the measurement scales of the ZakaTech acceptance model are satisfactory, valid and reliable. Thus, we can move on to test the structural model.

4.3 Structural model: direct effects
Prior to estimating the analysis of the structural model, we appraised the collinearity test using variance inflation factor (VIF); the results revealed no threat to the proposed model validity as VIF scores were less than the suggested value of 3.3 (Table 6) in both samples (Diamantopoulos and Siguaw, 2006). Four measures can be used to assess the structural model, including variance explained (R^2), effect size (f^2), predictive relevance (Q2), path coefficient (β) and hypotheses tests (Hair *et al.*, 2017).

Based on the PLS algorithm, we estimated the model-explained variance (R^2) to assess the variance proportion in the criterion explained by the proposed model. The R^2 value of the endogenous construct varies between 0 and 1, indicating the predictive accuracy and explanatory power of the model. For both Saudi Arabia and Egypt data, the integrated framework of UTAUT and SCT in the zakat context has an adequate level of variance in the endogenous variable ($R^2 = 0.688$ and $R^2 = 0.576$). It means that the independent variables

	PE	EE	SI	FC	SE	PR	TT	TZ	ISO	ADT
Saudi Arabia sample										
PE										
EE	0.809									
SI	0.710	0.665								
FC	0.626	0.594	0.693							
SE	0.757	0.814	0.724	0.665						
PR	0.242	0.249	0.223	0.133	0.270					
TT	0.395	0.535	0.429	0.374	0.508	0.158				
TZ	0.675	0.713	0.666	0.766	0.773	0.077	0.446			
ISO	0.058	0.046	0.093	0.101	0.067	0.114	0.030	0.098		
ADT	0.750	0.695	0.815	0.745	0.709	0.094	0.378	0.768	0.139	
Egypt sample										
PE										
EE	0.638									
SI	0.553	0.747								
FC	0.575	0.803	0.752							
SE	0.576	0.539	0.484	0.429						
PR	0.050	0.071	0.079	0.044	0.096					
TT	0.207	0.475	0.391	0.400	0.222	0.083				
TZ	0.332	0.162	0.077	0.111	0.145	0.127	0.074			
ISO	0.295	0.226	0.349	0.254	0.337	0.067	0.208	0.109		
ADT	0.575	0.552	0.588	0.547	0.681	0.089	0.334	0.179	0.580	

Notes: PE = performance expectancy; EE = effort expectancy; SI = social influence; FC = facilitating condition; SE = self-efficacy; PR = perceived risk; TT = trust in technology; TZ = trust in EZS; ISO = social isolation; ADT = ZakaTech adoption

Table 7.
Discriminant validity –
HTMT criterion

can collectively explain 69% and 58% of the variance level of Saudi and Egyptian zakat payers' intentions to use ZakaTech services.

In both samples, bootstrapping – a technique in PLS-SEM that allows determining the significance of direct and indirect proposed hypotheses – was used with 5,000 bootstrap samples. For the Saudi sample, the analysis outcomes (Table 8) demonstrate that with one exception (for the path: TZ → PR), all the hypothesized relationships between independent

Hypotheses	Path	Saudi Arabia sample				Egypt sample			
		β	t	p	Supported?	β	t	p	Supported?
H1	PE → ADT	0.198	4.786	0.000	Yes	0.135	3.356	0.000	Yes
H2	EE → ADT	0.132	2.521	0.006	Yes	0.034	0.671	0.251	No
H3	SI → ADT	0.420	10.260	0.000	Yes	0.138	2.752	0.003	Yes
H4	FC → ADT	0.195	6.325	0.000	Yes	0.140	2.758	0.003	Yes
H5	SE → ADT	0.067	1.740	0.041	Yes	0.305	7.714	0.000	Yes
H6	PR → ADT	−0.119	4.795	0.000	Yes	−0.063	1.799	0.036	Yes
H7	TT → PR	−0.200	4.652	0.000	Yes	−0.079	1.336	0.091	No
H8	TZ → PR	0.025	0.268	0.394	No	−0.139	3.222	0.001	Yes
H9	ISO → ADT	0.063	2.640	0.004	Yes	0.313	10.140	0.000	Yes

Notes: PE = performance expectancy; EE = effort expectancy; SI = social influence; FC = facilitating condition; SE = self-efficacy; PR = perceived risk; TT = trust in technology; TZ = trust in EZS; ISO = social isolation; ADT = ZakaTech adoption

Table 8.
Structural model
results

and dependent constructs are accepted statistically (i.e. *t-values* > 1.65; one-tailed test). Thus, the analysis supports *H1*, *H2*, *H3*, *H4*, *H5*, *H6*, *H7* and *H9*, while *H8* does not. In particular, PE (β = 0.198, p < 0.01), EE (β = 0.132, p < 0.01), SI (β = 0.420, p < 0.01), FC (β = 0.195, p < 0.01), SE (β = 0.067, p < 0.05), PR (β = −0.119, p < 0.01) and ISO (β = 0.063, p < 0.01) are significantly related to intention to adopt ZakaTech services. Also, TT had a negative and strong effect on PR (β = −0.200, p < 0.01).

As for the Egyptian sample, the results of the structural model indicate that all direct relationships are supported (p < 0.05), except for the relationship between EE and to intention to adopt ZakaTech services (β = 0.034, p > 0.05) and the relationship between TT and PR (β = −0.079, p > 0.05). Hence, *H1*, *H3*, *H4*, *H5*, *H6*, *H8* and *H9* are statistically supported, while *H2* and *H7* are not.

4.4 Multigroup analysis

To provide a more accurate comparison of the differences between male and female users of ZakaTech services in the path significance, multigroup analysis (PLS-MGA) was used. As suggested by Henseler *et al.* (2009), the PLS-SEM test is a nonparametric analysis that allows to evaluation of differences in group-specific path coefficients. In our study, the moderating role of gender in ZakaTech adoption among zakat payers in both Muslim-majority countries (Saudi Arabia and Egypt) is examined using the PLS-MGA test (Table 9).

In the Saudi sample, there are 330 males and 180 females, and the findings of the PLS-MGA test show that three of the presumed moderating hypotheses are supported, *H14* (SE → ADT, p = 0.032), *H17* (TZ → PR, p = 0.048) and *H18* (ISO → ADT, p = 0.049). The analysis shows significant moderating effects of GDR between SE and ZakaTech adoption intention; TZ and PR; and ISO and adoption intention.

In the Egyptian sample that included 281 males and 215 females, the findings of PLS-MGA analysis demonstrate that two proposed hypotheses of the moderating effects of gender were supported, namely, *H12* (SI → ADT, p = 0.005) and *H18* (ISO → ADT, p = 0.033). That is, there are significant moderating effects of GDR on the relationships between SI and adoption of ZakaTech services and ISO and ZakaTech adoption during COVID-19.

| | Path | Saudi Arabia sample | | | Egypt sample | | |
		β-diff (Male vs Female)	p-diff (Male vs Female)	Sig.	β-diff (Male vs Female)	p-diff (Male vs Female)	Sig.
H10	PE → ADT	0.014	0.445	No	−0.087	0.139	No
H11	EE → ADT	0.014	0.443	No	0.126	0.112	No
H12	SI → ADT	0.076	0.188	No	−0.251	0.005	Yes
H13	FC → ADT	0.002	0.489	No	−0.017	0.440	No
H14	SE → ADT	−0.163	0.032	Yes	0.077	0.185	No
H15	PR → ADT	0.039	0.242	No	0.056	0.207	No
H16	TT → PR	−0.042	0.426	No	−0.057	0.384	No
H17	TZ → PR	−0.259	0.048	Yes	0.001	0.450	No
H18	ISO → ADT	−0.098	0.049	Yes	0.120	0.033	Yes

Table 9.
Results of gender moderating effects (PLS-MGA)

Notes: PE = performance expectancy; EE = effort expectancy; SI = social influence; FC = facilitating condition; SE = self-efficacy; PR = perceived risk; TT = trust in technology; TZ = trust in EZS; ISO = social isolation; ADT = ZakaTech adoption

5. Discussion

As the outbreak of the pandemic has substantially affected all aspects of life and forced individuals to reform their lifestyle and work habits, in the new normal, zakat authorities and agencies are striving to cope with disruptions caused by COVID-19 and backing the efforts to ensure much-needed relief to less fortunate segments hit by this disaster. Such efforts may not generate advanced outcomes without the deployment of ZakaTech services to ensure the ground level of propagating technology opportunities and great transparency using innovative solutions that meet the needs of the Islamic crowd during this unprecedented crisis.

While the core issue revolves around whether Muslims would accept and use such relevant new digital services at this critical time, the present study is driven by the dearth of empirical-based studies that explored how and why a Muslim accepts and adopts the usage of newly EZSs in the time of social distancing. In particular, the aim of the research is to examine the users' intention to adopt ZakaTech services provided by some MENA Muslim-majority countries (e.g. Saudi Arabia and Egypt), especially during the time of the outbreak. We seek to answer the research question that focuses on proposing an integrated framework with the purpose of identifying the effect of UTAUT determinants, SE, PR, TT, TZ and ISO on intention to adopt ZakaTech. Also, the moderating role of GDR in ZakaTech adoption among males and females in two typical Islamic settings like Saudi Arabia and Egypt.

The nine-factor model emerges with some interesting outcomes. First, on the issue of PE, we found that the respondents from both countries showed that PE positively influences their intentions to adopt ZakaTech services. The analysis confirms earlier findings conducted in different contexts, such as Al Mansoori *et al.* (2018), Venkatesh *et al.* (2003), Schaupp *et al.* (2010), Tarhini *et al.* (2016) and Chua *et al.* (2018). The result could be traced to the fact that Muslims may believe that the zakat institution and its ZakaTech services can provide numerous profound benefits and options to zakat payers. These digital services, in turn, can considerably reduce the time and costs incurred by zakat payers in relation to paying zakat through the traditional way. Although EE was positively related to the ZakaTech adoption intention of Saudi users, the path analysis of the Egyptian sample found that among the UTAUT constructs, EE failed to report any statistical evidence. Some prior studies, but again in different settings (Lian and Yen, 2014; Schaupp *et al.*, 2010; Salloum and Shaalan, 2018) documented a similar conclusion. In the zakat scenario, this result may be an interesting discovery. Apart from the system and its degree of ease, Egyptian zakat payers may perceive that ZakaTech services are among the few means available to use in compliance with their religious obligation, particularly during the precautionary measures against the pandemic.

The study revealed that SI exerts the most significant effect on zakat payers' intentions to use ZakaTech in Saudi Arabia, and it is also among the strongest predictors in Egypt. This finding corresponds with previous research (Tan and Leby Lau, 2016; Ye *et al.*, 2020; Al-Awadhi and Morris, 2008). In fact, the more the SI of family, peers, friends or some other important in a relevant social network who perceive that using ZakaTech services are useful – through a shared cognition process – the greater the strength of zakat payers' intentions to use such services. Moreover, in both samples, this study found that users' intentions to use ZakaTech are strongly shaped by their FC. It is consistent with literature from various domains, such as Al Mansoori *et al.* (2018) in the e-government field; Bawack and Kamdjoug (2018) in health systems; and Foon and Fah (2011) in internet banking. In a context like digital zakat environment, Muslims may feel access to the relevant necessary resources and knowledge that enable them to adopt ZakaTech services provided by zakat institutions, nurturing zakat payers' propensity to continue using such services.

The application of UTAUT-SCT indicates that SE indeed plays an important role in technology uptake. The empirical evidence from both samples indicated that the SE of EZS users was found to positively influence their intentions to accept using ZakaTech services. We also found that TT reduces users' inherent risks associated with digital transactions and increases their likelihood of adopting ZakaTech services in Saudi Arabia, while no effect was revealed in Egypt. However, the study found that trust perception of the EZS seems to be a vital predictor for mitigating PR among Egyptian users of ZakaTech, but it did not report an effect in the Saudi sample.

In both countries, the study found that users' intentions to adopt ZakaTech are significantly influenced by ISO caused by the pandemic. It implies that socially isolated zakat payers are inclined toward using the EZS services to perform their religious obligation timely and safely while at the same time adhering to pandemic fight measures. For many, the COVID-19 crisis has exposed weaknesses and rendered many traditional strengths irrelevant. The common denominator for the resilience of most institutions is digital readiness and connectivity (Wilder-Smith and Freedman, 2020). IFIs, particularly zakat institutions could have an invaluable opportunity to capitalize on the significant cultural and behavioral shifts of the past few months so that they can get ready for a post-COVID-19 world. It is an indication of the need for new omnichannel business models that combine innovative digital offerings and Islamic law. Need for ZakaTech services that can be able to mitigate the negative impact and empower zakat payers to stay relevant during such an unprecedented crisis.

Interestingly, this study extracted significant insights into the moderating effects of GDR in adopting ZakaTech services across both countries. In the Saudi context, we found that there are three significant differences (SE, TZ and ISO) between male and female users to adopt digital services provided by the zakat institution. Most notably, GDR in the influence of SE on adoption, with female users showing a much stronger effect than males. Likewise, the results show an important difference between males and females regarding the effect of ISO on ZakaTech service adoption, experiencing a stronger effect among females than males. The pandemic had a more pronounced effect related to ISO on female compared to male counterparts, according to Prowse *et al.* (2021). As such, we could argue that females are generally more isolated than men, perhaps, and so the extent to which females are isolated has a greater impact on take-up. The results related to the negative effect of TZ on PRs were also different between male and female users in Saudi Arabia, as male zakat payers experienced a stronger effect than females.

In the Egyptian sample, the study also found a significant difference between males and females in relation to the effect of ISO on zakat payers' adoption of ZakaTech services. However, it is found that this effect is much stronger among male users than female users. Another difference between Egyptian male and female users was related to the effect of SI on ZakaTech services adoption, where it is evident that in Egypt, female zakat payers showed a stronger effect than males. A possible reason for this observation could be the cultural barriers found for women in economic participation in Saudi Arabia; where it is reported that Saudi Arabia has one of the lowest female labor force participation rates in the world (Tamayo *et al.*, 2021), while in Egypt, the participation of women in economic activities is more acceptable (The World Bank, 2021).

5.1 Theoretical implications

This research enriches Islamic finance literature in many ways. First, it draws attention to Islamic social finance and the effectiveness of zakat during the pandemic. Second, by examining the new trend of "ZakaTech" that has recently been introduced into the Islamic

finance industry from a cross-national perspective (Muslim-majority countries), we propose and empirically validate a viable extended model of UTAUT-SCT perspectives (SE, PRs, online trust and ISO) in an emergent context of Islamic FinTech services. As research on the effect of the UTAUT model and its constructs on the adoption of ZakaTech is still in its infancy, this comprehensive model is a pioneer in the zakat setting and could serve as empirical evidence confirming the suitability of the UTAUT unified model in investigating Muslim users' intentions to adopt ZakaTech services. The integrated UTAUT model in the zakat environment proved a good predictive and explanatory power in explaining Muslims' intentions to adopt ZakaTech by 69% and 58% of the variance in both Saudi Arabia and Egypt samples, respectively. Third, the present research adds value to the literature by testing the moderating role of GDR in the adoption of ZakaTech services from two typical Islamic settings like Saudi Arabia and Egypt. This helps to explain the motives that drive Muslims to use an EZS and delegate it with a core religious obligation like zakat. Therefore, the study is anticipated to serve as a springboard for future studies investigating behavioral issues concerning technology acceptance among Muslims, not only in the zakat context but also in any area of Islamic endeavors.

5.2 Policy implications
The findings of this study are relevant to policymakers not only in Muslim-majority countries but also in Muslim-minority countries where zakat administration is made informally. Due to the pandemic, it is clear that the future of zakat administration can only be shaped by the adoption of technology and as such, it is imperative for the policymakers not only to enact strategic plans to integrate technology with zakat; but also need to create awareness among the users of zakat including payers and beneficiaries on the PRs of technology and how they are mitigated to benefit them. It is also imperative to adopt a strategy to create awareness about this in a gender-balanced way where both males and females can have the same understanding, which eventually will lead to sustainable inclusion of both genders in participation in zakat. The cultural barriers or restrictions imposed in Muslim countries for females to participate in economic activities need to be eliminated, and the policymakers will have to ensure that this is made possible through strategies adopted and awareness created. Further, the policymakers need to provide incentives to zakat authorities and zakat organizations that adopt technology in managing zakat, as this would be a way to motivate them to adopt innovative means to manage zakat by providing technology-linked options for zakat users.

6. Conclusion and recommendations
Our results obtained indicate that models of technology acceptance continuously demonstrate utility and suitability in a wide range of domains. Globally, technology and innovation continue to accelerate over time and events; this is clearly seen during the ongoing pandemic crisis. COVID-19 has shown that technology can be an important instrument and solution for economic recovery; as such many institutions are rapidly pivoting to use digitally driven systems to survive and evolve during this crisis. In this research, we attempted to validate an integrated framework of UTAUT-SCT in a context as modern and unique as ZakaTech. The study aimed to examine the influence of relevant factors (UTAUT, SE, PR, online trust and ISO) on behavioral intentions to adopt ZakaTech services in Saudi Arabia and Egypt, especially during the time of the pandemic social distancing. Also, we attempted to examine GDR in the adoption of such digital services in both countries.

The empirical analysis pointed out that the majority of the determinants integrated into the ZakaTech model are significant, except for TZ $\rightarrow$ PR in the Saudi sample and EE $\rightarrow$ adoption and trust in internet $\rightarrow$ PR in the Egyptian sample. Furthermore, the results of the Saudi sample show that gender significantly moderated the relationship between SE and ZakaTech adoption intention, and TZ and PR. In both samples, we found important differences between males and females in terms of the effect of ISO on ZakaTech adoption. The relationship between SI on ZakaTech services adoption was significantly moderated by GDR in Egypt.

From the findings of this research, it is recommended policymakers, and stakeholders find ways to develop strategies to escalate the adoption of technology in zakat administration and also to create awareness among the users of EZSs in a gender-balanced manner that includes zakat payers and recipients in hopes of bridging the digital gender divide. In Islam, both men and women can have wealth, and as such, zakat payment eligibility is not only for men but also for women as well. The digital gender divide is a challenge that needs to be resolved simultaneously as well. OECD (2018, p. 37) states that there are three selected technologies, namely, internet and digital platforms, mobile phones and electronic payments. Governments should concentrate on creating awareness to bridge the gender gap as they offer "leapfrog" opportunities for all, and have the potential to improve the lives of women and girls in particular. Bridging the digital gender divide in this regard is imperative for the sustainable inclusive development of zakat.

Further, strategies need to be developed to provide incentives to zakat authorities and organizations that adopt technology in managing zakat. These incentives could include giving financial and technical grants by multilateral institutions, such as Islamic Development Bank (IsDB), through reverse linkage programs to provide the opportunity for zakat institutions to learn from each other by sharing their experiences. A reverse linkage program is a technical cooperation mechanism enabled by the IsDB whereby member countries and Muslim communities in nonmember countries exchange their knowledge, expertise, technology and resources to develop their capacities and devise solutions for their autonomous development. This is important to escalate the process of fusing technology with zakat, which is an important social finance tool to eradicate poverty in the world.

Moreover, there is a need to conduct future research to understand digital maturity by looking at the following aspects: communities' readiness for a digital change; convenience that can be delivered to communities; formulation of a digital strategy; finding out the skill set and the human capital required for the zakat organization to adopt a digital change; and ways in which cost can be reduced in running the zakat organization while improving efficiency. In this regard, digital maturity is defined as the "organization's readiness to adopt digital technologies and processes and respond to digital trends affecting their sector" (Green, 2020). It is essential to note that digital maturity is a self-assessment exercise carried out by charity leaders to find gaps in their capabilities, plan next steps and set short and long-term goals for more effective digital use.

Despite the ambitious aspirations of this research, certain limitations are worth noting. The research time horizon is cross-sectional, as such changes may be missed in opinions over time. Future longitudinal research is encouraged as COVID-19 has triggered high degrees of uncertainty. Moreover, given the recent launch of similar EZSs in some countries, we recommend conducting an empirical cross-country study of ZakaTech adoption levels relying on this proposed framework. Finally, future studies

based on this model are proposed to take into account other sensitive factors, such as user satisfaction and communication quality, as well as the moderating effects of age and experience with EZSs.

Note

1. It has been introduced at the 4th International Conference of Zakat (ICONZ), Indonesia, October 7th–8th, 2020. Also, it has recently been familiarized by the International Shariah Research Academy for Islamic Finance (ISRA, Malaysia).

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