

Aspects that constitute citizens' trust in e-government - A review and framework development



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Abstract The extent of citizens' trust in government determines the success or failure of e-government initiatives. Nevertheless, the idiosyncrasies of the concept and the broad spectrum of its approach still present relevant challenges. This work presents a systematic literature review on e-government trust while elaborating and summarizing a conceptual analysis of trust, introducing evaluation methods for government trust, and compiling relevant research on e-government trust and intentional behavior. A total of 26 key factors that constitute trust have been identified and classified into six categories: Government trust, Trust in Internet and technology (TiIT), Trust in e-government (TiEG), Personal Beliefs, Trustworthiness, and Trust of intermediary (ToI). The value added of this work consists of developing a conceptual framework of TiEG to provide a significant reference for future in-depth studies and research on e-government trust.

Keywords: trust, trust in e-government, Systematic Literature Review (SLR), framework

1. Introduction

The fundamental idea behind trust is that trusting behavior encourages partners to establish an open and informal relationship with a high degree of harmony. This behavioral characteristic has bestowed the capacity to allow firms to rely on their partners confidently (Butler, 1991; Moorman et al., 1993), facilitates conflict resolution (Weitz & Jap, 1995), and works as a substitute for other governing instruments (Gulati, 1995; Gundlach & Murphy, 1993; Heide, 1994; Parkhe, 1993). Trust can also be regarded as the expectation of goodwill in others and is related to the judgment of individuals, groups, and institutions. Most trust research focuses on the antecedents of trust, government trust, e-government trust, and adoption behavior (Patrick & Marques, 2022). Concerning people's relationships with their governments, it is widely assumed that individuals increasingly trust their governments and e-services, resulting in a process of establishing social trust and ultimately generating a readiness to accept e-government (Pérez-Morote et al., 2020). Nevertheless, there is currently no consensus on what constitutes citizens' trust in e-government. Prior studies emphasize the consequence of technology acceptance and behavior without an in-depth discussion of the process and mechanism of trust. Even extant theories are vague in definitions and dimensions, and the empirical parts fail to provide sufficient evidence to support the hypotheses.

This work aims to provide a comprehensive literature review about government trust, e-government trust, and behavioral intention. Drawing on insights from the review papers, we examine the critical factors, generalize the dimensions of trust in e-government, and propose a conceptual framework to open new research avenues.

2. Methodology

This review is based on three stages of Tranfield's systematic review method (Tranfield et al., 2003). Stage I: Planning the review, which includes identification, preparation, and protocol development. Stage II: Conducting the review, including identification of research, selection of studies, quality assessment, data extraction, and data synthesis. Stage III: Reporting and disseminating reports, comments, and evidence into practice. We rely on literature, such as journal articles, conference papers, book chapters, and Scopus database reviews. The publication years of the selected articles ranged from 2000 to 2022. The keyword selection and search criteria in Table 1 were based on the scope and definitions of e-government and trust theory (Abu-Shanab, 2014; Janssen et al., 2018; Teo et al., 2009). Three main strings were input with the connector "AND", while "OR" was also used for each keyword. The first string included (trust in e-government) OR (trust in mobile government) OR (trust in electronic government); the second string included (intention) OR (adoption) OR (willingness); and the third string included (trust) OR (political trust) OR (social trust). Based on the search criteria above, 556 articles were identified, as shown in Figure 1. Of these, 480 publications were related to subjects or disciplines such as social science, computer science, decision science, psychology, and multidisciplinary. In addition, articles with at least ten citations were selected to guarantee the quality of publications. After a manual screening of the titles and abstracts, a list of 148 papers



remained. We inspected all articles, after which 75 publications were identified as the final list of publications to be part of the sample represented in Section 3. Related discussion and conclusions are presented in Section 4 and Section 5, respectively.

Table 1 Criteria of search.

| Searching Strings | Keyword Category | Content of string |
|-------------------|--------------------|--|
| String 1 | E-government trust | (Trust in e-government) OR Trust in mobile government) OR (Trust in electronic government) |
| String 2 | Intention | (Intention) OR (Adoption) OR (Willingness) |
| String 3 | Trust | (Trust) OR (Political trust) OR (Social trust) |

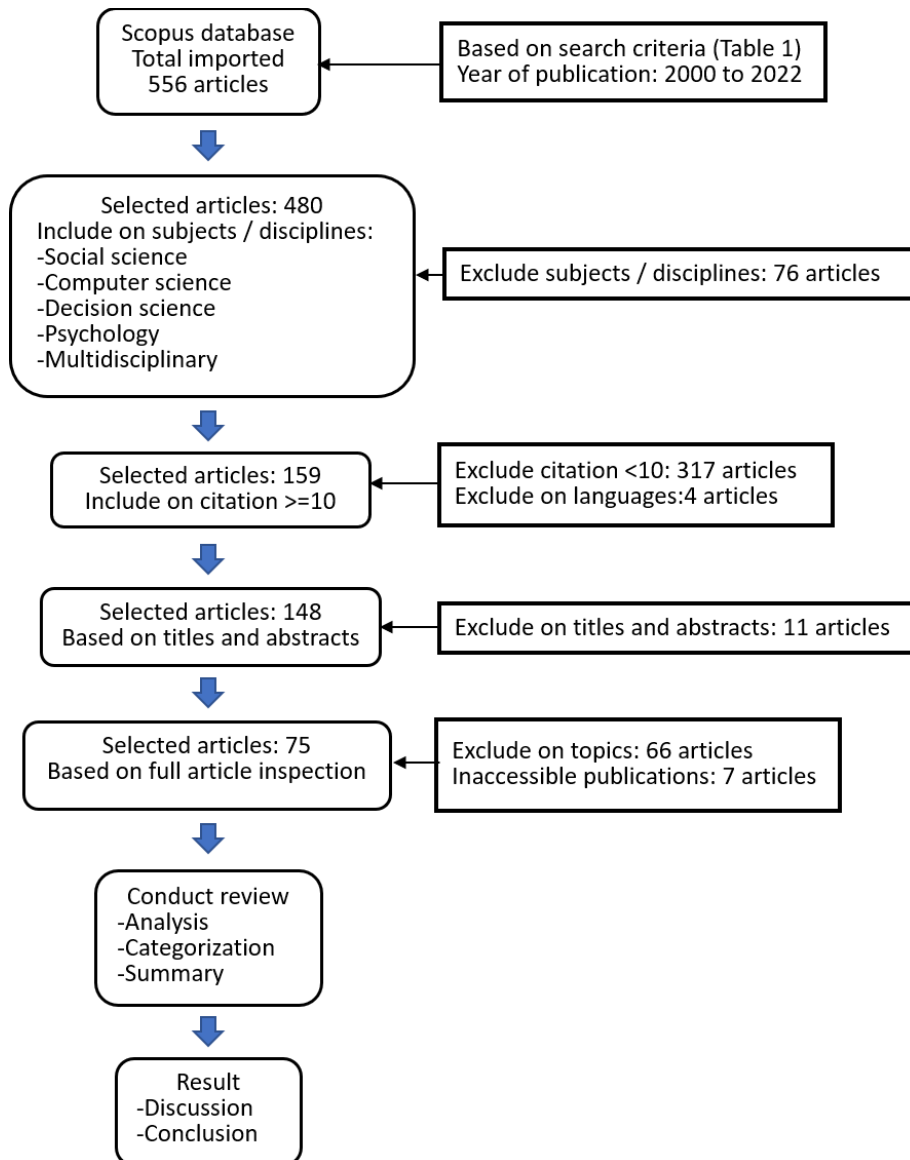


Figure 1 Flowchart of review methodology.

3. Thematic results

The themes that conform to this article include trust and acceptance factors of e-government services, the empirical research framework, trust and risk in e-government adoption, and e-tax services. The criteria and inclusion of themes are based on the definitions, theories, connotations, research direction, and viewpoints of e-government trust (Bélanger & Carter, 2008; Carter & Bélanger, 2005; Hajar et al., 2017; Janssen et al., 2018; Veeramootoo et al., 2018). Some of them are literature reviews and theoretical models, which help understand e-government. Some papers do not meet established standards and are excluded since their issues mainly involve satisfaction, public value, health care, reform, and innovation, and some of them are qualitative research, and related to tourism and economic topics. A summary of the topic and article selection are presented in Table 2. The topics retained will be resumed next.



Table 2 Included and excluded topics.

| Included topics: | Number of articles |
|---|--------------------|
| Trust and acceptance factors of e-government services | 24 |
| Trust and risk in e-government service adoption | 14 |
| Literature review, theoretical model, and conceptualization of trust | 10 |
| Empirical research framework on e-government trust and service adoption | 23 |
| Trust factors and adoption of e-tax services | 4 |
| Total | 75 |
| Excluded topics: | Number of articles |
| Barriers of e-services | 8 |
| Service satisfaction | 6 |
| Tourism and economic issues | 9 |
| Qualitative research and case studies | 9 |
| Transparency, innovations, corruption and participation | 15 |
| Online consumer behavior, transactions and consumption of mobile apps | 9 |
| Public value of e-governance | 5 |
| Public health care | 5 |
| Total | 66 |

3.1. Trust in government

Trust in government was defined as citizens' normative expectations and beliefs in government agencies, including multiple levels, such as trust in policies, institutions, and officials (Anderson, 2010; Miller & Listhaug, 1990). There is a common point in the definition of government trust, which is generally considered within a relationship between subject and object, in which the trust subject is a citizen, and the object of the trust relationship is the government. From a psychological standpoint, government trust is regarded as a psychological expectation of the political system and government behavior in a public-government interaction. One view regards it as an element of political trust, intricately connected to political legitimacy and support, encompassing various dimensions (Weinberg, 2022). Government trust is a fundamental dimension (Kui & Lei, 2017) and could be associated with political trust (Anderson, 2010). Dominant theoretical frameworks influence the literature on public trust in government: sociocultural theory, performance-based theory, and cultural theory (Aydin & Cenker, 2012). Sociocultural theory recognizes that socialization shapes personal values and beliefs during the process of personal development; consequently, age, gender, education level, religion, income level, sociopolitical and economic status determine an individual's trust in the government. Performance theory excludes consideration of socialization, personal culture, and contextual factors; it posits that public trust is founded on performance, with better government performance on political affairs, economic development, and providing services resulting in higher citizen trust. Cultural theory suggests that the impact of culture on political trust is significant and enduring. Consequently, individuals from diverse cultural backgrounds exhibit distinct perspectives regarding the interplay between the individual and the government, efficacy, and the level of trust (Aydin & Cenker, 2012; Wenxuan, 2013). We argue that traditional government services are essential to gaining the public's confidence. E-government serves as the core component of contemporary smart cities, effectively addressing obstacles related to spatial limitations, geographical constraints, and the processing of documents by utilizing information and communication technology (ICT), thereby reducing the complexity of face-to-face services. Relevant initiatives also consider the needs of elderly, disabled, and vulnerable groups. Despite the similarities in social context and personal characteristics between sociocultural theory and the focal point of cultural theory, the interplay between traditional government and e-government is mutually reinforcing. Thus, it becomes challenging for a single theoretical framework to comprehensively elucidate the concept of government trust at the micro level. Specifically, e-government is a strategic instrument for countries to connect with the global community during the reform and innovation process. The issue of establishing trust in e-government is of paramount importance and warrants the attention of both governmental authorities and society broadly.

3.2. Evaluation of government trust

The dominant theories elucidating citizens' trust in public institutions encompass 1. those focused on the psychosocial characteristics of individuals; 2. those focused on the cultural environment of individuals, groups, and communities; and 3. those focused on government performance (Newton & Norris, 2000). Government trust depends mainly on the performance evaluation of current and future macroeconomic assessments, views on the economy, and the perception of enhanced freedom and fairness of government (Mishler & Rose, 1997). People appear to trust local governments more in countries where local authority is more influential. Trust in state government in the United States varies considerably across states, with fiscal conditions, unemployment rates, national ideology, and integrity statistically influencing trust (Weinschenk & Helpap, 2015). Government trust manifests differently in China; as the hierarchy of government increases, there is an

associated rise in public trust, resulting in a more favorable perception of the central government compared to the local government (Liyong, 2014). The primary factor contributing to the notable level of political trust is mostly ascribed to excellent governance performance (Han et al., 2019). In the context of Hong Kong, there is a significant association between the extent of political trust placed in public service and government; the measurement of public service levels has emerged as an indicator through which residents express their confidence in the implementation of the "one country, two systems" framework (Cole et al., 2018; Fitzgerald & Wolak, 2014; Ma & Christensen, 2018; Zhang & Ip, 2019). Hetherington et al. conceptualized government trust as the proportion of individuals' assessment of governmental achievement relative to their normative anticipations regarding the functioning of the government (Hetherington & Husser, 2012), where trust is constrained by the economic, political, cultural, and social developing environment of the trust subject and object (Haiyang et al., 2016; Mishler & Rose, 1997; Yan-xia & Xia-mei, 2018). Institutionalists believe that governance performance and public policy satisfaction are important factors affecting trust in the government.

Government trust can be evaluated in two ways: direct measurement of the current government trust and measuring trust in the political system (Wenxuan, 2013). Direct measurement mainly involves the public's trust in current government leaders, government officials, and institutions. The measurement standard is based on the current government's performance, ability, and motivation. Such measurements generally correspond to specific support. The definitions provide a valuable approach to the three dimensions of trust: competence, benevolence, and integrity (Grimmelikhuijsen et al., 2013). Competence refers to whether people believe that government organizations are competent, effective, skilled, or professional in decision-making, thereby giving people confidence in the agency and related tasks. Benevolence refers to the degree to which government organizations care about citizens' interests and goodwill; the relying party has certain specific attachments to the trusted party. This dependency relationship is the perception of the positive orientation of the trusted party by the relying party. Integrity is the degree of sincerity, honesty, and commitment of government, involving the views of trusted parties on trusted parties, that is, the government's adherence to a set of principles that people consider acceptable, implying that government institutions are considered to keep their promises and be honest. Studies by Cole et al. revealed that these dimensions were psychologically effective and had strong internal consistency and effectiveness; relevant scales were often used to measure government trust (Cole et al., 2018; Grimmelikhuijsen, 2012; Grimmelikhuijsen & Knies, 2017; Mayer et al., 1995; Seok-Eun, 2005; Wenxuan, 2013). Measuring trust in the political system provides an indicator of understanding the public's trust in the system's operation and performance. The object of measurement is the political system, focusing on the effectiveness of the political system and the impartiality of the political process. The World Values Survey (Steven, 2007) and New Democracy Barometer (Mishler & Rose, 1997) are typical metrics utilized to balance the level of trust in the government.

3.3. Connotation of trust in e-government

From the review papers on e-government trust, trust in technology and trust in government have always been a concern (Alzahrani et al., 2018; Bélanger & Carter, 2008; Janssen et al., 2018). E-government is a governance initiative in which trust in e-government is inherently linked to trust in government, which pertains to people's perception regarding the integrity and competence of a government or institution. It signifies the government's genuine concern for its citizens and its ability to deliver e-services, fostering citizens' confidence that e-government will be able to fulfill their needs. In contrast, if a citizen has low trust in the government, he or she will be skeptical of the policies and actions that the government has implemented. Trust in technology involves the notion of placing trust in the counterpart within the network, thereby raising concerns regarding the dependability of the Internet infrastructure. We can say that trust in technology is the extent to which electronic service users trust the ability and security of the Internet. In addition, privacy risks involve losing control over personal information (Zeebaree et al., 2022). Citizens are unlikely to expect successful online transactions with e-services when they experience insecurity regarding the disclosure of private information over the Internet (Bélanger & Carter, 2008; Gupta et al., 2016; Teo et al., 2009). The composition of trust in the context of e-government is characterized by its multidimensionality, as it involves intricate dynamics among technology, government entities, organizations, and individuals (Alzahrani et al., 2018). The review papers suggest that more factors are related to the trustworthiness of e-government (Abu-Shanab, 2014; Janssen et al., 2018; Kumar et al., 2018; Lian, 2015), which can be divided into several aspects such as quality, capability, belief, and perception. The quality aspect includes satisfaction, quality of system, service, and information, which involve various quality indicators of public services (Abdulkareem & Mohd Ramli, 2022). Relevant service platforms, systems, and hardware are crucial to overall quality assurance. Capability can be explained with transparency, responsiveness, ability, and accountability. The perception aspect includes judgment of risk, security, and ability, reflecting users' concerns about security, privacy, and potential risks in accessing e-services. Political attitude, disposition, and use of trust are classified as belief aspects. These are citizens' judgments, evaluating whether authorities and institutions perform as their expectations. The above factors are essential in understanding citizens' decisions to adopt transformative e-government services (Carter et al., 2016).

3.4. E-government trust and behavioral intention

Fishbein defined intention as subjective willingness and possibility to perform a specific behavior (Fishbein 1975). This concept can be extended to the intention to adopt, use, participate, or share. Extensive research has demonstrated the significance of trust in the context of e-government acceptance, as evidenced by the findings presented in Table 3, which explores technology, government agencies, citizen perspectives, and risk aspects, thereby contributing to the theoretical and practical understanding of adoption mechanisms (Alzahrani et al., 2016). The primary constituents of trust consist of individuals and network users. Trusted objects mainly encompass e-services, online portals, e-tax systems, and e-invoicing platforms. The dependent variables are e-government acceptance, the intention to adopt, and the willingness to use. The literature reveals that technology acceptance models are mainstream empirical tools, mainly based on TAM (Technology Acceptance Models) and UTAUT (Unified Theory of Acceptance and Use of Technology), which combine quality, contextual and individual factors to compensate for the lack of trust in the research model (Alotaibi & Roussinov, 2017; Chen & Aklikokou, 2020; Khan et al., 2021; Zeebaree et al., 2022). Furthermore, the trust theories of McKnight and Carter are incorporated with the DOI (diffusion of innovation theory), TRA (theory of reasoned action), TPB (theory of planned behavior), and IS success model (DeLone and McLean's) to establish a comprehensive framework, which aids in elucidating the beneficial impact of trust in the process of implementing e-government solutions, platforms, and technologies (Alomari et al., 2012; Alzahrani et al., 2017; Horst et al., 2007; Lee & Raghav, 2007). Research on GAM (Government Adoption Model) only accounts for a few parts of the selected papers. Almaiah, Shahzad, and Verkijika et al. attempted to employ GAM as the main axis, combined with the main elements of UTUAT, and succeeded in justifying the positive effect of trust as an independent variable on behavior (Almaiah et al., 2020; Shahzad & Xiu, 2019; Verkijika & DeWet, 2018). Trust as a variable among them has a significant path coefficient in the model of Almaiah et al., yet there is no evidence to demonstrate the impact of social influence in this context. A similar situation and dilemma occurred in the studies of Alshehri et al. (Alshehri et al., 2012; Rifat et al., 2016; R.Sharma & Mishra, 2017). Over the course of time, the significance of social influence on behavioral intention will progressively diminish. Social aspects, quality, and personal factors are incorporated to construct models and explain the relationship and mechanisms underlying e-government trust and adoption behavior. Common social factors are social influence and government agency. Quality factors consist of service quality, information quality, system quality, perceived quality, perceived website assistance, user interface quality, and web design. Perceived usefulness (PU), perceived ease of use (PEOU), awareness, personal innovation, Internet experience, familiarity with the Internet, civic engagement, facilitating condition, age, and gender are categorized as personal factors. To a certain extent, participation in e-government transactions necessitates citizen trust in government and technology/Internet (Gupta et al., 2016). Public service providers must acknowledge the presence of uncertainties pertaining to the trust factor and recognize particular issues that may contribute to reluctance in utilizing e-services (Bélanger & Carter, 2008). Perceived risk, privacy, transactional concern, and security perception are the critical risk factors that mainly reduce the willingness to adopt (Alharbi et al., 2017; Alzahrani et al., 2018; Khan et al., 2021; Rehman et al., 2016). Technology acceptance models such as TAM and UTAUT have been extensively utilized in research to elucidate human behavior toward technology. However, excessive reliance on PEOU and PU as metrics for gauging individual perspectives on e-government solutions imposes limitations on the research methodology. It is imperative to incorporate novel extensions and perspectives to address inadequacy.

Table 3 Research summary of trust in e-government and intention behavior.

| Sources | Theory | Dependent variable | Trust object | Antecedents of trust | | Related factors | | |
|-------------------------|--|-----------------------------|-----------------------|--|--|--|--|--|
| | | | | Critical factors | Risk factors | Quality aspect | Social aspect | Other aspect |
| Alzahrani et al., 2017 | D & M IS model Trust theory (McKnight et al., 2002) | Adopting e-gov. | e-gov. | Disposition to trust Trust in e-government | Security & privacy Performanc e risk Time risk | Service quality System quality Information quality | Reputation of agency Past experien-ce | Internet experience Education Citizens' satisfaction |
| Carter & Bélanger, 2005 | TAM, DOI Trust theory (McKnight et al., 2002) | Intention to use | State e-gov. services | Disposition to trust Trust in Tech./Int. Trust in Gov. | Perceived Risk | | | |
| Teo et al., 2009 | IS success model Trust theory (Carter, Bélanger 2005, McKnight et al., 2002) | Intention to continue using | e-gov. web site | Trust in Tech./Int. Trust in Gov. Trust in E-government web site | | Service quality System quality Information quality | | User satisfaction |
| Carter et al., 2016 | TAM Trust model | Intention to use | e-gov. service | Trust in Tech./Int. Trust in Gov. | Perceived Risk | | | |
| Gupta et al., 2016 | UTAUT Trust theory | E-Gov. Adoption | e-gov. online | Trust in Tech./Int. Trust in Gov. | | | Social influence | Citizens' satisfaction |



| | | | | | | | | | |
|-------------------------|---|------------------------------------|----------------------------------|---|---|--|------------------|--|---|
| | (Carter, Bélanger 2005, McKnight et al. 2009, 2011) | | service | | | | | | PE EE FC |
| Alharbi et al., 2017 | UTAUT2 Trust theory (Carter, Bélanger 2005) | Intention to use e-gov. services | e-gov. services | Trust in Tech./Int. Trust in Gov. | Privacy perception Security perception | User interface quality | Social influence | | Habit PE EE FC |
| Lian, 2015 | UTAUT2 Trust theory (Carter, Bélanger 2005) | Intention to adopt | cloud based e-invoice | Trust in Tech./Int. Trust in Gov. | Perceived Risk Security concerns | | Social influence | | |
| Bélanger & Carter, 2008 | Trust theory (McKnight et al., 2002) | willingness to use e-gov. services | e-gov. services | Trust in Tech./Int. Trust in Gov. Disposition to trust | Perceived Risk | | | | |
| Alshehri et al., 2012 | UTAUT Trust theory (Carter, Bélanger 2005) | Use behavior of e-gov. services | e-gov. services | Trust in Internet Trust in Gov. | | | Social influence | | Gender Age Internet experience |
| Colesca, 2009 | TAM DOI Trust theory (McKnight et al., 2002) | Trust in e-gov. | National /local e-gov. services. | Propensity to trust Trust in Technology Trust in Gov. Perceived organizational trustworthiness | Privacy concerns | Perceived quality | Social influence | | PU Age Internet experience |
| Sharma & Mishra, 2017 | TAM Service quality (Parasuraman 1988) Trust theory (McKnight et al., 2002) | Intention to use CSC | e-gov. services. | Benevolence Integrity competency | | Service quality | Social influence | | Awareness Usefulness Ease of obtaining |
| Abu-Shanab, 2014 | TRA, TPB TAM, TAM2 IDT, UTAUT Trust theory (Carter, Bélanger 2005) | Intention to use e-gov. services | e-gov. services | Trust in Technology Trust in Gov. | Privacy & security concerns | Service quality Information quality | Social influence | | PU PEOU Familiarity with Internet |
| Alzahrani et al., 2018 | D & M IS model Trust theory (McKnight et al., 2002; Carter, Bélanger 2005) | Adoption of e-gov. | e-gov. services | Disposition to trust Trust in Technology Trust in Gov. | Privacy & security | Service quality Information quality System quality | Gov. agency | | Technical factors Gender Age Internet experience |
| Sjafrizal et al., 2017 | UTAUT D & M IS model Trust theory (Carter, Bélanger 2005) | Adoption of e-gov. | e-gov. services | Trust in Technology Trust in Gov. | | Information quality System quality | Social influence | | PE EE FC |
| Alawadhi, 2019 | TAM, DOI Trust theory (McKnight et al., 2002) | Intention to use Civic engagement | e-gov. services | Trust in Technology Trust in Gov. Trust in e-Gov. | | | | | PU Civic engagement |
| Jyot & Adel, 2017 | Learning theory DOI Trustworthiness (Belanger, Carter 2008) | Intention to use e-gov. | e-gov. portal services | Disposition to trust Trust in Internet Trust in Gov. | Perceived risk | Perceived website assistance | Social influence | | |
| Rifat et al, 2016 | UTAUT Trust theory (Carter, Bélanger 2005) | Intention to use | e-tax service | Trust in Internet Trust in Gov. | Privacy | | Social influence | | Personal innovative FC PE EE |
| Alharbi et al., 2017 | UTAUT 2 Trustworthiness (Carter, Lemuria 2005) | Intention to use | e-gov. services | Trust in Internet Trust in Gov. | Privacy perception Security perception | User interface quality | Social influence | | Habit PE EE FC |
| Rehman et al. 2016 | TAM, DOI D & M IS | Intention to get | e-gov. web service | Trust in Internet Trust in Gov. | Perceived risk | Service quality | | | PU PEOU |

| | | | | | | | | |
|-----------------------------|---|--|---|---|---|--|--|--|
| | Trust theory (McKnight et al., 2002) | information Intention to conduct transaction | | | Information security Transactional security | Information quality System quality Web design | | |
| Horst et al. 2007 | TAM, TRA, TPB Trust theory (Mayer, 1995) | Intention to adopt gov. e-services | Gov. e-services | Trust in e-government Trust in governmental organizations | Risk perception | | Subjective norm | PU Perceived experience Perceived behavioral control |
| Ayyash et al. 2012 | D & M IS TAM Trustworthiness (Belanger, Carter 2005, 2008) | Intention to use | e-gov. services | Trust in e-government (Trust in Tech./Int. Trust in Gov.) | Perceived security/privacy | Service quality Information quality System quality | | PU PEOU |
| Ranaweera, 2016 | TAM Trustworthiness (Belanger, Carter 2008) | Use of e-gov. services | e-gov. services | Trust in government and Internet | Perceived risk Perceived security Perceived privacy | Information quality | | PU PEOU |
| Khan et al., 2019 | TAM Trust theory (McKnight et al., 2002) Trustworthiness (Belanger, Carter 2008) | Intention to participate | government social media services | Ability Benevolence Integrity Disposition to trust | Privacy risk Security risk | Information quality | Uncertain avoidance Structural assurance | PU PEOU |
| Ahmad & Khalid, 2017 | Extended TAM Trustworthiness (Belanger, Carter 2005, 2008) Trust theory (McKnight et al., 2002) | Intention to adopt | M-gov. | Trust in Technology Trust in Internet | | Variety of services Cost | Social influence | PEOU PU |
| Almarashdeh & Alsmadi, 2017 | TAM, UTAUT Trustworthiness (Carter & Bélanger, 2005). | Intention to use | mobile government services | Perceived Trust in Technology | | Cost of service | Social influence | PEOU PU |
| Chen & Aklilikokou, 2020 | Trustworthiness (Carter & Bélanger, 2005). TAM, UTAUT | Intention to use | e-gov. services | Trustworthiness | Technology Risk | Degree of Openness | Social influence | PEOU PU FC |
| Sharmaa et al., 2018 | UTAUT Trust theory (McKnight et al., 2002) (Mayer, 1995) | Intention to use | Mobile applications for the gov. services(m G-App) m-Gov. | Online Trust | | Information quality | Social influence | PE EE FC |
| Alotaibi & Roussinov, 2017 | TAM Trustworthiness (Carter & Bélanger, 2005). | Intention to use | | Perceived trustworthiness | | Reliability Responsiveness Empathy Perceived mobility | | PEOU PU |
| Shahzad & Xiu, 2019 | Trust theory (Carter & Bélanger, 2005) Uncertainty Reduction Theory (Berger, 1986; Tidwell & Walther, 2002) e-Government Adoption Model | Intention to use | M-gov. security response system | Online Trust | | Accuracy Completeness Awareness Perceived compatibility Transparency | | PU Perceived response time |

| | | | | | | | | |
|--------------------------|--|----------------------|-----------------------------|--|---|--|------------------|---|
| Horst et al., 2007 | (Shareef et al., 2011) TAM, TPB Online trust (Gefen 2002) | Intention to adopt | Gov. e-services | Trust in government Trust in governmental organization | Risk perception | | Subjective norm | PU Personal experience Perceived behavioral control |
| Schaupp et al., 2010 | UTAUT Trust theory (Carter, Bélanger 2005) | Intention to use | E-file | Trust of system Trust of Internet | Perceived risk | | Social influence | PE EE FC Optimism bias |
| Weerakkod et al., 2013 | UTAUT Trust theory (Carter, Bélanger 2005) | Behavioral Intention | e-gov. | Trust of intermediary Trust of Internet | | | Social influence | PE EE FC |
| Christian & Carter, 2005 | TAM, DOI Trust theory (Carter, Bélanger 2005) | Intention to use | e-voting | Trust in Internet Trust in Gov. | | Compatibility | | PU |
| Alomari et al., 2012 | TAM, DOI Trustworthiness (Belanger, Carter 2005, 2008) | Adoption | e-gov. | Trust in Gov. Beliefs | | Website design Complexity | | PU |
| Aloudat et al., 2013 | TAM, TRA Trust theory (Carter, Bélanger 2005) | Behavioral Intention | Gov. Location-based service | Trust | Perceived privacy concern | Perceived service quality | Visibility | PEOU PU |
| Carter et al., 2011 | UTAUT Trust theory (Carter, Bélanger 2005) | Intention to use | Online tax filing | Trust of independent intermediary | Perceived security control | | Social influence | PE EE Self-efficacy |
| Lee & Raghv, 2007 | TAM, TRA SEU theory Prospect theory Trust theory (McKnight et al., 2002) | Intention to use | e-gov. websites | Disposition to trust Trust in national government Belief in service provider Belief in Internet | Perceived risk Privacy risk Security risk | Perceived quality of website | | Perceived relative usefulness |
| Formunyuy & DeWet, 2018 | UMEGA UTAUT, UTAUT2 Trustworthiness (Belanger, Carter 2005, 2008) | Behavioral Intention | e-gov. | Trust of government Trust of Internet | Perceived risk | | Social influence | PE EE FC Self-efficacy |
| Chatzoglou et al., 2015 | DOI, TAM UTAUT Trustworthiness (Belanger, Carter 2005, 2008) | Intention to use | e-gov. services | Trust in e-government | Perceived risk | Perceived quality Quality of Internet connection | Peer influence | PEOU PU Self-image Self-efficacy Internet experience |
| Zeebaree et al., 2022 | UTAUT System trust | Intention to use | e-gov. services | Trust in System | | Study Qualification | Social influence | PE EE FC Ethics of Internet |
| Li, 2021 | Trust theory (Carter et al., 2016) UTAUT | E-gov. adoption | E-gov. websites | Trust of government Trust of Internet | Perceived Risk | | Social influence | PE EE FC |
| Almaiah et al., 2020 | Trustworthiness (Belanger, Carter 2005, 2008) UTAUT GAM (Shareef et al., 2010) | Mobile gov. adoption | Mobile gov. services | Trust government Trust Internet Perceived trust | Perceived Security | Perceived Information Quality Perceived compatibility | Social influence | PE EE FC Self-efficacy Perceived awareness Availability of resources |

| | | | | | | | |
|----------------------|---|-----------------------------|--|-------|---|------------------------|---------------------------------------|
| Khan et al., 2021 | TAM Trust theory (Carter et al., 2016) | Intention to participate | E-gov. service (social media) | Trust | Perceived security Perceived privacy | Information quality | PEOU PU Structural assurance |
|----------------------|---|-----------------------------|--|-------|---|------------------------|---------------------------------------|

Note: PE (Performance Expectancy), EE (Effort Expectancy), FC (Facilitating Conditions), PEOU (Perceived Ease Of Use), PU (Perceived Usefulness).

3.5. Review the factors that constitute TiEG

Based on the insights discussed in the preceding sections and the frequency of critical factors in the reviewed literature (Table 3), twenty-six factors constituting trust have been identified and classified into six main categories (Table 4): Government trust (GT), Trust in Internet & Technology (TiIT), Trust in e-government (TiEG), Personal beliefs (PB), Trustworthiness, and Trust of intermediary (ToI). GT concerns the entire nation, central government, local governments, or specific agencies. It involves citizens' confidence in the government mentioned above. Given the subjective nature of this perspective, it carries implications pertaining to the level of political trust. Hence, it is an essential component in assessing the effectiveness of e-government initiatives. TiIT reflects the decisive influence of network stability, signal quality, system and platform technology of the Internet and ICT, and it determines whether e-government implementation succeeds or fails. TiEG takes e-government as the main body and focuses on evaluating e-services and individual systems. However, it can be explained by multiple dimensions with different constructs. PB explains the individual's perception of trust and belief; this concept originates from social trust, while trust propensity pertains to the extent to which an individual exhibits a disposition to depend on others (Mcknight et al., 2002). Trustworthiness emphasizes overall service performance and problem-solving capabilities, strategies and resource utilization, and more detailed trust measurements at all levels. Trust of intermediary (ToI) involves the public's trust in intermediaries and suppliers. Since intermediaries and suppliers are the software and hardware providers of e-services and the operators and managers of service platforms, they have to gain the trust of the public and government agencies to ensure the continued operation of e-government.

Table 4 Summary of factor category from selected articles.

| Factor category | Significant factors included in articles | Frequency (%) | Proportion of factor category (%) |
|---------------------------------------|--|---------------|-----------------------------------|
| Government trust (GT) | Trust in(of) government | 27.27% | 31.17% |
| | Trust in national government | 1.30% | |
| | Trust in governmental organizations | 1.30% | |
| | Perceived organizational trustworthiness | 1.30% | |
| Trust in Internet & Technology (TiIT) | Trust in(of) Internet | 9.09% | 29.87% |
| | Belief in Internet | 1.30% | |
| | Trust in technology | 7.79% | |
| | Trust in Internet or technology | 10.39% | |
| | Perceived trust in technology | 1.30% | |
| Trust in e-government (TiEG) | Trust in e-government | 6.49% | 12.99% |
| | Trust in e-government website | 3.90% | |
| | Trust in government and Internet | 1.30% | |
| Personal beliefs (PB) | Trust of system | 1.30% | 9.09% |
| | Disposition to trust | 6.49% | |
| | Propensity to trust | 1.30% | |
| Trustworthiness | Beliefs | 1.30% | 12.98% |
| | Ability | 1.30% | |
| | Benevolence | 2.60% | |
| | Integrity | 2.60% | |
| | Competency | 1.30% | |
| | Online Trust | 2.60% | |
| | Trustworthiness | 1.30% | |
| Trust of intermediary (ToI) | Perceived trustworthiness | 1.30% | 3.9% |
| | Trust of intermediary | 1.30% | |
| | Trust of independent intermediary | 1.30% | |
| | Belief in service provider | 1.30% | |
| | Total percentage | 100% | 100% |

4. Discussion

As researchers measure trust in e-government, government trust is often adopted as one of the dimensions (Alawadhi, 2019; Ayyash et al., 2012; Colesca, 2009; Teo et al., 2009). The dimensions of government trust consist of competence, integrity, and benevolence (Deepak et al., 2002; Grimmlikhuijsen, 2009; Horst et al., 2007; Liu et al., 2014; Nulhusna et al., 2017; Sharma & Mishra, 2017). The impact of political trust on government trust is worthy of attention. The World Values

Survey (Steven, 2007) and New Democracy Barometer (Mishler & Rose, 1997) are employed to measure political trust in the political system. Can a high level of political trust positively impact government trust? To what extent does political trust affect government trust? Is there a direct correlation or any intervening variables between them? Which is the most fruitful way to distinguish among different dimensions of TiEG? While the reviewed literature does not provide sufficient evidence to fully address these issues, it has offered valuable insights and constructive perspectives. Government trust encompasses individuals' psychological expectations regarding overall government performance and is an integral component of political trust. Empirical studies introduce specific e-government policies to measure trust in e-government, making respondents more precise about the scope of e-government and effectively eliminating the confusion caused by the overall political trust of respondents. In addition to government trust, three dimensions (trust in technology, trust in the Internet, and trustworthiness) are introduced to measure trust in e-government. ICT applications, platforms, and software are central to implementing e-government initiatives. Service, information, and system quality constitute a significant portion of the landscape. Concurrently, individuals must embrace the emerging challenges of mobile technology and assume greater cyber risks. These circumstances directly affect people's perception of government e-services. Government trust will decrease due to poor service quality, performance, and satisfaction. Subsequent studies should consider the connection between these factors. Developing countries are concerned about the extent of social acceptance of e-government (Glyptis et al., 2020), advocating citizen-centered policies and investing vigorously to achieve governance objectives (Pérez-Morote et al., 2020). Thus, numerous studies have focused on e-government adoption. E-government is a collective term for overall public e-services. The services encompass various digital platforms, such as websites, web portals, social media, cloud services, mobile payment, applets, and kiosk services. It is crucial to undertake autonomous research on relevant applications, systems, and services to enrich the theoretical and practical significance of studying behavior. There is a tendency to overlook the diverse range of risks, policy implications, and application techniques. The focus of these works is primarily directed toward the inclination of citizens to utilize certain services, with little emphasis placed on the integration and collaboration between government agencies, nongovernmental organizations, and business entities. Citizens are trusted as a whole despite varying levels of trust between different institutions and countries (Mishler & Rose, 1997). Given the fundamental importance of trust within society, it is inconceivable for a responsible government to endure a prolonged absence of trust from its citizens. Indeed, enhancing government transparency can potentially strengthen public confidence in governmental institutions (Wenxuan, 2013). This measure fosters a sense of benevolence and enhances individuals' perception of goodwill (Grimmelikhuijsen, 2009). A single factor does not influence TiEG. Further investigation on the antecedents of TiEG is needed, including a thorough factor analysis and discussion. No TiEG model can be widely adopted or fit for specific political contexts. Therefore, proposing a complete TiEG model will help understand the mechanism of influence, including intermediary effects and path analysis of factors. From empirical studies on technology acceptance, TiEG tends to influence adoption behavior favorably. One limitation of the TAM lies in its failure to incorporate social influence and external factors that motivate users. Instead, TAM primarily focuses on technical measurements (Napitupulu, 2017); UTAUT emphasizes the influence of PE, EE, SI, and FC on willing behavior but fails to include the trust factor. The issue of Internet ethics necessitates a comprehensive examination (Zeebaree et al., 2022). E-government adoption should not only focus on the direct influence of external factors but also consider the uncertainty associated with personal perception, experience, and the actual environment. The field of e-service technology is characterized by ongoing innovation, and the current landscape has become increasingly intricate in recent times. In the context of China, the advancement of e-government is exemplified. E-government services extend beyond web portals and applications, as they are also seamlessly integrated into mobile payment platforms such as Alipay and WeChat. These platforms are closely linked to various information and communication technologies (Patrick & Marques, 2022). Involved techniques and information systems are distinct and exhibit a high level of popularity. Hence, it is imperative to undertake further model development to overcome the limitations of conventional acceptance theory and effectively address the prevailing challenges.

4.1. Proposed conceptual framework of TiEG

Trustworthiness is the sense of confidence in services via the Internet and is related to trust in public e-services (Chen & Aklidikou, 2019). Previous research has reflected benevolence, integrity, and competence as important attributes of trustworthiness in different situations (Khan et al., 2019). PB significantly affected trustworthiness in McKnight's web trust mode (McKnight et al., 2002). Jason's research results showed that PB is significantly related to trustworthiness (Colquitt et al., 2007). At the same time, Alzahrani believed that PB was an antecedent of trust and impacted TiEG (Alzahrani et al., 2017). In the e-government adoption research of Bélanger, PB was an important antecedent that positively affected government trust and trust in the Internet (Bélanger & Carter, 2008). Trustworthiness evaluates the extent to which citizens believe the government and technology (Carter & Bélanger, 2005). The results of Colesca's study revealed that trustworthiness, PB, and TiIT are statistically significant factors influencing users' TiEG (Colesca, 2009). TiEG consists of the conventional concept of trust in a specific entity (trust in the government) and trust in the supporting technology (trust in the Internet) (Carter & Bélanger, 2005; Pavlou, 2003). Furthermore, Ayyash et al. consider TiEG as a combination of trust in government and technology, which exerts a significant influence on users' trust in e-government initiatives (Ayyash et al., 2012). From the

viewpoints mentioned above, the conceptual framework of TiEG is constructed as shown in Figure 2. A total of 6 research propositions are proposed. In e-government adoption research, it has been confirmed that TiEG positively affects adoption behavior (Alawadhi, 2019; Chatzoglou et al., 2015). However, there is still no unified opinion on the dimensions of TiEG. Additional clarification is needed regarding certain issues. For instance, does the presence of PB directly impact TiEG? Is there any intermediary variable that exists between them? Despite GT, TiIT, and trustworthiness being critical influencing factors of TiEG (Horst et al., 2007), few empirical studies can elaborate on the interconnections within the same paradigm. Trust theory is adopted to extend various technology acceptance models and simply introduce GT and TiIT to explain behavior (Rehman et al., 2016); therefore, the proposed conceptual framework of TiEG is essential (Teo et al., 2009). The connotation of TiEG includes elements such as electronic services and service quality. GT and TiIT have a positive effect on TiEG. PB explains individual trust tendencies, reflects subjective ideas, and directly influences the extent of trust in government, institutions, and political parties and then affects TiEG. Trustworthiness is based on the characteristics and evaluation of electronic services (Janssen et al., 2018). Although GT and TiIT are important components of trustworthiness (Carter & Bélanger, 2005), other views consider ability, competence, and integrity as components of trustworthiness (Grimmelikhuijsen & Knies, 2017; Mayer et al., 1995). Thus, the proposed model highlights the significant role of trustworthiness in the relationship between TiEG, GT, TiIT, and PB. Furthermore, it clarifies the connection between these determinants.

Hence, this work proposes the following research propositions:

- Proposition 1: Personal beliefs have a positive effect on Government trust.
- Proposition 2: Personal beliefs have a positive effect on Trustworthiness.
- Proposition 3: Personal beliefs have a positive effect on Trust in Internet & Technology.
- Proposition 4: Government trust has a positive effect on Trustworthiness.
- Proposition 5: Trust in Internet & Technology has a positive effect on Trustworthiness.
- Proposition 6: Trustworthiness positively influences Trust in e-government.

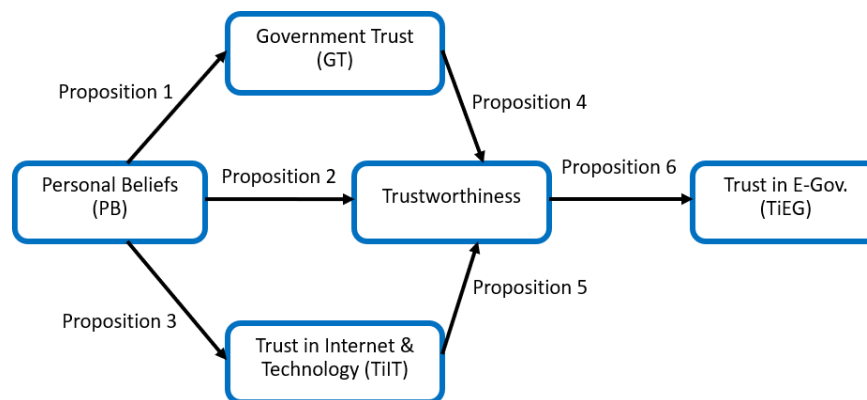


Figure 2 Proposed conceptual framework of TiEG.

5. Final considerations

Establishing trust in e-government is rooted in the fundamental trust among individuals and is also considered one of the social trusts that evolve within a society. The literature posits that the functioning of a society becomes difficult in the absence of trust. Consequently, sociology, psychology, economics, and political science scholars have extensively researched trust theory, employing diverse analytical frameworks to elucidate the fundamental determinants that shape individuals' trust in governmental institutions. Of particular interest is investigating the trust disparity between local and central governments. In Europe, America, and the Asia-Pacific region, comparable circumstances exist within non-democratic systems and systems characterized by democratically elected governments. This pressing matter necessitates prompt resolution. Government trust is the public's overall expectation and satisfaction with the government. Scientific research on trust has the potential to address the trust crisis. Integrity, benevolence, and competence are crucial when assessing traditional government services; they have been utilized to measure trust in public agencies and government policies among the general population. The barometer and survey are frequently employed to assess political trust, trust in the political system, and attitudes. E-government is based on government trust. There is no standardized framework for e-government. The research focus and perspective have always determined it. Researchers have introduced trust theory and integrated various technology acceptance models to explain the mechanism of social adoption. Since e-government attracts ICT as a supplement, users will inevitably face risks. Research findings imply that privacy and security have an adverse impact on the willingness to adopt; trust in the Internet, trust in technology, and trust in government directly and favorably impact individuals' intentions. This work summarizes various determinants from quality, social, and individual perspectives. E-government provides various services via social media, websites, web portals, mobile apps, QR codes, and kiosks to ensure

service quality, maintain public trust, and foster public acceptance. Service, system, and information quality constitute the overall e-service index. The increasing prevalence of mobile government has resulted in the extensive utilization of mobile devices as the primary mode of accessing e-services. For the scope of the system, information and services, the definition and criteria of quality necessitate adjustment in accordance with current development. Possible factors to be considered include contextual awareness services, mobility, user interface, information volume, and response time. Mobile technology is becoming increasingly integral to the advancement of society. The community atmosphere influences people's perceptions. Consequently, there has been a gradual transformation in human habits, beliefs, and cognitions. The advancing maturity of mobile apps and social media has led to a greater acceptance and utilization of digital payment, resulting in a novel social phenomenon. Hence, social influence is another crucial reason for e-government adoption. The proposed conceptual framework of TiEG offers a supplementary perspective to the trust theory of e-government, clarifying the interconnections among different antecedents. Future works may explore relevant research propositions with data collection and empirical analysis to further investigate the model's validity.

Ethical considerations

Not applicable.

Conflict of Interest

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