# Journal of Politics and Ethics in New Technologies and AI

**A Review of the e-Government Maturity Models: Are They Still Relevant?**

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RESEARCH ARTICLE

# A Review of the e-Government Maturity Models:
# Are They Still Relevant?

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**Abstract**

In the past, a number of methodologies and approaches have been created to evaluate the development of e-Government and the public sector's digital transformation. Numerous e-Government maturity models have been created to close this gap. The variety of models, though, has come under criticism from several academics. The purpose of this research is to examine whether e-Government maturity models can still be regarded as relevant through the examination of 39 e-Government maturity models that have been established throughout the year. The results indicate that due to the numerous internal and external relevant inflectional factors that have not been taken into consideration by the models under study, e-Government maturity models have a limited ability to represent the growth of e-Government.

**Keywords:** E-government, e-services, maturity models, stage model, e-government maturity assessment

## 1. Introduction

Researchers, professionals, and international institutions have been working on creating e-Government maturity models for several years as a universal guide for the steps public institutions must take to successfully adapt to the digital age (Layne & Lee, 2001; Fath-Allah et al., 2014). Some of these models have also been used as e-government assessment instruments (Shahkooh et al., 2008; Lee & Kwak, 2012; Siau & Long, 2005; Wescott, 2001; Deloitte & Touche, 2000).

However, a high level of criticism has been directed at them as a result of the numerous models that have been launched over the years and the differences that exist between them. During the past decade the notion that the evolution of e-Government is a never-ending process that keeps up with new developments in technology, creative thinking, and user needs is becoming more popular and so the existence for a traditional e-government model is becoming obsolete. The criticism is based on the fact

that e-Government maturity models offer insight into the situation of the organization today while disregarding the factors that led to these advances and their effects (Nograšek & Vintar, 2014). According to Bélanger and Carter (2012), additional and inclusive research regarding context and stakeholders is required to contribute to the Theory of e-Government Evolution. A different recent study refers to the critical junctures in the development of e-Government (Iannacci at al., 2019). By looking at 39 e-Government models and the criticisms that have been put forth over the years, this study intended to give a critique of the e-Government maturity models. The research question proposed for the analysis is "Are the e-Government maturity models still relevant?".

The remainder of the study is structured as follows. The sample selection approach is presented in the "Methodology" section. The various stage models put forth over the years and the criticism leveled at them are all analyzed cohesively in the "Review of the e-Government Maturity Models". The main results of the study are outlined, and future research directions as well as the work's limitations are reviewed in the part titled "Discussion, Limitations and Conclusions".

## 2. Methodology

A rigorous literature review was the initial phase in the process, which was used to create a comprehensive list of the e-Government Maturity Models. According to the backward snowballing rules from Webster & Watson (2002) and Jalali & Wohlin (2014), a snowballing strategy was used. First, the writers reviewed the literature and created a list of e-Government Maturity Models by reading the complete papers that were determined to be pertinent to the goal. The list was then evaluated again to find works that created e-Government models using the meta-synthesis technique. Twelve studies were found (Persson & Goldkuhl, 2005; Shahkooh et al., 2008; Kim & Grant, 2010; Lee, 2010; Sandoval-Almazan & Gil-Garcia, 2008; Fath-Allah et al., 2014; Almuftah et al., 2016; Janowski, 2015; Nielsen, 2016; Zahran et al., 2015).

The authors found 28 empirical papers that built e-Government Models from 1999 to 2020 using the backward snowballing technique. To compare the differences among the 39 works that created a new e-Government maturity model, both empirical and meta-synthesis, were all included in the analysis. A 4-stage model has been generated by 14 of the recognized models, a 5-stage model by 14, a 3-stage model by 5, a 6-stage model by 3 a 2-stage model by 2, and a 7-stage model by only one of them (Chart 1).

**Chart 1: No. of Papers developed different stage models**
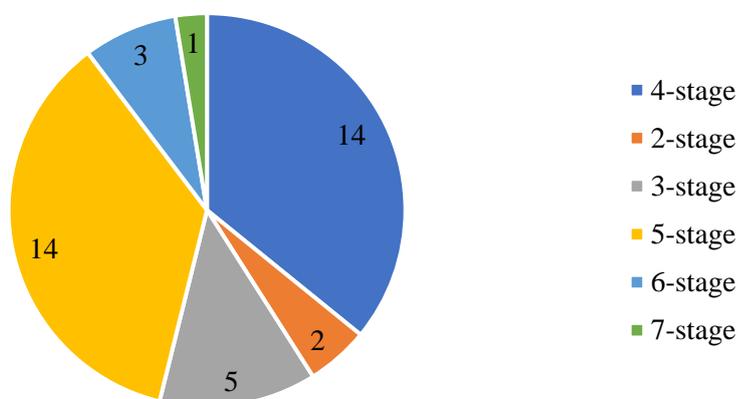


The models were then classified into generic (totaling 33) and municipalities-focused categories (6 in total). The proposed models that are discussed in a different section of this article have also received criticism from the meta-synthesis articles. The maturity models analyzed are summarized in Table 1. The models are assessed from the most prevalent number of stage models to the rarest in the section titled "e-Government Maturity Models' Review." In the analysis, the models are also separated into general e-government and municipality focused models.

**Table 1**.

*General e-Government Models*

| Authors | Year | No. of Stages | Stage 1 | Stage 2 | Stage 3 | Stage 4 | Stage 5 | Stage 6 | Stage 7 |
|---|---|---|---|---|---|---|---|---|---|
| (ANAO) | 1999 | 4 | Publishing and Information | Interaction | Transaction | Data sharing | - | - | - |
| (Baum & Di Maio) | 2000 | 4 | Information | Interaction | Transaction | integration | - | - | - |
| (Statskontor et) | 2000 | 4 | Information | Interaction | Web & Communication | Integration | - | - | - |
| (Deloitte & Touche) | 2000 | 6 | Information publishing | 'Official' two-way transaction | Multi-purpose portals | Portal personalisation | Clustering of common services | Integration | - |
| (Hiller & Belanger) | 2001 | 4 | Web presence | Interaction | Transaction | Integration | Political Participation | - | - |
| (Howard) | 2001 | 3 | Publishing | Interaction | Transaction | - | - | - | - |
| (Layne & Lee) | 2001 | 4 | Catalogue | Transaction | Vertical integration | Horizontal integration | - | - | - |
| (Wescott) | 2001 | 6 | Email system and internal network | Inter-organisational and public access to information | Two-way communication | Exchange of value | Digital democracy | Joined-up government | - |

| Author | Year | # | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| (Chandler & Emanuels) | 2002 | 4 | Information | Interaction | Transaction | Integration | - | - | - |
| (Netchaeva) | 2002 | 5 | Information | Emails and FAQ | Interaction via forums and surveys | E-government portals offering e-services | Possible democracy | - | - |
| (Windley) | 2002 | 4 | Simple website | Online government | Integrated government | Transformed government | - | - | - |
| (UK National Audit Office) | 2002 | 5 | Basic site | Electronic publishing | Personalization of services | Transactional | Joined-up e-governance | - | - |
| (Toasaki) | 2003 | 3 | Publish | Interact | Transact | - | - | - | - |
| (Accenture) | 2003 | 5 | Online presence | Basic capability | Service availability | Mature delivery | Service transformation | - | - |
| (Reddick) | 2004 | 2 | Cataloguing | Transactions | - | - | - | - | - |
| (West) | 2004 | 4 | Bill-board | Partial-service-delivery | Portal for information and services | Interactive democracy | - | - | - |
| (Siau & Long) | 2005 | 5 | Web presence | Interaction | Transaction | Transformation integration | E-democracy | - | - |
| (Persson & Goldkuhl) | 2005 | 2 | Integration of services focusing on services | Integration in services across agencies | - | - | - | - | - |
| (Andersen & Henriksen) | 2006 | 4 | Cultivation (website with static content) | Extension (e-services, basic personalization) | Maturity (user centricity, open data) | Revolution (Data ownership transferred to the end-user) | - | - | - |
| (Cisco) | 2007 | 3 | Information interaction | Transaction efficiency | Verical & Horizontal Integration | - | - | - | - |
| (Chan, Lau, & Pan) | 2008 | 5 | Publishing | Interaction | Transaction | Integration | Tri-party integration (public, private and stakeholder) | - | - |
| (Shahkooh, Saghafi, & Abdollahi) | 2008 | 5 | Online presence | Interaction | Transaction | Integration | Digital democracy | - | - |
| (Almazan & Gil-Garcia) | 2008 | 5 | Presence | Interaction | Transaction | Integration | Political participation | - | - |
| (Kim & Grant) | 2010 | 5 | Web presence | Interaction | Transaction | Integration | Continuous improvement | - | - |
| (Lee J. ) | 2010 | | Presenting | Assimilating | Reforming | Morphing | e-Governance | - | - |
| (Chen & Mingins) | 2011 | 3 | Catalogue | Transaction | Integration | - | - | - | - |
| (Alhomod, et al.) | 2012 | 5 | Initial conditions (one-way static interaction) | Data transparency | Open participation (includes e-voting and e-petitioning) | Open collaboration | Ubiquitous engagement (vertical & horizontal integration) | - | - |

| | Year | No. of Stages | Stage 1 | Stage 2 | Stage 3 | Stage 4 | Stage 5 | Stage 6 | Stage 7 |
|---|---|---|---|---|---|---|---|---|---|
| (European Committee) | 2012 | 5 | Emerging Presence | Enhanced Presence | Interactive | Transactional | Seamless (horizontal and vertical integration) | - | - |
| (Al-Hashmi, Surasha, & Darem) | 2012 | 4 | Emerging Presence | Enhanced Presence | Interactive | Transactional | - | - | - |
| (United Nations) | 2012 | 4 | Emerging Presence | Enhanced Presence | Transactional Presence | Connected Presence | - | - | - |
| (Fath-Allah A. , Cheikhi, Al-Qutaish, & Idri) | 2014 | 6 | Presence | Interaction | Transaction | Vertical & Horizontal Integration | E-participation and digital inclusion | Open government | - |
| (Janowski) | 2015 | 4 | Digitization Technology in Government | Transformation Electronic Government | Engagement Electronic Governance | Contextualization Policy-Driven electronic Governance | - | - | - |
| (Almuftah, Weerakkody, & Sivarajah) | 2016 | 3 | Presence | Communication | Full Integration | - | - | - | - |
| (Kawashita, Baptista, & Soares) | 2020 | 7 | Presenting Information | Interaction | Transaction | Integration | Transformation | e-Governance | Policy Driven e-governance |
| Municipality focused e-Government models | | | | | | | | | |
| Authors | Year | No. of Stages | Stage 1 | Stage 2 | Stage 3 | Stage 4 | Stage 5 | Stage 6 | Stage 7 |
| (Kaylor, Deshazo, & Van Eck) | 2001 | 4 | Information | Link to relevant contact | Downloadable forms | Transaction or other interaction | - | - | - |
| (Moon) | 2002 | 5 | Web presence | Interaction | Transaction | Transformation / Integration | Participation | - | - |
| (Flak, Olsen, & and Wolcott) | 2005 | 4 | Information Dissemination | Interactive functions | E-commerce | E-democracy | - | - | - |
| (Arslan) | 2008 | 5 | Information | Interaction | Two-way Interaction | Transaction | Service Integration | - | - |
| (Ore & Lozada) | 2017 | 5 | Presence | Urban Information | Interaction | Transaction | e-Democracy | - | - |
| (Khalid & Lavilles) | 2019 | 4 | Emerging information services | Enhanced information services | Transactional services | Connected Services | - | - | - |

# 3. e-Government Maturity Models' Review

## 3.1. General e-Government Models

### 3.1.1. 4-Stage Maturity models

Eleven of the four-stage maturity models that have been proposed by academics over the years are explored in this section. The first four-stage e-Government model identified was introduced by the Australian National Audit Office in 1999. The "Web Presence" phase's first task was to inform the public about the government, the state or province, the range of services available, and contacts for more information. During the second phase, referred to as "Database queries online," users can access and interact with the agency's database. The third phase, "Agency contact with clients, including client

entry of confidential data," allows users to enter secure data and transact with the government. In the fourth level, "Agencies receiving authenticated information exchange data with other agencies with prior approval of individual clients," the government agency shares the user's information with other government agencies" (ANAO, 1999).

In 2000, the Gartner Group and the Swedish Agency for Administrative Development both created their own four-stage e-Government maturity models. The capacity to interact is described as the second stage since the first stage both provides an information sharing website with static content, and the integration (vertical and horizontal) is referred to as the fourth stage (Statskontoret, 2000; Baum & Di Maio, 2000). The third stage is where the only difference can be noticed; while Gartner Group presented the "Transaction," the Swedish Agency for Administrative Development focused on the ability to enter and retrieve personal information.

Layne and Lee (2001), who offered their own analysis of e-Government maturity by creating a four-stage maturity model, introduced the most well-known e-Government maturity model. At the first stage of this model, the government organization only has a "cataloging" webpage. The second stage is the "transaction," which is when companies and individuals begin conducting electronic commerce with the government. Higher-level systems in comparable jurisdictions are integrated during the third stage, referred to as "vertical integration." The top level, called "horizontal integration," involves connecting systems from various government agencies and turning portals into one-stop shops (Layne & Lee, 2001).

Four-stage maturity models were also presented by Windley (2002) and Chandler (2002) and Emanuels (2002). Their stages included "Information," where the website contains static informational pages, "Interaction," which allows users and the government agency to communicate, "Transaction," which enables citizens to conduct transactions, and "Integration," where the systems are integrated both vertically and horizontally. In the third step, service customization is added to the integration process by Windley (2002), differentiating his model from the others. Accordingly, four-stage e-Government models with similarities were offered by West (2004), Andersen and Henriksen (2006), Al-Hashmi (2012), the United Nations (2014), and Janowski (2015). (Table 1).

### 3.1.2. 5-Stage Models

Eleven five-stage maturity models have been looked at for this section. Five of the eleven five-stage maturity models that were examined for the purposes of this paper are comparable to one another, but they diverge at the final stage. The first four stages include the existence of an online presence, the

capacity of engagement, the capability of transaction, and vertical and horizontal integration. The fifth step was suggested by Hiller and Belanger (2001), Siau and Long (2005), and Shahkooh et al. (2008) as e-Democracy and Political Participation. On the other hand, Kim and Grant (2010) proposed continual improvement as the last step and Chan et al. (2008) tri-party integration between the public, private, and stakeholders. The components of Netchaeva's (2002) model were as follows: "Scattered information," "Emails and FAQ," "Other Online Services" (including discussion forums and opinion polls), "e-Government portal" with transaction feature, and "Possible Democracy" where citizens can vote, take part in online discussions, and make policy recommendations.

Five-stage approaches have also been proposed by organizations. A model was put forth by the UK National Audit Office in 2002 that moved from a "Basic site" with scant information about authorities to "Electronic publishing" with more content, "E-publishing" with customizable search tools and personalization options, and "Transactional" and "Joined-up" e-governance through vertical and horizontal integration. Finally, Accenture offered a five-stage model covering the steps of developing an online presence, offering fundamental capabilities, delivering services, maturing services, and transforming services in 2003.

### 3.1.3. 3-Stage Maturity Models

Five of the popular three-stage e-Government maturity models are examined in this study. A three-stage maturity model with the stages of "Publishing," "Interaction," and "Transaction" was proposed by Howard and the World Bank in 2001. (2003). Disseminating static information including laws, regulations, documents, and forms is done in "Publishing" stage. The "Interaction" stage allows for user comments and contributions. Safe online transactions and electronic payments are included in the "Transaction" stage. The ability to interact with public services through portals was created as the second level, while the Cisco IBSG (2007), Chen (2011), and Almuftah et al. (2016) identified the provision of information as the first stage. The integration and consolidation of administrative services from several government agencies, however, constitutes the third and last stage.

### 3.1.4. 6-Stage Maturity Models

The initial six-stage maturity model was created by Deloitte & Touche in 2000 as a guide for the successful implementation of e-Government. Two additional six-stage e-Government models have since been introduced. The Deloitte & Touche' s (2000) model consisted of six phases. The first stage is "Information Publishing/Dissemination." The second stage is the "Official Two-Way Transaction," which enables customers to share personal data with multiple departments and conduct financial

transactions with them. In the third stage, referred to as "Multi-Purpose Portals," customers use the e-Government portal as a single point of entry to send and receive information, as well as to conduct financial transactions across multiple departments. The fourth stage, "Portal Personalization," offers users the chance to add the features they desire to portals. By grouping shared services together along comparable axes, the fifth stage, "Clustering of Common Service," speeds up the supply of shared services. The main goal of the sixth stage, "Full Integration and Enterprise Transformation," is to tear down obsolete barriers identifying service silos and integrate technology throughout the new business to reduce the distance between the front and back offices (Deloitte & Touche, 2000)

A year later, Wescott (2001) added a six-stage maturity model. His framework was broken down into six phases, the first of which focused on the creation of internal networks and email systems, the second on the dissemination of information to the general public and within organizations, the third on two-way communication, the fourth on the exchange of value through information sharing, the fifth on digital democracy, and the sixth on integrated government. After reviewing 25 maturity models, Fath-Allah et al. produced a second six-stage maturity model in 2014 that includes the stages of "Presence," "Interaction," "Transaction," "Vertical & Horizontal Integration," "E-participation and digital inclusion," and "Open government."

### 3.1.5. 2-Stage Maturity Models

The analysis of the literature discovered that two studies have proposed a maturity model with two stages. Reddrick (2004) suggested that the development of e-Government occurs in two stages: "Cataloguing," where the web presence provides a list of the offline services that are offered as well as agency information, and "Transactions," where public agencies provide online services and the ability to engage in financial transactions with the general public. On the other hand, Persson and Goldkuhl (2005) proposed that in the first stage, the web presence combines offline services via the online ecosystem, and in the second stage, the web presence permits data sharing and acts as a focal point for all services offered by various public bodies. Both models, in general, provide a broad overview of the stages, whereas more stage-rich models depict in greater depth.

### 3.1.6. 7- Stage Maturity models

The most recent e-Government maturity model was released in 2020 by Kawashita, Baptista, and Soares and was based on a meta-synthesis of eleven different research publications. They developed a seven-step model, which included each stage mentioned in the literature review (Kawashita et al., 2020). The stages of this paradigm include "Information Publishing," where there are no criteria for

content, utility, or usability, and "Interaction between the Government and Users," where the scalability of two-way communication and the interactions' utility are unstandardized. The third stage is "Online Transactions," in which portals allow users to plan and carry out operations. The fourth level, "Integrations," contains vertical and horizontal integrations that improve operational and technological efficiency. The "Transformation of the State-Society Relationship" stage, which is the fifth, focuses on enhancing organizational and service provision while also taking user pleasure and the usability of services into account. In the sixth stage, "Social Participation and e-Governance," users can use e-portals to express their ideas and cast ballots on significant subjects. The seventh and final stage, "Contextualization or Policy-Driven Electronic Governance," describes the implementation of public policies through an e-portal that prioritizes particular social groups, such as low-income single-parent households, rural areas, and so on (Kawashita et al., 2020).

### 3.2. Municipality focused e-Government Models

The aforementioned models are all-encompassing, however some scholars have worked to create e-Government maturity models specifically for municipalities. The six municipality e-Government maturity models included three four-stage and three five-stage e-Government models. They all advise starting with creating a web presence that includes information about the authority. At the second stage, Kaylor et al. (2001) proposed providing contact information to the general public (e.g. phone number, email). Ore and Lozada (2017) recommended the "Urban information" as the second stage, which would include information on the city, travel, useful municipal activities, and visual documentation. As part of the second stages, Moon (2002), Flak et al. (2005), and Arslan all introduced the ability to interact (2008). The Interaction has been proposed by Kaylor et al. (2001) and Ore & Lozada as the third step (2017). The "Transaction" was identified as the third step by Moon (2002) and Flak et al. (2005), while Arslan (2008) advocated a two-way interaction that included the functionalities of forms processing and authentication. While Moon (2002) proposed Integration and Flak et al. (2005) promoted e-Democracy, Kaylor et al. (2001), Arslan (2008), and Ore & Lozada (2017) included the possibility of transactions in the fourth stage. Finally, whereas Aslan suggested Service Integration as a fifth stage, Moon (2002) and Ore & Lozada (2017) incorporated the fifth step of active participation.

Khalid and Lavilles (2019) created another model for evaluating municipal e-government. Their method focuses on a modified methodology that Al-Hashmi et al. (2012) previously developed to evaluate the level of e-Government maturity of Yemeni ministries. Throughout the "Emerging Information Services" stage, which is the initial stage, e-portals offer key qualities such office

information, a search engine, external links, and regular updates. The second stage "Enhanced Information Services" features things like contact forms, printable forms, accessibility widgets, multilingual interfaces, and more. In the third stage, "Transactional information services," users can log in, upload forms, conduct financial transactions, and apply for credentials and licenses. E-voting, employing web 2.0 for online participation in decision-making, online consultations, and appointment scheduling are all features that are available at the top stage, "Connected Information Services." This model adapted the UN's four-stage model (Emerging information services, Enhanced information services, Transactional services, Connected Services) to the municipal level, defining specific criteria and integrating the numerous roles provided by the earlier works (Khalid & Lavilles, 2019).

Generally, it seems that the core functionalities of all the models under examination are similar. All of them, with the exception of Wescott (2001), who took a different tack, support the creation of an online presence as the initial stage in the diffusion of knowledge. The following most common functionalities identified by the analysis are the capacity to interact (included as a step in 20 of the models evaluated), and the capacity to conduct transactions (included as a stage in 19 of the models examined).

### 3.3. A critique towards e-Government models

Even though there might not be any significant differences between different e-Government models, it appears that the research lacks a uniform framework for evaluating e-Government operations. This problem appears to have been caused by a dearth of empirical studies evaluating the measures now in use, according to Virgo & Brajik (2011). Although there is a lack of empirical data, earlier studies have highlighted flaws in the current models.

The main issue with the e-government models is that they are nearly identical (Kawashita et al., 2020). The models examined, demonstrate that the vast majority of models are derived from early models developed between 1999 and 2003. Despite apparent differences, the principles, reasoning, and viewpoints that are developed from the majority of e-Government models seem to be the same (Kawashita et al., 2020). They prioritize technology and supply and view ICT as a vehicle for achieving government change and transformation (Nielsen, 2016). The focus on ICT and supply orientation excludes important qualitative measures, such as usability and service quality, and fails to account for user acceptance of e-government portals and their effectiveness (Curtin, 2006; Zahran et al., 2015). Due to the imbalance between the availability of government-side surveys and the scarcity of citizen-side studies, the ultimate goal of e-Government has been neglected. The existing paradigm compels governments to prioritize obtaining good ratings for creating a variety of services without regard to

whether citizens will really use them (Montserrat, 2010; Zahran et al., 2015). As Efthymiou - Egleton et al. (2020) note, digital transformation and the resources it creates must coexist with our societal needs, institutions and democratic processes.

The oversimplistic nature of the e-Government maturity models has also drawn criticism (Yildiz, 2007). The UN model, for example, seems to be extremely general and to have too many components, placing an excessive emphasis on characteristics and insufficient attention on services (Abanumy et al., 2003). The score and stage of e-Government maturity will therefore be determined by the characteristics an e-Government portal has, regardless of the quantity of services it offers, which undervalues the importance of the services. Information, transactional capability, and personal data should not be viewed as discrete maturity levels, but rather as components of a particular service request and subsequent delivery, as Nielsen (2016) noted. The number of features and the ranking method lead to an incorrect assessment of the maturity, because experience has shown that the e-Government site may have elements from multiple phases (Nielsen, 2016). Higher levels may not include features from earlier levels since the evolutionary phases are not sequential or linear (Zahran et al., 2015).

Another issue addressed by Nielsen is the fact that e-participation and e-democracy shouldn't be seen as an e-government maturity stage (2016). Instead, because they all involve information, transactional capabilities, and some kind of data, engagement, petitioning, and voting solutions should be regarded as service types. Examples of this information include election-related data, an online voting platform that facilitates voting, and information like a voter's name, address, and unique ID number. The e-participation and e-democracy stage(s) should therefore be seen as an indication of democratic growth and level of transparency in a country rather than as a measure of e-government maturity levels (Nielsen, 2016).

The history of e-Government research was examined by Bélanger and Carter in 2012, who also identified the key topics of the studies and offered suggestions for future e-Government research. They discovered that a variety of stakeholders and circumstances, such as culture, were left out of prior e-Government models' research (Bélanger & Carter, 2012). Without addressing the causes, ramifications, or characteristics of these developments, e-Government maturity models offer insight into the condition of e-Government today (Nograšek & Vintar, 2014). A theoretical framework created by Nograsek and Vintar (2014) establishes a connection between e-Government and the organizational changes brought on by digital transformation. The strategy separated the attributes into two groups:

organizational level and environment (processes, people, culture, and structure). Their paradigm offers a thorough analysis of the numerous factors that should be taken into account during digital transformation and makes a hint at the difficulty of offering a single e-Government maturity model.

Iannacci et al. (2019) developed a trajectory-turning point theory of e-Government maturity through an analysis of the English criminal justice system in response to this criticism. Their findings suggest that e-Government maturity is an unpredictable process, with turning points (or dramatic changes) being crucial in the formulation of e-Government strategies. Contrary to common e-Government models, they contend, these changes may encounter historical and/or institutional obstacles, making the assumptions of linear, progressive, and irreversible changes leading to e-Government unrealistic. To get around these restrictions, they proposed the trajectory-turning point theory because it takes into account both evolutionary and improvisational mechanisms as well as the dialectical conflicts that define e-Government maturity (Iannacci et al., 2019).

## 4. Discussion, Limitations and Conclusions

Analysis of 39 e-Government models in the Literature Review reveals that the argument that they are too similar is true (Kawashita et al., 2020). The four fundamental steps that almost every model advises are the creation of an institutional online presence, the capacity for interaction, the capacity for transactions, and the vertical and horizontal integration.

Another criticism that this research seems to support is that these models have a limited ability to capture usability and service quality (Curtin, 2006; Zahran et al., 2015). All of the reviewed models refer to general features that do not specify quality standards and do not take into account the viewpoint of the users because they are only concerned with the supply side (Montserrat, 2010; Zahran et al., 2015). The functionalities outlined in the models reviewed can be achieved using current technology. So, the question of how the functionalities will be used and what services will be offered must be addressed for these models to work in any capacity. As Nielsen (2016) observed, only a few models responded to this question in their latter stages which included functionalities such as e-democracy and participation (Flak et al., 2005; Ore & Lozada, 2017; Fath-Allah et al., 2014; Almazan & Gil-Garcia, 2008; Shahkooh et al., 2008; Siau & Long, 2005). However, because they do not include services in the earlier stages of their models, these inclusions render them incoherent.

Additionally, because of the functionalities included, the models under examination are static and unable to be developed along with technology, stakeholder needs, and legal requirements. The UN (2014) argued that due to the advancement of technology, e-Government maturity models should no

longer be regarded as relevant. The stakeholders and various organizational environments that must be taken into account while formulating and implementing digital transformation were included to Nograsek and Vintar's (2014) model of e-Government transformation. This study also found that even the most recent models do not adequately address the problems that the GDPR raises with regard to the gathering and exchange of personal data. As a result of the GDPR's constraints, advances like portal personalization (Deloitte & Touche, 2000) and information sharing (ANAO, 1999) may not be supported in the years to come.

The study's main findings suggest that it might be difficult to evaluate the digital transformation of public organizations using a uniform e-Government paradigm because of its overly simplistic nature, which leaves out many significant influencing factors on both the internal (organizational culture, processes, and structure) and external (technology, legislation, country's environment, national economy, political stability, citizen's needs, etc.) levels. However, because of the snowballing technique, it is probable that this research did not include e-Government models that had considered variables that the models analyzed had not, and the generalization of the results is not possible. To overcome this restriction, future study might conduct a more systematic review. Furthermore, the criticism that e-Government advancement is not linear is not addressed in this paper. The e-Government linearity hypothesis appears to be refuted by Iannacci, Seepma, de Blok, and Resca's (2019) longitudinal study and trajectory-turning point; nonetheless, additional empirical research may be necessary to safely determine whether e-Government maturity models are appropriate.

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