Determinants of E-government Adoption:
A Systematic Literature Review

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Abstract: The adoption of E-government has significant benefits for both citizens and governments. The objectives of this study were to (1) find out the common areas investigated in the empirical research landscape on E-government adoption from 2015 to 2020, as well as (2) the areas that need more focus for research. The systematic literature review methodology was used in this study. Fifty-five empirical articles published during the 2015-2020 period in journals were extracted from the Scopus database. The review's article selection and findings are published following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. According to the findings, the perceived usefulness, perceived easiness, trust, and perceived risk of Technology Acceptance Models (TAM) and performance expectancy, effort expectancy, social influence, and facilitating conditions of the Unified Theory of Acceptance and Use of Technology (UTAUT) model have all been extensively studied. They are the determinants for E-government adoption. Additionally, citizen awareness, cost of services, citizen satisfaction, digital inequality, and individual motivators are determinants of E-government adoption. The research implications and future research agendas are also provided.

Keywords: *Adoption, Determinants, E-government*

1. Introduction

E-government refers to using Information Technologies (IT) for efficiency, effectiveness, transparency, and responsibility of government services. It improves governance through citizen empowerment and participation, better delivery of government services, more efficient management, less corruption, more transparency, greater convenience, increased revenue, and reduced cost(Chowdhury, 2008; Titah & Barki, 2006). Successful E-government adoption offers stakeholders significant financial, administrative, social, and political benefits and values (Moatshe, 2014). The most advanced countries in E-government implementation could capture 20% of savings (Titah & Barki, 2006). It gives citizens more control over how and when they interact with the Government. Notably, citizens can receive government services anywhere convenient to them within seven days /24 hours instead of visiting a government department at a particular

location or calling several times to get a service. Some drawbacks of traditional government systems, such as waiting time at physical premises due to the number of clients, inefficient procedures to be followed, and a limited number of personnel to interact with clients, will be avoided with the E-government initiatives (Alshehri & Drew, 2011; Bhatnagar & Singh, 2010). Thus, it can be considered a paradigm shift in the public service delivery process with disruptive technologies in the 21st century.

It is reported that many nations have extensively adopted E-governments and have reaped more benefits. In contrast, some countries reported lagging behind speedy adoptions (Bojang, 2021; Carter & Weerakkody, 2008; United Nations, 2018). E-government services cannot provide public service delivery if they are not used by the public (Al-Hujran et al., 2015). Therefore, citizen adoption of E-government services is an essential issue for the success of E-government initiatives (Carter & Bélanger, 2005). Adoption is a choice of whether to use or not the public's E-government services (Dilhani & Priyashantha, 2021; Dilhani & Priyashantha, 2021). Thus, the adoption of E-government services is determined by citizens' intention and (Carter & Bélanger, 2005; Warkentin et al., 2002) willingness (Gilbert et al., 2004). Additionally, the intention to use and e-readiness cause the adoption of E-government services (Alateyah et al., 2013). Besides, E-government adoption offers stakeholders significant financial, administrative, social, and political benefits and values (Moatshe, 2014; Dilhani &

Priyashantha, 2021). To the best of the authors' knowledge, a synthesis of the empirical findings of determinants and consequences is limited.

Thus, in a context of a growing interest in the research landscape on E-government adoption, this study was conducted to achieve two main objectives. They are to; (1) find the common areas investigated in the empirical research landscape on E-government adoption during the 2015-2020 period and (2) the areas that need more focus for research. A systematic literature review methodology was adopted, and 55 articles were included in the review published in journal articles. All the included articles were extracted from the Scopus database. The PRISMA guidelines were followed to include the article for the review and report the review's findings. The following sections of the manuscript include the methods and methodology, results and findings, discussion, implications and future research agenda, and conclusion.

2. Research Methodology
2.1. Article Selection Process and Methods

A Systematic Literature Review (SLR) was used to conduct the research. The PRISMA criteria (Liberati et al., 2009) were followed as recommended for SLRs (Priyashantha et al., 2021a). The PRISMA follows a systematic procedure to incorporate articles and report the findings without subjectivity(Petticrew & Roberts, 2006; Priyashantha et al., 2021b, 2021c). The PRISMA recommends an article selection process, known as the

PRISMA flow diagram, including three steps: "Identification, Screening, and Included."

The identification step encompasses databases, search items, and search criteria. The database used to select the article was Scopus. The search terms were "E-government adoption" and "determinants." The search algorithm was developed by combining the two search terms with AND operative. The OR operative combined the similar terms of each key search term. Thus, the search algorithm is given in figure 1.

The screening stage includes eliminating the articles that do not meet the inclusion criteria (Priyashantha et al., 2021b, 2021c). The inclusion criteria for the study were the empirical studies on the determinants for E-government adoption published in journals in English from 2015 to 2020. The final empirical journal articles were chosen as; they are recommended for systematic literature reviews (Tranfield et al., 2003; Xiao & Watson, 2019) and ensure consistency in methodological quality (Okoli & Schabram, 2010). The articles that have used consistent methodology satisfy the selected articles' internal validity(Petticrew & Roberts, 2006). A reason for selecting empirical journal articles is that they are reliable as they undergo a rigorous peer-review procedure. Screening includes automatic screening and manual screening, retrieving, and eligibility checking. Moreover, since the search algorithm-generated articles from 2015, articles were selected from then until 2020.

The automatic screening is done with the database default limiting options. Thus, the articles screened based on the year: 2015-2020, subject areas; Business Management and Accounting, Social Science, Computer science, document type: article, keywords; E-government systems, E-government, E-government services, E-government adoption, and determinants. Other document types such as Conference Papers, conference reviews, book chapters, and reviews were excluded.

The remaining articles were manually screened by the study's authors independently by referring to the abstract of each article. At this stage, articles were excluded, and any disagreements concerning inclusion or exclusion were settled through discussion. Then the next step was retrieving the remaining articles. The full versions of the articles were downloaded and started the immediate next step, eligibility checking of articles that assesses methodological quality. The authors independently assessed each article's methodology section and found qualitative studies. They were excluded. The article selection steps are given in figure 1.

2.2. Article Selection Risk of Bias Assessment

Due to researcher bias in article selection, the quality of reviews suffers (Kitchenham & Charters, 2007). In order to improve the quality, an objective article selection procedure (Kitchenham & Charters, 2007; Xiao & Watson, 2019) and the parallel independent quality assessment of each

article to be included by two or more independent reviewers can all help minimize selection bias (Brereton et al., 2007). The PRISMA guidelines provide objective article selection steps; thus, we followed them. Additionally, the authors of the article manually screened each article against the inclusion criteria. Moreover, the prior protocol design for systematic literature study predetermines the analysis procedures and prevents analysis bias (Brereton et al., 2007; Kitchenham & Charters, 2007; Xiao & Watson, 2019). Accordingly, a protocol was designed and followed to prevent analysis bias.

2.3. Methods of Analysis

This study adopted the Bibliometric analysis using the tools like Biblioshiny and VOSviewer. It is a scientific technique for analyzing the activity in a research study (Aparicio et al., 2019; Paule-Vianez et al., 2020). Assessment, performance, scientific productivity analysis, and scientific maps are part of the analysis (Cobo et al., 2012; Priyashantha et al., 2022). Scientific map analysis assesses a research endeavor's structure, evolution, and significant participants (Noyons et al., 1999). Different information from an article called a unit of analysis is used to generate maps, commonly referred to as bibliometric networks (Callon et al., 1983). In bibliometric networks, keywords that indicate an article's major content are one of the most widely used units of analysis. The co-occurrence of keywords in an article might result in various connections between the keywords (Aparicio et al., 2019). Such connections are visualized

in a map termed "keyword co-occurrence network visualization" by the VOSviewer. It is crucial to relativize the interactions between the keywords when the researcher wants to learn more about his/her research subject. As a result, the VOSviewer applies association strength normalization by default and generates a network in a two-dimensional space. Strongly associated terms are shown by nodes close to each other, whereas weakly related keywords are indicated by nodes far apart (van Eck & Waltman, 2014). The nodes were then assigned to a network of clusters by the VOSviwer, with nodes highly correlated with other nodes placed in the same cluster (Chen et al., 2016). VOSviewer uses colors to indicate the cluster assigned to a node. Thus, a cluster may represent a common theme. This keyword co-occurrence analysis was used because the study's primary goal was to find the common areas addressed.

Visualizing keyword density is similar to the depiction of keyword co-occurrence networks. According to the VOSviewer manual, the density of keywords at each location in the density visualization map is depicted by color ranges ranging from blue to green to red by default. The closer a position's color is red, the more keywords it has nearby and the higher its weight. The fewer keywords nearby and the lower the weights, the closer a point's color is to blue. The color green denotes that the keywords in a point are average. Other than that, "basic information of the article set," annual article production, average article citations received per year, and most relevant sources articles published

were generated through R Biblioshiny software. The "country-wise article publications" were generated by the VOSviewer software. These were presented to introduce the profile of the article set selected for the review.

3. Results and Findings
3.1. Selection of Articles

Scopus yielded 262 articles that met the search criteria at the identification stage. Articles published between 2015 and 2020 were included in the study, whereas others were not. Editors' comments, books, book chapters, book reviews, conference proceedings, and unpublished data were eliminated as the journal articles to be included according to the inclusion criteria. Non-English articles unrelated to business management, accounting, social science, computer science, the arts, and humanities were also eliminated. All these exclusions were made using the default automatic limiting options of the database. At this stage, 46 articles were retained for manual screening. The list of those 46

articles was downloaded into an MS Excel sheet. The authors then separately reviewed each abstract against the inclusion criteria, finding 04 articles to be irrelevant. Based on the idea, articles on Viewpoint (n=2) and Irrelevant (n=2) were disqualified for inclusion. In the eligibility assessment, two articles were excluded as their methodology was qualitative. Finally, 40 articles were included for the review. The steps followed for selecting articles are depicted in Figure 1.

3.2. Article Characteristics

The review included fifty-five articles published from 2015 to 2020 in 39 journals. One hundred forty authors have published them in 36 countries. The total number of references included for the review was 3450. The average number of citations per article was 23.36. The Biblioshiny in R software was used to generate the basic information for the article set, shown in table1.

Table 1: Basic information about the article set

Description	Results
Timespan	2015:2020
Journals	39
Articles	55
Average years from publication	4.45
Average citations per article	23.36
Average citations per year per doc	3.74
References	3450
Author's Keywords (DE)	211
Authors	140
Countries	36

Source: Review data, 2022

The annual article production on E-government is given in figure 2. There is a gradual increase. It indicates that the interest of the scholars in the subject has been growing. However, the number of citations received by each article, which is given in figure 3, has decreased during the period. Concerning the source journal of the articles published, the information given in figure 4 indicates that the Electronic Government Journal and the International Journal of Electronic

Government Research have published the highest number of articles on E-government adoption (6 articles each). Other than that, the country-wise article publication analysis is given in figure 5. It shows how each country is related to the other countries in E-government research. Figure 5 indicates that Malaysia (8 articles), United Kindom (7 articles), Jordan (7 articles), and the United States of America (6 articles) have published the highest number of articles.

Figure 1: PRISMA Diagram
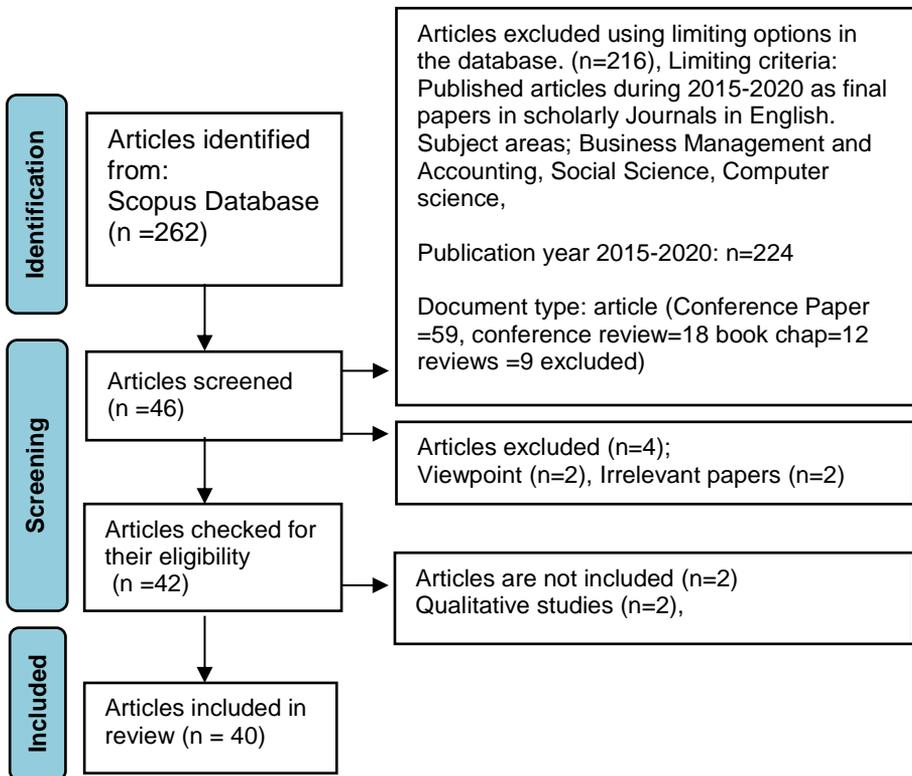
Source: Authors' construct, 2022

Note: Search Algorithm - e- AND Government
AND *adoption* OR electronic AND *Government* AND *adoption* AND determinants.

Figure 2: Annual article production
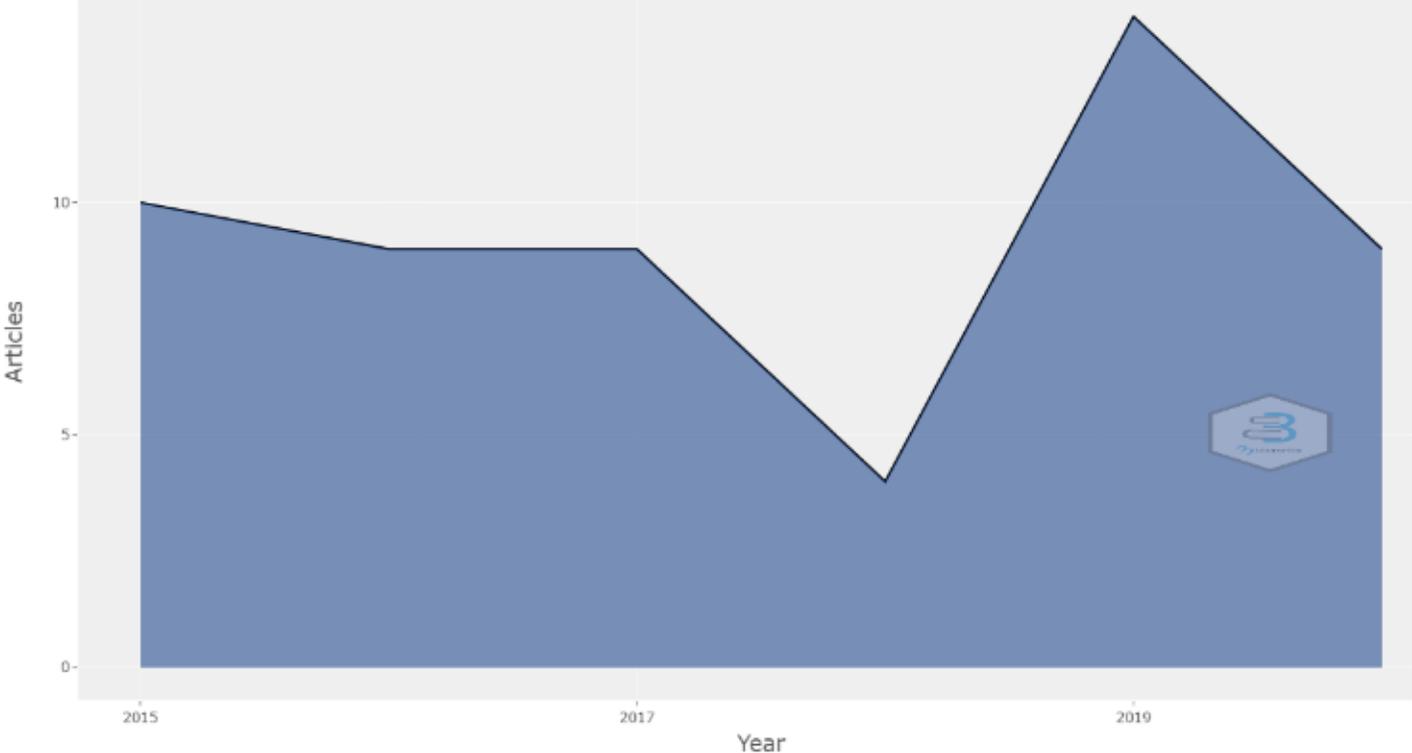
Source: Review data, 2022

Figure 3: Average article citations received per year
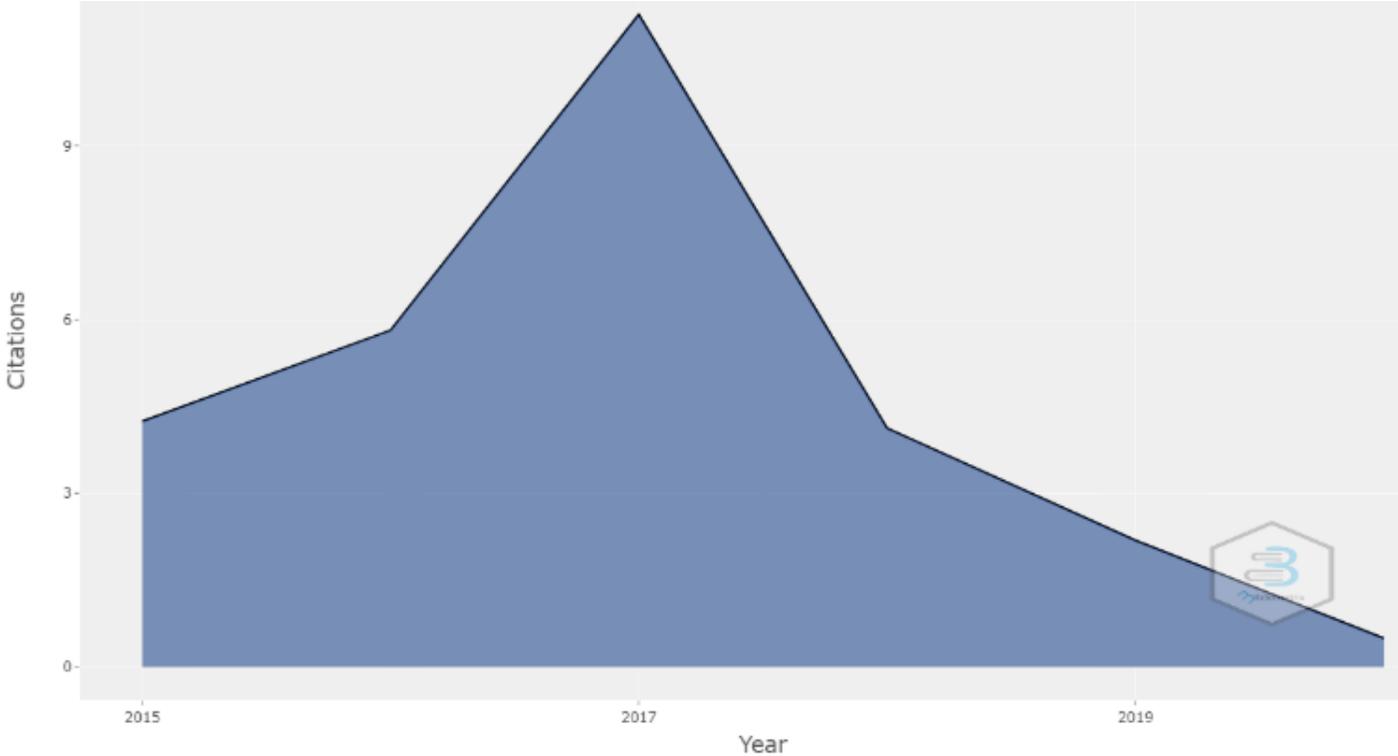
Source: Review data, 2022

Figure 4: Most relevant sources articles published

Source: Review data, 2022

Figure 5: Country wise article production
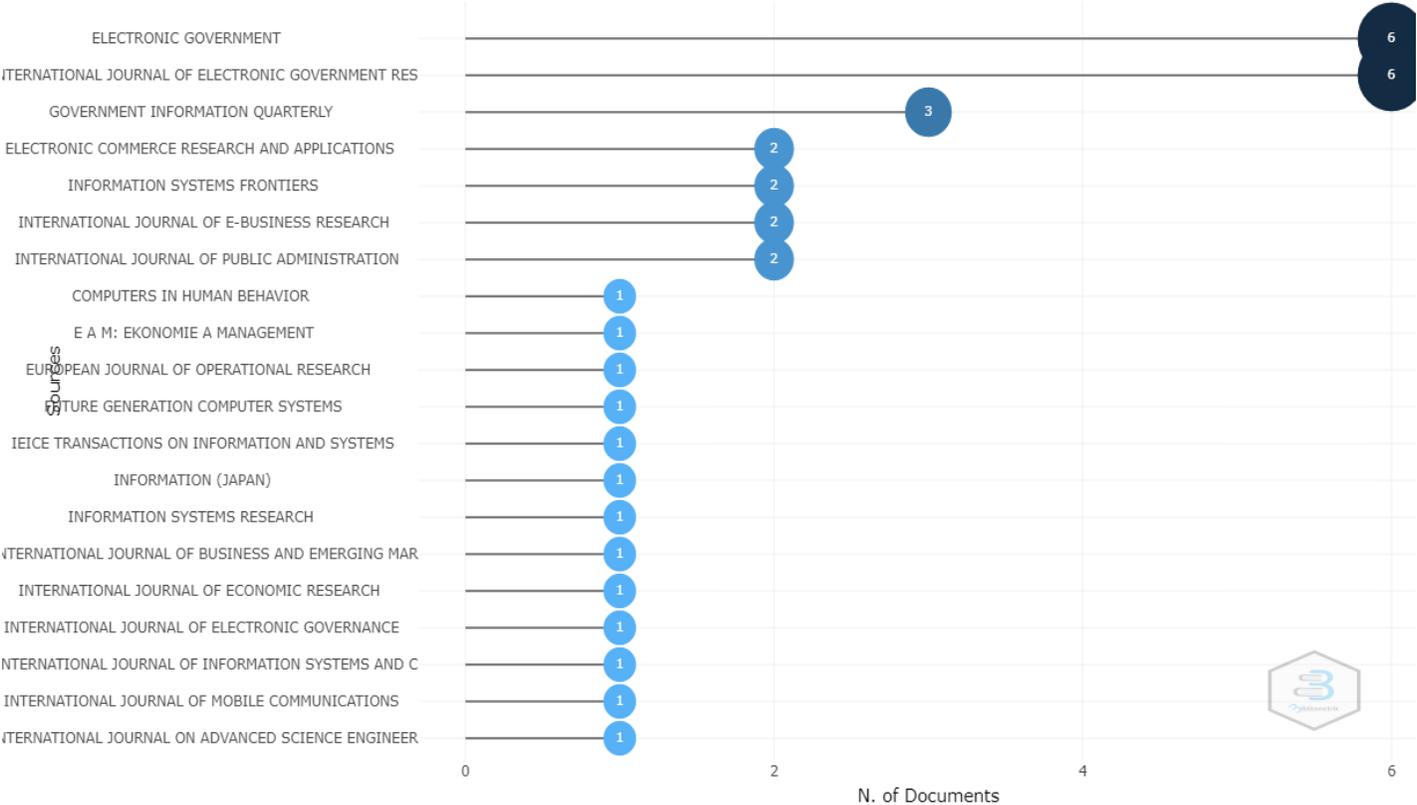
Source: Review data, 2022

Figure 6: The map of keyword co-occurrence network
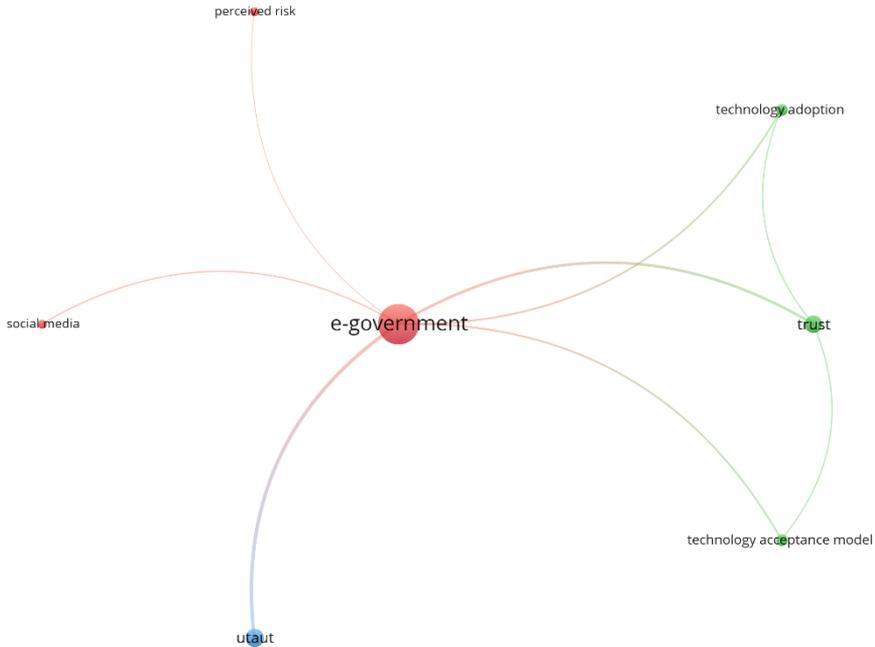
Source: Review data, 2022

3.3. Results and Analysis

This section primarily addresses the research objectives. The study's objectives were (1) to find the common areas investigated in the empirical research landscape on E-government adoption during 2015-2020 and (2) the areas that need more focus for research. Section 3.3.1 addresses the first objective, and 3.3.2 addresses the second objective.

Table 2: Keyword clusters

Cluster	Keywords
Cluster 1	E-government, perceived risk, social media
Cluster 2	Technology acceptance model, technology adoption, trust
Cluster 3	UTAUT

Source: Review data, 2022

3.3.1. Common Areas Investigated in E-government Adoption

There are mainly three clusters found. They represent different themes: Cluster 1: Social Media and Perceived Risk, Cluster 2: Technology Acceptance Model (TAM), technology adoption and trust, and Cluster 3: Unified Theory of Acceptance and Use of Technology (UTAUT). The results received for each cluster are explained as follows.

Cluster 1: Social Media and Perceived Risk

Social Media and E-government: Social media like Facebook is used for rendering government services. Thus, governments open their service pages on Facebook (Mhina et al., 2019; Sawalha et al., 2019). The perception of performance expectancy, social influence, effort expectancy, personal innovativeness, and enjoyment influence the continuous use of E-government pages on Facebook. However, some studies found that social media does not influence E-government intention (Tsui, 2019).

Perceived Risk and E-government: The perceived risk for E-government use affects the trust in E-government technologies, resulting in intentions for E-government adoption (Ejdys et al., 2019). Moreover, perceived risk directly affects E-government adoption (Karavasilis et al., 2016).

Cluster 2: Technology Acceptance Model (TAM), Technology Adoption and Trust

TAM and E-government: TAM is widely used in technology adoption research. It is an information systems theory that models how users come to accept and use technology(Davis et al., 1989). It highlights the perceived usefulness and easiness that determine the acceptance and use of technology. Instead of the TAM, there is TAM 2, which incorporates the factor of social influence on the acceptance and use of technology(Venkatesh et al., 2003). Moreover, TAM 3 has also been introduced, incorporating trust and perceived risk on acceptance and system use. Since this E-government adoption is a form of technology acceptance and use, researchers have used them. In our analysis, we found that the three model types; TAM (Abu-Shanab, 2017; Alryalat, 2017; Chauhan & Kaushik, 2016; Kabir et al., 2017; Kollmann et al., 2015; Mensah & Mi, 2017; Sawalha et al., 2019), TAM 2 (Vejačka, 2016), and TAM3 (Alryalat, 2017), all have been used as the theoretical foundation. In those researches, perceived usefulness (Kabir et al., 2017; Sawalha et al., 2019; Vejačka, 2016), perceived ease of use (Kabir et al., 2017; Sawalha et al., 2019) amount of information about E-government (Vejačka, 2016) have been used. Other than that, researchers have used perceived quality of services (Vejačka, 2016), perceived security, trust (Alryalat, 2017; Sawalha et al., 2019; Vejačka, 2016), facilitating conditions (Alryalat, 2017), and computer Self-efficacy (Kabir et al., 2017).

Technology Adoption and E-government: The keyword technology adoption has been used to denote the adoption of new technologies into government services. Adopting e-learning for government servants (Hung et al., 2016), e-voting (Mensah & Mi, 2017), use of web site and social media (Mhina et al., 2019; Sawalha et al., 2019) to information delivery (Al-Shafi & Weerakkody, 2010). Moreover, the technology is used for information quality characteristics (accuracy and completeness) and (2) channel characteristics (convenience and personalization) that predict the citizens' intentions to use E-government (Venkatesh et al., 2016).

Trust and E-government: The cornerstone of all interpersonal relationships, trust, is frequently addressed in human-technology interactions. Thus, trust is an essential determinant of E-government adoption (Abu-Shanab, 2017; Al-Ma'aitah, 2019; Alryalat, 2017; Jaradat et al., 2018; Sawalha et al., 2019; Vejačka, 2016). The includes citizens trust (Al-Ma'aitah, 2019; Mensah, 2020). The personal data security and the perceived level of risk associated with the technology embeddedness in government services determine the level of trust in such technologies (Ejdys et al., 2019).

Cluster 3: Unified Theory of Acceptance and Use of Technology (UTAUT)

UTAUT and the E-government: UTAUT is a theory developed to explain technology acceptance and use. It has factors: performance expectancy, effort expectancy, social influence, and facilitating conditions that determine the acceptance and use of technology. Thus, the researchers used this for theoretical grounding in the E-government adoption research (Alraja, 2016; Mensah, 2020; Mensah & Mi, 2017; Mhina et al., 2019; Rana et al., 2016; Sawalha et al., 2019; Witarsyah et al., 2017).

3.3.2. Areas That Need More Focus for Research

More research is possible on a particular area designating the keyword when that keyword is in the red background on the density visualization map (Chen et al., 2016). It is then viewed as sufficient knowledge on that particular area designating the keyword (An & Wu, 2011). If the keyword is in the green background, it is assumed that there is limited research on that area designating the keyword (Chen et al., 2016). Based on this notion, we loaded all the study keywords into the VOSviewer. We found that only E-government or Electronic Government has been frequently investigated during the 2015-2020 period (see Figure 7). It was prominent for having such a finding as they were our key search terms. Instead of these two keywords, we focused on finding the other areas linked with E-government. Figure 7 shows that none of the other keywords are in the red background,

indicating that sufficient research is unavailable on different areas of E-government. All the other keywords are in yellow and green areas. There is only effort expectancy, facilitating conditions, social media, UTAUT, user acceptance, and adoption. They have been investigated avere number of times and regarded as the knowledge created in them is not sufficient for an established knowledge for E-government research. The other areas, in figure 7, for example, awareness, cost of services, citizen satisfaction, digital inequality, individual motivators etc., are the areas in the green area. They are considered infrequently investigated. Thus the areas need to be further investigated.

3.4. Reporting Bias Assessment

The PRISMA guidelines demanded that biases related to missing study results be assessed and reported. In this study, we did not use any assessment of whether reporting of results involved any biases. However, we used systematic and objective software tools (VOSviewer) to produce the results, and they were reported as per the PRISMA guidelines.

4. Discussion

The results of the articles were synthesized under the two sections; (3.3.1) common areas investigated in E-government adoption and 3.3.2, the areas that need more focus for research. It was done to address the two objectives of the study. In the first heading, three main areas of E-government research were identified. "Social Media and Perceived Risk," "TAM, technology adoption and trust," and the UTAUT.

Most of the research has investigated Social media use for government services. The citizens' perceived risk and trust in the technology are common factors investigated that determine the user acceptance and the use of E-government technologies. Moreover, the two common technology acceptance and use theoretical models, TAM and its modifications and UTAUT, have been widely used. The determinants, perceived usefulness, perceived easiness, trust, and perceived risk of TAMs and performance expectancy, effort expectancy, social influence, and facilitating conditions of UTAUT have been commonly investigated. They are the factors for E-government adoption.

Figure 7: Map of keyword Co-occurrence density visualization
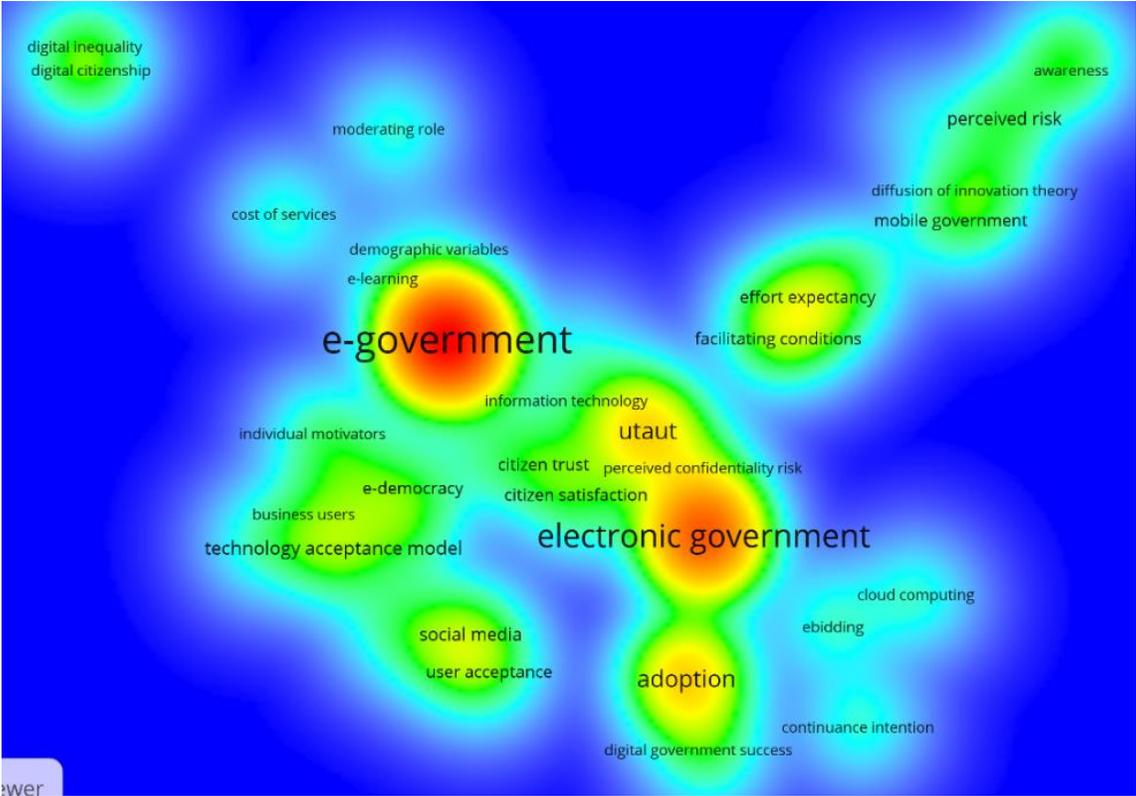
Source: Review data, 2022

In 3.3.2, awareness, cost of services, citizen satisfaction, digital inequality, individual motivators, etc., are some of the areas infrequently investigated. Those are the determinants for E-government adoption.

The present study focused the empirical research on E-government adoption. If the E-government had been searched, the determinants, outcomes, and services could have been found. We found only the determinants as we focused on E-government adoption. Citizen empowerment and participation, better delivery of government services, more efficient management, less corruption, and more transparency (Chawdhry, 2008) need to be researched. There were gaps in the empirical research landscape regarding the benefits or outcomes for citizens and governments in adopting E-government services. Successful E-government offers stakeholders significant financial, administrative, social, and political benefits and values (Chowdhury, 2008; Moatshe, 2014; Titah & Barki, 2006). They need to be researched. Moreover, the study searched the articles from only one database. If more databases had been used, more articles and areas of E-government adoption could have been found.

4.1. Implications and Future Research Agenda

The theoretical implication is that the E-government adoption determinants confirm the existing theories of TAM models and the UTUT model. Further, the other technology acceptance theories can be used for further theoretical grounding. Since no

benefits and outcomes were found in this study, related theories can be used. The findings' managerial implication includes providing facilities for citizens to strengthen the determinants found so that acceptance and usage of E-government can be increased. Specifically, the determinants found may be a useful source in making decisions to strengthen the E-government adoption of the citizens.

The current study's findings suggest more opportunities for future research agendas. The current systematic literature review found that more research can focus on infrequently investigated areas such as citizen awareness, cost of services, citizen satisfaction, digital inequality, and individual motivators. Citizen empowerment and participation, better delivery of government services, more efficient management, less corruption, and more transparency (Chawdhry, 2008) need to be researched. The E-government adoption's benefits or outcomes (financial, administrative, social, and political) can also be researched.

5. Conclusions

Citizen empowerment and engagement, improved government service delivery, more efficient management, less corruption, more transparency, greater convenience, increased revenue, and lower costs are all benefits of E-government adoption. This study aimed to (1) find out the common areas investigated in the empirical research landscape on E-government adoption during 2015-2020 and (2) the areas that need more focus for research. A systematic

literature review methodology was adopted. Fifty-five empirical articles published during the 2015-2020 period in journals were extracted from the Scopus database. The article inclusion for the review and findings are reported according to the PRISMA guidelines.

Findings reveal that the determinants, perceived usefulness, perceived easiness, trust, and perceived risk of TAM models and performance expectancy, effort expectancy, social influence, and facilitating conditions of the UTAUT model have been commonly investigated. They are the determinants for E-government adoption. Additionally, citizen awareness, cost of services, citizen satisfaction, digital inequality, and individual motivators are determinants of E-government adoption.

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