Systematic Literature Review on Adoption of E-government among Employees in the Public Sector

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ABSTRACT

Government worldwide has adopted e-government into their organizations to improve the efficiency and effectiveness of service delivery to citizens. However, the non-adoption behavior among public-sector employees is hampering the digitalization effort. This issue has attracted several researchers to conduct a study on e-government adoption among employees in the public sector. Although numerous studies are being conducted on e-government adoption among employees, the effort made to review this topic is still scarce and limited. Nevertheless, only scant researchers have made an effort to review this topic systematically. Therefore, this study aims to conduct a systematic literature review concerning the adoption of an e-government system among employees in the public sector. PRISMA guided the review process. This SLR consists of the following methodological steps: formulating research questions, systematic searching strategies based on identification, screening, and eligibility on established databases (Scopus), then data extraction and analysis. Three main themes were identified through thematic analysis, namely (1) human factors, (2) technical factors, and (3) organizational factors. This review aims to provide reliable knowledge and ideas for academics and practitioners to implement e-government strategies in governmental agencies effectively. Although this study was only restricted to the review, it would provide a valuable basis for empirical research in the future.

CCS CONCEPTS

• **Education**; • **People in computing**; • **Law, social and behavioral sciences**;

KEYWORDS

systematic literature review, SLR, e-government, adoption, employees

1 INTRODUCTION

In recent decades, the emergence of information and communications technology (ICT) has transformed how individuals, organizations, and governments communicate with each other. Since the 1990s, the introduction and adoption of ICT in government organizations have significantly impacted the working habits of government personnel and how work is carried out [1]. The advancement in ICT has attracted governments worldwide to use ICT to provide an efficient and transparent government [2]. Subsequently, to achieve good governance, any nation must automatize its administration systems and function [3]. Thus, governments are unable to deny the benefits that technology brings [4].

Globally, the development of ICT has influenced governments to adopt electronic systems in delivering public services to citizens, which is also popularly known as electronic government or e-government [5]. E-government aims to provide citizens with more efficient ways to access government services and make governmental organizations interconnected [6], which could bring many benefits, such as reducing time and cost and increasing the efficiency and effectiveness of public services [7]. In addition, e-government will enhance public services, democratic procedures, and enforcement of public policy [8].

Hence, an e-government project should be functional to reap its benefits. A successful e-government project not only depends on its implementation alone but also on the usage of the systems and services by employees and citizens [7], [9], [10]. Capistrano [11] stated that e-government is not purely about the technology itself. It entails other components such as social-political, organizational, economic, institutional, and environmental components. Although all of these components are crucial, the most challenging part of e-government is dealing with people. It is important to note that the users of e-government consist of government workers who provide and citizens who use such services [9]. Research in e-government, where public employees are the sample, is not as common as research using citizens as the sample [12].

Furthermore, the government allocates a large sum of money to implementing e-government programs for the benefit of the public, and the adoption of these projects by government workers is crucial to their success. An increase in the adoption of ICT leads to numerous accomplishments [1]. However, adopting e-government among employees presents various challenges, such as administrative issues, technological difficulties, infrastructure problems, a lack of confidence in computer applications, security concerns, and the digital divide [13]. At the same time, e-government allows for better performance among government employees. Unfortunately, a local civil servant failed to utilize it successfully due to a lack of understanding of the benefit and use of e-government [14].
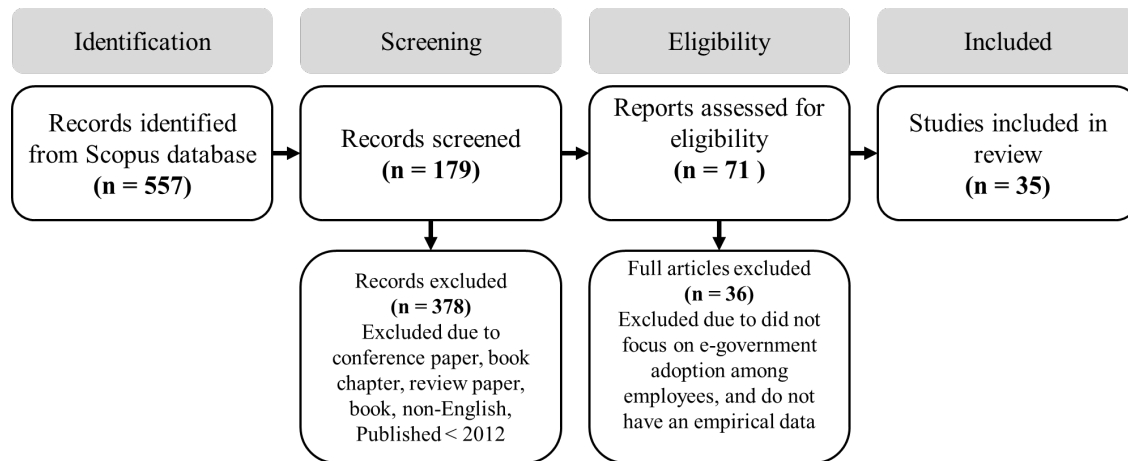
Identification	Screening	Eligibility	Included
Records identified from Scopus database (n = 557)	Records screened (n = 179)	Reports assessed for eligibility (n = 71)	Studies included in review (n = 35)
	Records excluded (n = 378) Excluded due to conference paper, book chapter, review paper, book, non-English, Published < 2012	Full articles excluded (n = 36) Excluded due to did not focus on e-government adoption among employees, and do not have an empirical data	

Figure 1: The flow diagram of the study

Government cannot cope with emerging challenges if civil servants fail to update their skills and expertise quickly. Consequently, this will lead to poor administrative service and inefficient governance [15]. The adoption of e-government among employees is plagued by challenges, and employees' perspectives must be strengthened in research [16]. Many previous studies and other research have explored various contributing factors. Due to the abundance of these studies, conducting a systematic literature review is essential to comprehensively collect and understand previous research findings. However, the current number and scope of systematic literature reviews on this topic are not remarkable. Nevertheless, noteworthy studies, like [17], have investigated the same issue, and this paper is expected to offer new insights up to the current year. Thus, this study also aims to fill the gap in the literature by conducting a systematic review concerning this topic since the public sector is expected to undergo the digital transformation process progressively in the future.

2 RESEARCH PROBLEM

The first step in the SLR study is formulating the research question. A mnemonic method known as PICo determines the critical elements that must be present in the SLR qualitative synthesis study [43]. PICo refers to P: Population, I: Interest, and Co: Context. Based on this method, the three elements of the research question of employees (population), e-government adoption (interest), and public sector (context) are used as the basis for the formation of several research questions, namely:

- What are the factors of e-government adoption among employees in the public sector?
- What are the trends in e-government adoption among employees in the public sector?

3 PROCESS OF SYSTEMATIC SEARCHING

3.1 Identification

The section discusses the method employed to retrieve articles on e-government adoption. The researchers used the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA)

method. PRISMA includes resources, the Scopus database as the primary resource for conducting their systematic review, eligibility and exclusion criteria, followed by a systematic process involving identification, screening, eligibility assessment, and data abstraction and analysis [18], ensuring a robust approach to gather relevant articles on e-government adoption.

The first step of the review (1) is the identification process; synonyms, related terms, and variations for the main keywords of e-government, adoption, and employees were identified. The identification process involved searching for an additional keyword in the online thesaurus and keywords used in past studies. This process facilitates the authors find more articles in the Scopus database. This section identifies the additional keywords for the main keywords of 'Adoption' (acceptance, utilization, usage, embrace), 'E-government' (electronic government, digital government, internet government, nline government), and 'Employees' (government employees, public servants, civil servants).

The searching process was run on the Scopus database using advanced searching techniques as follows: TITLE-ABS-KEY (("e-government" OR "electronic government" OR "digital government" OR "internet government" OR "online government") AND ("adopt*" OR "accept*" OR "utili*ation" OR "use*" OR "embrace*") AND ("employee*" OR "government employee*" OR "civil servant*" OR "public servant*")).

To search the related articles and documents for the review, one main database, namely Scopus, was selected as the leading database. This is in line with the suggestion of Bhaskar et al. [17] that the Scopus database has a broad coverage of peer-reviewed, high-quality research papers. Shaffril et al. [18] also agreed that Scopus is one of the most extensive peer-reviewed literature databases comprising more than 22,800 journals from 5000 publishers worldwide. Scopus also consists of an advanced search function, comprehensive indexing, a multidisciplinary field, and its control articles' quality.

3.2 Screening

This study screened all the selected articles by choosing the criteria for article selection which is done automatically based on

the sorting function available in the Scopus database. Based on the search process on the Scopus database, it was realized that the number of studies related to e-government usage among employees has been increasing from 2012 onwards, and articles related to the information technology (IT) field have rapidly progressed within the ten-years span. Another reason for limiting the search to 2022 was that the search process started in early January 2023, and 2023 still has not ended. Therefore, based on this, the timeline between 2012 and 2022 was selected as one of the inclusion criteria. Moreover, only articles published in English are incorporated in the review to avoid confusion in understanding. Only journal articles containing relevant empirical data are included in the study. Thus, conference proceedings, book chapters, review papers, and books were excluded since the objective was to identify previous studies' findings. Additionally, the study only includes articles that specifically discuss the factors of e-government adoption among employees in the public sector. At this stage, out of 557 articles, 378 were removed, and only 179 are eligible to be reviewed in the next stage.

3.3 Eligibility

In this process, the remaining articles will be manually monitored to ensure being in line with the criteria. The authors will read the title and abstract of the selected articles, and if there is still no clear understanding gained on the relevance of the selected articles to the study, the article's content was examined. After a careful examination, a total of 36 articles that did not clearly state the factors of adopting e-government use among public sector employees, such as those focused on the private sector or citizens, were excluded. Overall, 35 articles were selected for the review (see Table 1).

3.4 Data abstraction and analysis

The remaining articles will be evaluated and analyzed based on studies focusing on formulated research questions. In order to identify the main themes, the authors started by extracting data from reading the articles' abstracts and then reading the entire articles. In addition, thematic analysis was employed to identify appropriate themes concerning e-government adoption factors among public sector employees.

4 RESULT AND DISCUSSION

The review resulted in three main themes, covering human factors, technical factors, and organizational factors. According to the trends of the studies, the authors identified the countries, methodology, years of publication, and theories that other researchers used. According to Table1 , four studies focused on the adoption of e-government by civil servants in Indonesia [14], [19]–[21]. Three studies concentrated on adoption among civil servants in India [13], [16], [22]. Three studies focused on Iraqi employees [4], [23], [24]. Furthermore, two studies were conducted among employees in Iran [25], [26], two studies were conducted in Malaysia [27], [28], two studies concentrated on a civil servant in Greece [7], [29], two studies were conducted in Nigeria [5], [30], two studies were conducted in Oman [31], [32], two studies focused on employees in Taiwan [15], [33]. Meanwhile, two studies were conducted in

two different countries; for example, Batara et al. [19] in the Philippines and Indonesia, and Falco et al. [1] focused on employees in Cyprus and Spain. One study was performed by Dukic et al. [9] among civil servants in Croatia and Azamela et al. [34] conducted a study on Ghana employees. In addition, each of the researchers conducted one study in the following countries: Pakistan [35], Serbia [2], Slovenia [36], Malawi [37], Jordan [3], Tanzania [38], Tunisia [39], Turkey [40], USA [41], and Yemen [42].

Moreover, only one studies used mixed method approach, two studies applied the qualitative approach, and the remaining 32 studies used quantitative methods. Regarding years of publication, two studies were published in 2022, three studies were published in 2021, five studies were published in 2020, five studies were published in 2019, one study was published in 2018, five studies were published in 2017, eight studies were published in 2016, one study was published in 2015, three studies were published in 2014, and two studies were published in 2012.

According to Figure 2 , a total of 13 studies used the Unified Theory of Acceptance and Use of Technology (UTAUT) [3], [4], [14], [19], [21], [24], [25], [30], [32], [33], [36], [38]. In addition, nine studies utilized Technology Acceptance Model (TAM) [1], [5], [23], [25], [28], [29], [37], [40], [41]. Another four studies applied Diffusion of Innovation (DOI) [25], [28], [29], [42] and Theory of Planned Behavior (TPB) [28], [34], [37], [41]. Three researchers employed Delone and Mclean IS Success Model [2], [20], [39], and two researchers used Decomposed Theory of Planned Behavior (DTPB) [15], [35]. Only one study applied Moore and Benbasat theory [27], Social Cognitive Theory (SCT) [19], Technology Organization Environment (TOE) [37], Theory of Reasoned Action (TRA) [19], Technology Readiness Index (TRI) [21], and Task Technology Fit (TTF) [42].

Human factors were found to be the most common factors cited by other researchers. A total of 33 human factors were used by researchers to investigate the adoption of e-government by civil servants. Figure3 shows that performance expectancy (13 studies), effort expectancy (12 studies), social influence (12 studies), facilitating condition (10 studies), perceived ease of use (10 studies), perceived usefulness (9 studies), and perceived behavior control (7 studies) were found to be most commonly cited by researchers recently. In recent years, from 2019 to 2022, researchers have increasingly utilized variables such as effort expectancy, performance expectancy, social influence, and perceived behavior control to investigate the factors of e-government adoption among employees.

Among the most common human factors used, performance expectancy, effort expectancy, social influence, and facilitating conditions were adopted from the UTAUT model. Meanwhile, perceived usefulness and perceived ease of use were adopted from TAM, and perceived behavior control comes from TPB. In addition, TAM variables were frequently used by researchers throughout the early, middle, and recent periods (2012-2022). Furthermore, human factors such as accessibility, anxiety, attitude, availability, awareness, barrier factors, compatibility, the capability of IT workers, complexity, computer self-efficacy, control, demographic factors, efficiency, character, image, innovativeness, job relevance, motivation, skill, optimism, perceived risk also used by others researchers to study the e-government adoption among employees

Table 1: Literature on the adoption of e-government among employees

Authors (year)/Country	Methodology	Theory	Variables/Factors
Rosnidah et al. (2022) Indonesia	Quantitative	UTAUT TRI	Behavior intention, Innovativeness, Insecurity, Optimism, Social influence, Technology readiness
Azamela et al. (2022) Ghana	Quantitative	TPB	Attitude, Subjective norms, Perceived behavioral control, Behavior intention, Actual behavior
Gholami (2021) USA	Quantitative	TPB TAM	Attitude, Subjective norms, Perceived behavior control, Perceived usefulness, Perceived ease of use, Behavior intention, Trust in Office 365, Demographic construct
Dewi and Fajar (2021) Indonesia	Quantitative	D&M IS Success Model UTAUT	System quality, Information quality, Service quality, Intention to use, User satisfaction, Net benefit, Performance expectancy
Alminshid and Omar (2021) Iraq	Quantitative	TAM	Perceived ease of use, Perceived usefulness, Trust in government, Trust in internet, Intention to use, Use of e-government
Ziba and Kang (2020) Malawi	Quantitative	TOE TPB TAM	Environmental surroundings, Donor support, Top management support, E-government funding, ICT Infrastructure, Performance expectancy, Effort expectancy, Self-efficacy, Attitude, Subjective norm, Perceived behavior control, Intention to use.
Mellouli et al. (2020) Tunisia	Quantitative	D&M IS Success Model	System quality, Information quality, Service quality, Intention to use, User satisfaction, Environmental sustainability, Organizational performance
Falco E. et al. (2020) Spain & Cyprus	Quantitative	TAM	Perceived ease of use, Perceived usefulness, Training, Level of skills
Bhaskar et al. (2020) India	Qualitative	-	Perceived determinant value, Administrative issues, Organizational dynamics, Physical and technological resources, E-government website, Attitude to use, Trust issues, Exogenous factors, Auxiliary service
Rana S. et al. (2020) India	Qualitative	-	Technological-level barriers, Institutional-level barriers, Operational-level barriers, Employee-level barriers
Alibraheem et al. (2019) Jordan	Quantitative	UTAUT	Performance expectancy, Effort expectancy, Social influence, Facilitating condition
Tabuni and Kusuma (2019) Indonesia	Quantitative	UTAUT	Job fit, Performance expectancy, Effort expectancy, Social influence, Facilitating condition, Behavior use of e-government
Zahid and Din (2019) Pakistan	Quantitative	DTPB	Trust (economic bonds, social bonds, and structural bonds), Attitude (performance expectancy, effort expectancy, perceived risk), Subjective norms (mass media influence, family influence), Perceived behavioral control (self-efficacy & facilitating condition)
Valsamidis et al. (2019) Greece	Quantitative	DOI	Control, Complexity, Compatibility, Information quality, System quality, Trust, Intention to use
Al-Swidi and Faaeq (2019) Iraq	Quantitative	UTAUT	Social influence, Electronic service awareness, Performance expectancy, Effort expectancy, Facilitating condition, Use behavior of e-gov service, Continued usage intention
Mhina et al. (2018) Tanzania	Quantitative	UTAUT	Performance expectancy, Effort expectancy, Social influence, Facilitating condition, Perceived confidentiality risks (PCR), Attitude, Behavioral intention
Mohammed et al. (2017) Yemen	Quantitative	TTF DOI	Task, Relative advantage, Compatibility, Complexity, Trialability, Security, Cloud fitness for e-government
Dukić et al. (2017) Croatia	Quantitative	-	Socio-demographic, Readiness to accept e-government, satisfaction with e-government
Batara et al. (2017) Indonesia Philipines	Quantitative	UTAUT TRA SCT	Performance expectancy, Effort expectancy, Social influence, Facilitating conditions, Anxiety, Attitude, Behavioral intention, Age (AGE), Length of work experience
Kabir et al. (2017) Nigeria	Quantitative	TAM	Perceived Usefulness, Perceived Ease of Use, Computer Self-efficacy
Gupta et al. (2017) India	Mixed Method	-	Employees personal characteristics (age, gender, educational level), Technical factors (access speed, layout of the website, technical infrastructure), Organization factors (training, technical support), Trust (Trust in data storage and management, Trust in technical infrastructure)

Ibrahim and Zakaria (2016) Iraq	Quantitative	UTAUT	Website quality, Awareness, Computer self-efficacy, Capability of IT workforce, Training, Performance expectancy, Effort expectancy, Social influence, Facilitating condition
Chung et al. (2016) Taiwan	Quantitative	UTAUT	Performance expectancy, Effort expectancy, Facilitating condition, Social influence, Behavioral attitude, Barrier factor, Policy factor
Pitchay et al. (2016) Malaysia	Quantitative	Moore and Benbasat	Relative advantage, Ease of use, Compatibility, Visibility, Image, Result Demonstrability, Intention to use
Stefanovic et al. (2016) Serbia	Quantitative	D&M IS Success Model	Information Quality, System Quality, Service Quality, Demographic intention, Intention to use/use, User satisfaction, Net benefit
Alraja (2016) Oman	Quantitative	UTAUT	Social influence, Facilitating condition
Alraja et al. (2016) Oman	Quantitative	UTAUT	Performance expectancy, Effort expectancy
Karavasilis I. et al. (2016) Greece	Quantitative	TAM, TAM2 DOI	Perceived risk, Trust in e-government, Perceived behavioral control, Output quality, Job relevance, Perceived usefulness, Awareness, Personal innovativeness, Subjective norm, Image, Perceived ease of use, Compatibility, Relative advantage, Intention to use
Hung et al. (2016) Taiwan	Quantitative	DPTB	Behavioral intention, Attitude, Subjective norm, Perceived behavior control, Perceived usefulness, Perceived ease of use, Perceived compatibility, Personal Innovativeness, External influence, Self-efficacy, Facilitating condition, Government support, Learning culture, Professional core competence
Dečman (2015) Slovenia	Quantitative	UTAUT	Performance expectancy, Effort expectancy, Social influence, Personal value, Facilitating condition, Age, Gender, Experience, Voluntariness of use, Behavior intention, Use behavior
Sebetci (2014) Turkey	Quantitative	TAM	Information quality, System quality, Service quality, Perceived usefulness, Perceived ease of use, Attitude toward using, Behavioral intention to use
Shajari and Ismail (2014) Iran	Quantitative	TAM UTAUT DOI	Output quality, Job relevant, Image, Perceived usefulness, Perceived ease of use, Trust of internet, Trust of government, Compatibility, Social influence, Intention to use
Zolfani et al. (2014) Iran	Quantitative	-	Accessibility, Security, Efficiency, Availability, Private sector partnership, Workforce capability, Information exchange
Sulaiman et al. (2012) Malaysia	Quantitative	TPB TAM DOI	Perceived usefulness, Perceived ease of use, Perceived risk, Personal innovativeness, Trust, Compatibility, Attitude, Intention
Olatubosun and Rao (2012) Nigeria	Quantitative	UTAUT	Performance expectancy, Effort expectancy, Social Influence, Technology access, Online skills, Motivation, Self-efficacy, Anxiety, Attitude toward behavior, Behavioral intention, Perceived behavioral control, Use of technology

Technical factors emerged as the second most cited feature. Under this theme, a total of 15 technical factors were identified, including service quality, system quality, information quality, website quality, compatibility, complexity, access speed, the layout of the website, technical infrastructure, job fit, perceived confidentiality risk, relative advantage, security, task, and trialability. Moreover, service quality, system quality, and information quality were the most frequently employed by researchers to investigate the adoption of e-government among civil servants [2], [7], [20], [39], [40]. These variables were adopted from DeLone and McLean IS Success model and were progressively used in recent studies from 2019 to 2022 (see Figure 3). Several studies relied on other technical factors such as website quality [24], perceived confidentiality risk [38], access speed, the layout of the website, and technical infrastructure [13]. A study by Mohammed et al. [42] employed the technical variables including relative advantage, security, task, trialability, compatibility, and complexity.

Organizational factors are one of the prominent features in e-government adoption among employee research. A total of eleven factors emerged, and training was cited in three studies [1], [13], [24]. Training is one of the important indicators for employees' acceptance of the e-government system. A study by Ziba and Kang [37] employed the elements such as donor support, top management support, e-government funding, the surrounding environment, and ICT infrastructure. Another study conducted by Zolfani et al. [26] used information exchange and learning culture as a factor of e-government adoption among employees. In Taiwan, Hung et al. [15] utilized learning culture, professional core competence, and government support as a variable to explore the behavioral intention of civil servants to adopt e-government.
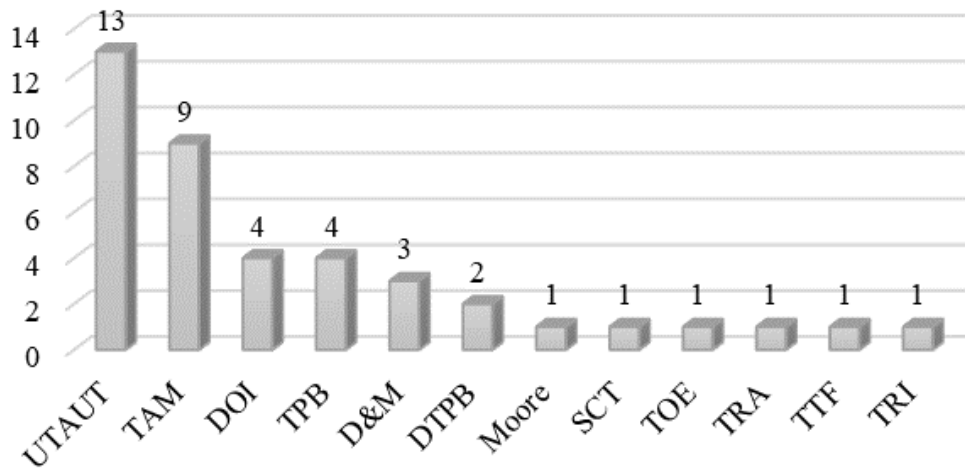
Figure 2: Theories used in the adoption of e-government by civil servants
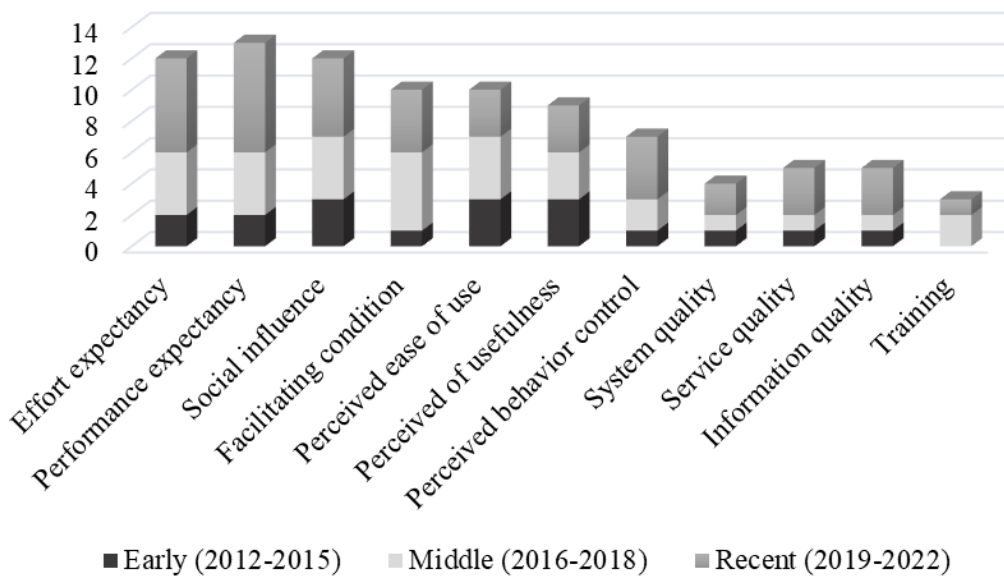

Figure 3: Frequency of factors for e-government adoption among government employees

5 CONCLUSION AND FURTHER RECOMMENDATION

The review identified three main factors in employees' adoption of information technology, such as human factors, technical factors, and organizational factors. Several research gaps were identified in this review. First, researchers frequently used human factors compared to the technical and organizational aspects. Hence, future studies can focus more on technical and organizational variables in the study on adopting e-government among employees or consider incorporating all elements of human, technical, and organizational

factors into their studies for a deeper understanding. Secondly, most articles used quantitative methods (33 studies), while only two of them used qualitative methodology. The absence of qualitative and mixed-methods design studies creates a significant gap. It is important to note that both approaches have their own advantages and should be explored by future researchers. The qualitative design provides in-depth explanations of processes within specific local contexts, generating richer data going beyond quantitative statistics. On the other hand, the mixed methods approach enhances data validity, informs the collection of additional data sources, aids in

knowledge creation, and integrates various elements to yield more comprehensive findings and conclusions.

Several limitations were identified. This paper is limited to a literature review based on databases search in Scopus. Therefore, future reviews can be executed using additional leading and supporting databases such as Web of Sciences, Google Scholar, ScienceDirect, Dimensions, DOAJ, and Myjurnal to enhance the search strategies. Secondly, it is crucial to use quality appraisal tools to ensure the reliability and strength of the literature included in the review paper. By using different assessment instruments, researchers expected to uncover any differences in the quality of the articles. Therefore, in future studies, it is recommended to analyze either a greater or smaller number of articles compared to the 35 articles examined in this study while employing various assessment tools.

In conclusion, this systematic literature review can shed light on the topic of government employees' use of technology in the public sector by analyzing articles about trends and influencing factors. This paper aims to contribute to the body of knowledge and provide enlightenment on this issue. Based on the literature search, this study is relevant, considering that there are still scarce systematic literature studies that have been found concerning the current trends and factors of employee adoption of information technology in the public sector.

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