

## Conference Paper

# A Systematic Review: Factors Affecting Employees' Adoption of E-government Using an Integration of UTAUT & TTF Theories

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## Abstract

Information and communication technologies (ICT) have been implemented mainly in government organizations, where e-government has become prevalent. The previous research focuses mostly on e-government adoption from the perspective of citizens. However, there is a scarcity of research conducted from the viewpoint of the employee. This study tried to identify and predict the factors that influence an employee to adopt technology implemented at the workplace by focusing on acceptance technology theories. The unified theory of acceptance and usage of technology (UTAUT) and Task-technology fit (TTF) using relevant findings in this review. The attempt to conduct a comprehensive explanation and analysis of the existing literature up to 2018, to understand the current situation of e-government implementation. Reviewing procedures were done by reviewing articles on e-government and related work by using indexing databases "web of science & Scopus. Finally, the results of this paper are the factors that make employees directly or indirectly adopt e-government.

**Keywords:** e-government adoption, UTAUT, TTF, G2E, employee.

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## 1. Introduction

The world today lives in the era of information after a lengthy industrial era, and the information and communication technology (ICT) is considering one of the benefits of this information age. In recent years, e-government has been one of the most critical technologies in ICT. Using of IT tools for some people is ordinary in their daily lives, while others still choose traditional ways to use (Greenland, 2019; Xing, 2018). There is no particular e-government definition, and most definitions emphasize on better delivery of government services to beneficiaries by using technology. According to (World Bank, 2015), e-government refers to the use of IT technologies by government agencies. These technologies can serve a variety of different ends such as citizens, customers,

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clients and employees (Al-nidawi, Al-wassiti, Maan, & Othman, 2018; El-dosuky & El-adl, 2019; Joshi & Islam, 2018). (Al-nidawi et al., 2018; Alkhatib, 2013) categorised e-government into four classes: (a) Government to Citizen “G2C”: which refers to the interaction between government and its citizens to access information and government services effectively, efficiently, and quickly; (b) Government to Employee “G2E”: which indicates the interaction between government and its employees to improve productivity by using all effective ways available; (c) Government to Government “G2G”: which is the interaction between government agencies functional at local levels; (d) Government to business “G2B”: the interaction between government and businesses by using the Internet to help businesses activities.

Due to the growing application of IT technology, the determinants of technological acceptance have been explained and predicted in several theoretical frameworks. To unify the eight existing frameworks as shown in Table 1, the Unified Theory of Acceptance and Use of Technology (UTAUT) model was developed by (Venkatesh, Morris, Davis, & Davis, 2003). It has been tested empirically over time, examining the acceptability of technology between various areas. A commonly used model represents only about 56% variation in the intention of users to accept and use technology. Consequently, UTAUT2 was developed to improve the original framework and explanation for more variance. Though, there is a little study on UTAUT2 (Venkatesh, Thong, & Xu, 2012).

Task-technology fit (TTF), the theory says that if the IT capacities suit the duties that an employee has to do, the IT may have a beneficial effect on employee performance. (Goodhue & Thompson, 1995) Suggested (TTF) model for understanding the linkage between information systems and individuals. About this model, technological features relate to the technology used to perform their tasks by employees. Task characteristics refer to the actions performed by users who turn inputs into products. TTF is the extent to which technology helps a user to complete tasks. Hence, the technology will be adopted by employees in case the tasks of the technology correspond with the services to perform.

This survey conducted on e-government adoption, it reveals a gap in previous studies on the integration of UTAUT & TTF theories in technology adoption from the employees perspective. This review provides evidence on e-government adoption by integrating UTAUT and TTF. By recognizing these factors, senior managers can build essential strategies that will help in dealing with different subgroups of employees and the varying degrees of acceptance of using the technology more efficiently and effectively.

TABLE 1: Constructs of eight theories & their relation with UTAUT I.

Theory/ Framework	Constructs	UTAUT Constructs
Theory of Reasoned Action (TRA) by (Ajzen & Fishbein, 1975)	Attitude. Subjective Norm.	Social Influence.
Theory of Planned Behaviour (TPB) by (Ajzen, 1985)	Attitude. Subjective Norm. Perceived behavioural control.	Social Influence. Facilitating Conditions.
Technology Acceptance Model(TAM) by (Davis, 1986)	Perceived Usefulness. Perceived Ease of Use.	Performance Expectancy. Effort Expectancy.
Technology Acceptance Model2 (TAM2) by (Venkatesh & Davis, 2000)	Perceived Usefulness. Perceived Ease of Use. Subjective Norm. Image. Job Relevance. Output Quality. Result Demonstrability.	Performance Expectancy. Effort Expectancy. Social Influence.
Innovation Diffusion Theory (IDT) by (Rogers, 1995)	Relative Advantage. Complexity. Image. Compatibility. Voluntariness Use.	Performance Expectancy. Effort Expectancy. Social Influence. Facilitating Conditions.
Social Cognitive Theory (SCT) by (Bandura, 1986)	Outcome Expectations. Encouragement by Others. Others Use. Support. Self-Efficacy. Performance Outcome. Affect. Anxiety.	Performance Expectancy.
Motivational Model (MM) by (Vallerand, 2000)	Extrinsic Motivation. Intrinsic Motivation.	Performance Expectancy.
Model of PC Utilization (MPCU) by (Thompson, Higgins, & Howell, 1991)	Job-fit. Complexity. Social Factors. Facilitating Conditions. Affect. Long-Term Consequences	Performance Expectancy. Effort Expectancy. Social Influence. Facilitating Conditions.
Combined TAM-TPB (C-TMA-TPB) by (Taylor & Todd, 1995)	Perceived Usefulness. Subjective Norm. I have perceived behavioural control. Attitude.	Performance Expectancy. Social Influence. Facilitating Conditions.

## 2. Theoretical Background and Research Model

The challenges for e-government projects are less pronounced in technologically developed countries than in developing countries. At a basic level, there is likely to be limited access for many citizens to technological resources such as computers and the internet. Also, there could be lower skills in using the technology, lower literacy and education levels as well as the most advanced technologies related to industry 4.0 like clouding,

blockchain and other related technologies and innovations (El-dosuky & El-adl, 2019; Nanos, Manthou, & Androutsou, 2019).

According to a many studies conducted on e-government (Al-Mutairi, Naser, & Fayez, 2018; Almarabeh & Abuali, 2010; Dewa, Zlotnikova, & Science, 2014; Yadav & Tiwari, 2014), they determine the challenges and obstacles in developing countries like cultural and social matters, content accessibility, insufficient infrastructure, insufficient service delivery and lack of confidentiality and trust as well as digital divide where employees' resistance towards adopting digital technology.

UTAUT focuses on individual behaviour to using a specific technology, that developed based on ease of use and usefulness of the IT technology. TTF Theory emphasizes the connection between the user job requirements and the IT capabilities available. While each model provides considerable clarification, a model that includes buildings from both models can provide a significant enhancement over each model alone (Lai, 2017).

According to (Mosweu & Bwalya, 2018), UTAUT alone is not enough to explain the factors that impact the adoption of technology. So, by integrating the (TTF) model and (UTAUT), this research proposes an e-government user adoption model to explain the relationship between software use and user performance. The link between the IS and user performance was the main issue in IS research. (Bakker, 2018; Goodhue & Thompson, 1995).

### 3. Methodology

This research divided into three main stages, which are:

#### 3.1. A bibliometric study

This phase which conducted with proceeding papers and journal articles published up to Dec. 2018 by using indexing databases (web of science & Scopus), so the publication period restricted from the first article published up to December 2018. This review conducted in three searching levels. The first search was under the topic ("UTAUT" or "UTAUT2" or "unified theory of acceptance and use of technology" and "e-government" or "electronic government"). The second search was on ("TTF" or "task-technology fit" and "e-government" or "electronic government"). Finally, the combination of all the previous searches done (UTAUT, TTF, and e-government).

The following criteria that used for exclusion or inclusion of all journal articles and proceeding papers:

1. The topic was e-government adoption through UTAUT and TTF theories,
2. The full article obtained from different digital databases,

### 3.2. The systematic review for retrieved articles.

A systematic review was done to ensure that most of the relevant research included, in this phase, all abstracts of these articles read and analyzed, and an article not related to the study domain removed. Few of them were relevant and considered to be investigated for the bibliometric and systematic aspects. Finally, in-depth analysis of these articles that were conducted to extract the factors affecting employee to adopt the technology.

### 3.3. Reporting data process

The included articles were organized into three groups: UTAUT & e-government, TTF & e-government and UTAUT & TTF & e-government. Once the first category achieved, go to the next one that is finer distinctions based on their research focus, which is employee perspective. All articles were then summarised, and their data entered into tables and figures.

## 4. Results and Findings

The bibliometric survey carried out, and the results obtained by the analysis of the 145 articles that getting from the indexing databases. Although both theories emerged in 1995 and 2003, respectively, the first e-government study by using these theories was in 2006. Also, the first integration of the two theories in the same field was in 2016. Table 2 shows details about the articles published in this domain.

Although, both theories TTF and UATUT that used in this study have applied for a long time, however, few reviews were found used these theories in the e-government domain. After getting the bibliometric results, there is an apparent gap in utilizing an integration of UTAUT and TTF in e-government studies, where only one article found and this article not related to the employee. As seen in Figure 1.

### 4.1. E-government and UTAUT

After a bibliometric study, was done to cover the first domain. One hundred thirty articles were found and analyzed to determine the factors affecting this phenomenon

TABLE 2: Overall Research Results.

Indexing Database	e-government & UTAUT		e-government & TTF		e-government, UTAUT & TTF	
	Count	Percent % Out of 130	Count	Percent % Out of 14	Count	Percent % Out of 1
Web of Science	73	56.15	8	57.14	1	100
Scopus	99	76.15	9	64.28	0	0
Total	172		17		1	
Duplication	42		3		0	
Total without duplications	130		14		1	
Related to employee perspective	11	8.46	2	14.28	0	0

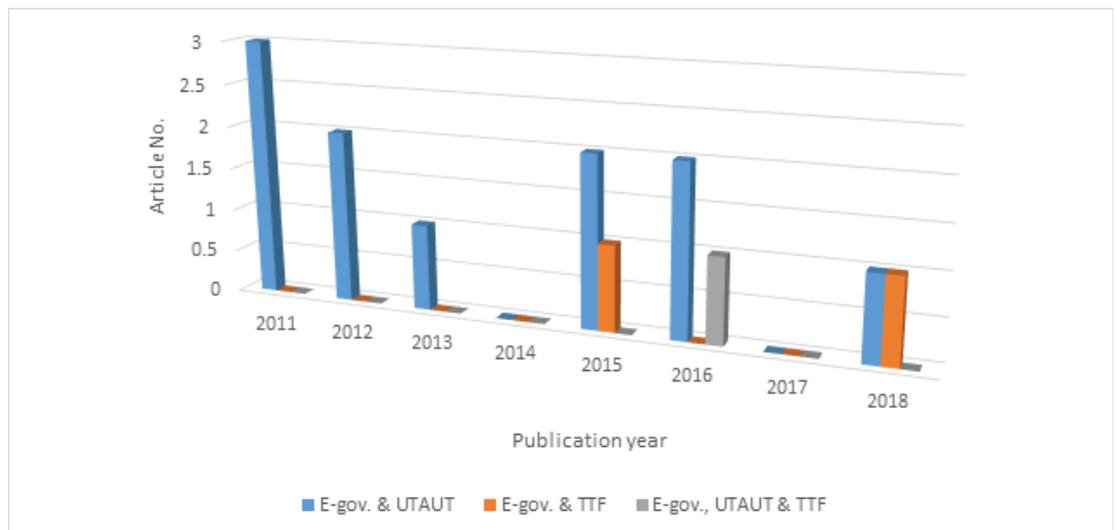


Figure 1: Sum of Article Related to Employee and Articles Published Per Year.

of research based on UTAUT. Only 11 articles were related to the employee perspective. Table 3 shows these factors from 11 articles.

According to (Venkatesh et al., 2003, 2012) The definition of Performance expectancy, effort expectancy, social influence and facilitating conditions are the combinations of past findings termed such as Relative advantage, the image and complexity, and compatibility respectively (Moore & Benbasat, 1991). So, to avoid duplication, the UTAUT construct only used in this review, and dropped other factors.

TABLE 3: Factors Used in Previous E-Government Studies through UTAUT Theory.

Factor		Count	Percent %	Dependent Variable			Moderator			
				Intention	Usage	Adoption	Age	Gender	Experience	Voluntariness
Performance Expectancy (PE)	UTAUT Factors	10	90.9	9	7	2	6	6	4	2
Effort Expectancy (EE)		10	90.9	9	7	2	6	6	4	2
Social Influence (SI)		10	90.9	9	7	2	6	6	4	2
Facilitating Conditions (FC)		7	63.6	7	6	0	4	4	3	2
Self-efficacy (SE)		2	18.1	2	2	0	1	1	0	0
Attitude toward		1	9	1	1	0	1	1	0	0
Anxiety		1	9	1	1	0	1	1	0	0
Website quality	External Factors	1	9	1	1	0	0	0	0	0
Awareness		1	9	1	1	0	0	0	0	0
IT workforce capability		1	9	1	1	0	0	0	0	0
Training		1	9	1	1	0	0	0	0	0
Personal Value		1	9	1	0	0	1	1	1	0
Trust of Internet		1	9	0	0	1	0	0	0	0
Trust of Government		1	9	0	0	1	0	0	0	0
Image= IS		1	9	0	0	1	0	0	0	0
Output Quality		1	9	0	0	1	0	0	0	0
Job Relevant		1	9	0	0	1	0	0	0	0
Compatibility= FC		1	9	0	0	1	0	0	0	0
Total		11	100	10	7	2	6	6	4	2

## 4.2. E-government and TTF

From the results of the bibliometric survey which carried out on the second domain, "E-government & TTF." Only fourteen articles were found and analyzed to determine the factors affecting this phenomenon of study based on TTF. Only two articles were related to the employee perspective. Table 4 shows these factors from the two articles.

TABLE 4: Factors Used in Previous E-Government Studies through TTF Theory.

Factor	Count	Percent %	Dependent Variable
Task characteristics	2	100	TTF
Technology characteristics	2	100	TTF
total	2	2	2

### 4.3. E-government, UTAUT & TTF

Finally, after the searching conducted on e-government, UTAUT, and TTF, only one article was found in this category, and it is not related to the employee perspective (Tarhini, El-Masri, Ali, & Serrano, 2016).

## 5. Discussion

According to the results of this study review, many factors are influencing an employee to adopt technology in the workplace environment that extracted from UATUT, TTF, and other previous studies. Then a model can be structured to reflect the influence factors of employee adoption of technology, as shown in Table5.

TABLE 5: Operational definitions of factors that extracted from this review.

Factors	Operational Definitions
Performance Expectancy	To what extent an employee perceives using the system will help him to achieve employment efficiency benefits.
Effort expectancy	The level of ease with using the system.
Social influence	To what extent an employee recognizes that other people think he or she had better use the system.
Facilitating conditions	To what extent an employee perceives that an organizational and infrastructure occurs to support using the system.
Technology Attitude	The overall effective reaction of an individual to using a system.
Self-Efficacy	One believes that in particular circumstances, one can achieve success.
Anxiety	The extent to which a user experiences fear temporarily when considering using the system.
Awareness	To what extent the employees are aware that e-government technology is introduced.
Website quality	High-quality, affordable, easy-to-use website that meets the e-government services requirements of stakeholders.
Trust in government	Citizens are encouraged to use e-government when they consider that the government can manage its online transactions confidentially and faithfully.
Personal Value	A reliable source of conduct when a user can determine his or her behaviour autonomously.
Task Characteristic	Actions by the user that turn inputs into outputs to meet their requirements.
Technology Characteristic	The tool that users use to perform their duties.
Task-Technology Fit	To what extent the technology helps users to carry out their duties.

In the integration model, the UTAUT model is used to analyze the influence of different factors on behaviour to make an adoption decision. Moreover, the TTF model

is applied to explain to what extent the matching degree between computing tasks and technology.

## 6. Conclusion and Implications

The target of this review is to identify and understand the main factors affecting the employees to adopt e-government technology. This literature review links two IT theories (Goodhue & Thompson, 1995; Venkatesh et al., 2012) to develop a sound analysis which takes past results into account as a review of the previous studies. In the current research, try to give more information regarding the factors influencing an employee to adopt e-government applications. E-government is supposed to offer useful services and information to both citizens and employee to create online services instead of online services.

This study has determined the key factors that are vital to enhancing technology adoption by those who work in a workplace environment. The previous studies on e-government adoption were reviewed with related subjects, and the survey conducted in this study discovered the set of factors that must be considered to design a successful application. Based on this review, this paper identifies the critical factors for the development of a successful model for adopting technology.

Finally, although UTAUT has existed for some time and was even improved since 2003, it still needs to be verified in more environments and perspective. The low number of technology acceptance research studies in the area of G2E shows that more effort can be made in the future.

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