Electronic Participation Technology Adoption Model in Indonesia: The Role of Gamification Impact

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Abstract. This study aims to propose a conceptual model in the context of e-participation technology adoption. This research develops the UTAUT base-line model with several constructs, namely Insecurity and Gamification. The impact of gamification to increase user participation is not widely known, especially regarding the acceptance of e-participation. The method used is a literature study related to several best practice models such as UTAU, TRI and gamification constructs. The results showed a total of 7 constructs and 6 hypotheses proposed in this study. All these constructs are performance performance expectancy, effort expectancy, social influence, facilitating conditions, insecurity, gamification impact and behavioral intention to use. The implication of this research is that the lack of public participation in digital platforms can be increased through redesign of e-participation by applying the gamification approach.

1. Introduction

In the last two decades, e-Government has been adopted by the government with the aim of providing public information and services online [1]. In addition, Presidential Instruction No. 3/2003 states that the public also wants their aspirations to be heard in the formulation of state policies. Therefore, the government must facilitate public participation starting from the process of making government policies to their implementation [2]. The lack of public participation will创造 resistance to government policies. Failures in development programs in the past were also caused by low public participation in the process of formulating, implementing and evaluating government programs [3]. As a result, development is no longer participatory and aspirational. The low public participation also causes the poor quality of public services provided by the government. The rampant practice of extortion, convoluted bureaucratic processes, non-transparent procedures show low government integrity [4]. This will reduce the level of public trust in the government. According to [5], the benefit of public participation in policy formulation is to gain legitimacy in the form of public trust in the government. When this legitimacy is obtained, the implementation of government policies will be easier because there is no resistance from the community. Therefore, public participation is an important factor in the formulation of state policies where the role of society at this time is not only as recipients but also contributing (co-create) in producing public policies and services [6].

Along with these conditions, research with a focus on e-Government to encourage public participation in government has also increased [7] - [9]. Information and Communication Technology
(ICT) is used as a tool to facilitate public participation, defined as e-participation. E-Participation is more specifically the use of ICT to conduct online consultation and public dialogue [10]. E-Participation comes in various forms ranging from simple online applications to interactive electronic platforms such as social media, online discussion forums and mobile applications [11]. All of these channels aim to provide the widest possible opportunity for the public to participate in conveying aspirations, information and even criticism as a form of evaluation of government policies.

Unfortunately, the lack of public participation is still a challenging issue for the current government [11]. It can be said that the e-Participation that has been developed so far has not been widely used by the public. E-participation initiatives generally experience problems when participation is done online. Some of the factors that cause it, among others, the public is not familiar, low public interest, the design is less attractive to its complexity [10], [12]. This is in line with several studies that still highlight the lack of public participation in e-participation [8], [11]. Thus, further study is needed related to the factors of e-participation adoption in order to encourage public participation in government administration.

The purpose of this research is to develop a gamification-based e-participation model to increase public participation. Gamification is a game-based approach that is still relatively new in the government domain, aimed at providing a positive experience that can motivate users to participate actively [13]. Research related to the impact of gamification on e-participation is still very limited [14]. Therefore the contribution of this research is to fill the existing literature by proposing an e-participation model that combines the UTAUT model as a baseline theory with the gamification construct.

2. Methodology

Research related to technology adoption models has actually been carried out by many previous researchers where various behavioral theories emerged related to user behavior in adopting a technology. Popular behavioral theories are Theory of Reasonable Action (TRA), Theory of Planned Behavior (TPB), Theory of Diffusion of Innovation (DIT), Technology Acceptance Model (TAM), Technology Acceptance Model 2 (TAM 2), Technology Readiness Index (TRI), Delon & McLean (2003) and Unified Theory of Technology Acceptance and Use (UTAUT) [13]. The background for the emergence of behavior theory is due to the rapid and dynamic development of technology itself. This of course has an impact on how fast users can accept and adopt a technology, depending on a number of factors such as convenience, usability, convenience, speed, security, etc. [15]. Each behavior theory in the field of technology, especially information technology (IT) proposes different technology adoption factors from different perspectives.

Behavioral theory can be used to help organizations predict whether a technology can be adopted successfully or not by its users. Attempts to understand why people accept or reject a technology is very challenging [16]. It is also important to know so that the technology that has been developed can be used by its users in the future. In addition, behavior theory aims to find out in depth the user's behavior and attitudes by asking users direct questions to find out their perceptions about the use of certain systems / technologies. Then the user will evaluate the technology according to their experience using the technology. Behavioral theory is a branch of psychology that studies human behavior scientifically where response behavior can be observed and measured. In other words, user behavior can be studied and explained scientifically. Behavior is a response to stimuli from the environment that can be learned.

In this study, the base-line behavior theory used to predict user behavior in adopting e-participation is UTAUT (Unified Theory of Acceptance and Use of Technology). The UTAUT theory or model was found by Venkatesh (2003) to explain user behavior towards technology, especially information technology or information systems (IT / SI) [17]. The UTAUT theory or model shows that behavioral intention and behavior using a technology are influenced by performance expectation, effort expectation, social influence and facilitating conditions. These four factors are moderated by factors of gender, age, experience and voluntary use. Many empirical studies that adopt this model have been
conducted and have various findings. However, these four factors, namely performance expectation, effort expectation, social influence and facilitating conditions, have been widely used to predict user acceptance and adoption of technology [18,19,20].

![Figure 1. Model of UTAUT [17]](image)

The UTAUT model is a combination of eight previously developed models, namely Theory of Reasoned Action (TRA), Technology Adoption Model (TAM), Motivational Model (MM), Theory of Planned Behavior (TPB), Combined TAM and TPB (C-TAM), PC Use Model (MPCU), Diffusion Innovation Theory (IDT), and Social Cognitive Theory (SCT). The UTAUT model proved to be more successful than the other eight theories in explaining up to 70 percent of the user variant [17]. After evaluating these eight models, Venkatesh (2003) found six constructs that appear to be significant direct determinants of behavioral intention or usage behavior in one or more of each model. These constructs are performance expectation, effort expectation, social influence and facilitating conditions, attitude toward use of technology and self-efficacy. After conducting further testing, it was found that four main constructs play an important role as direct determinants of behavioral intention and usage behavior, namely, performance expectation, effort expectation, social influence and facilitating conditions. Others proved insignificant as direct determinants of behavioral intention. In addition there are also four moderators: gender, age, experience and voluntary use which are positioned to moderate the impact of the four main constructs on behavioral intentions and user behavior. Figure 1 shows the UTAUT model and the relationship between its constructs. The main purpose of research using UTAUT is to help organizations understand how users react to a new technology [21]. Initially, UTAUT was developed from the Technology Acceptance Model (TAM) in 2003 in an organizational context with four main constructs. However, currently UTAUT has been developed from an organizational context into an individual context, namely UTAUT 2 where habit factors, hedonic motivation, and price values are added as new constructs in the model.

In addition, in this study, the UTAUT model will be combined with several constructs such as insecurity and gamification in the context of adopting e-participation. The insecurity construct is one of the constructs of the TRI (Technology Readiness Index) model developed by Parasuraman (2000) which is used to measure user readiness in adopting a technology [17]. Insecurity can be interpreted as insecurity or suspicion of a technology regarding personal data. Insecurity also refers to distrust of technology-based transactions as well as doubts about the workability of a technology. Meanwhile, gamification is widely applied to increase user participation in adopting technology. Gamification is believed to be able to influence, involve, and motivate individuals, groups or communities so as to encourage the creation of behavior and produce the desired effects and results [22]. At the same time, gamification can reduce perceived barriers to system use such as low usability or difficulty to use where minimal public participation remains an issue the government has not resolved to date.
3. Result and Discussion
The UTAUT (Unified Theory of Acceptance and Use of Technology) model is a theory or model that has been widely used to analyze the factors that influence user acceptance or adoption of technology. In other words, UTAUT provides information related to individual behavior toward technology that can be measured from the user's perception. UTAUT is a development of the previously popular theory, namely TAM (Technology Acceptance Model) by adding two external constructs, namely Social Influence and Facilitating Conditions. This is because the weakness of the TAM model is that it only focuses on internal factors, namely the technological aspects. Furthermore, UTAUT 2 produced several external constructs (outside the technological aspect) which proved significant, such as hedonic motivation, habit and price value [18-20]. However, on the other hand, UTAUT still has a weakness, namely it does not consider the psychological factors of users which are also proven to influence users' decisions in adopting a technology [17]. Therefore, in this study, the proposed construct is one of the user's psychological factors derived from the TRI (Technology Readiness Index) model, namely Insecurity. The insecurity construct in the context of this study is related to one's belief in the ability of a technology to facilitate public participation through electronic platforms. Insecurity is considered an obstacle because of the distrust of activities or transactions that occur in the electronic platform, in this case e-participation. Users will feel insecure when their personal identity is known by others in submitting information / complaints / aspirations to the government through e-participation. In addition, the gamification construct was also added to the UTAUT model in the context of this study. As with the problem related to the lack of public participation in digital platforms, e-participation needs to be redesigned with the aim of increasing community involvement to participate actively through the gamification approach [23, 24].

![Figure 2. Proposed Research Model](image-url)

Gamification is the use of game mechanics and game design techniques in a non-game context to design behavior, develop skills, or to engage people in innovation [25]. Gamification is a new, effective way to increase motivation or involvement of people to solve complex problems, take certain actions, or just have fun [26]. Although gamification has been applied to various domains, the impact or influence of gamification on technology adoption, especially e-participation, is still very limited. Research conducted by Baptista & Oliveira (2017) shows the potential impact of using mechanics and game design techniques (gamification) on user acceptance in the financial industry [27]. Unfortunately the research was conducted in a different context from this research, namely on mobile banking services. Therefore, the gamification construct is added in this study because it is believed that
applying game techniques in a non-game context such as e-participation will have a significant impact on increasing the level of user acceptance, as shown in Figure 2.

Based on Figure 2, there are 6 hypotheses generated from the proposed conceptual model which can be described as follows:

H1: Performance Expectation (PE) has a significant positive effect on Behavioral Intention (BI)
H2: Effort Expectation (EE) has a significant positive effect on Behavioral Intention (BI)
H3: Social Influence (SI) has a significant positive effect on Behavioral Intention (BI)
H4: Facilitating Condition (FC) has a significant positive effect on Behavioral Intention (BI)
H5: Insecurity (IS) has a significant negative effect on Behavioral Intention (BI)
H6: Gamification Impact (GI) has a significant positive effect on Behavioral Intention (BI)

The combination of the UTAUT (The unified theory of accept and use of technology) construct with the gamification construct is used as a theoretical support model for investigations in this study according to Figure 2. UTAUT has been empirically tested and proven to be superior to other models that exist today [28]. The inclusion of the gamification construct in the proposed research model allows researchers to gain a better understanding of the impact of this gamification factor, which is believed to be one of the important driving factors for the level of acceptance of e-participation in the future. Other constructs as moderating variables in the UTAUT model such as gender, age, experience and voluntary use were not considered in this study.

4. Conclusion
The results of this study propose a conceptual model of electronic participatory adoption (e-participation) by combining the UTAUT model with several constructs such as Insecurity and the Gamification impact construct. Research related to the impact or potential of gamification on user acceptance is still limited in the context of e-participation. The contribution of this research is to fill in the lack of literature related to how gamification affects user participation in digital platforms. In addition, the proposed model also includes user psychological factors in the form of insecurity to determine the level of user security in using e-participation. In the context of government, users should be given a sense of security in submitting complaints or aspirations to the public services provided. All 6 hypotheses in this study require further empirical research to test proving the proposed e-participation adoption model.

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References
[1] M. K. Feeney and A. Brown, “Are small cities online? Content, ranking, and variation of U.S. municipal websites,” Gov. Inf. Q., vol. 34, no. 1, pp. 62–74, 2017.
[2] D. Napitupulu, “User-Acceptance instrument development: a content validity study in the e-participation context,” J. Appl. Res. Technol., vol. 18, pp. 34–43, 2020.
[3] I. W. A. Suarnata, A. T. Atmaja, N. Luh, and G. Erni, “Pengelolaan Alokasi Dana Desa (Studi Kasus Pada Desa Manikliyu Kecamatan Kintamani Kabupaten Bangli),” S1 Ak Univ. Pendidik. Ganesha, vol. 8, no. 2, 2017.
[4] H. Puspitosari, Khalikussabir, and L. J. Kurniawan, Filosofi Pelayanan Publik: Buramnya Wajah Pelayanan Menuju Perubahan Paradigma Pelayanan Publik. Setara Press (Kelompok Intrans Publishing) dan Jaringan Nasional [dengan] Masyarakat Peduli Pelayanan Publik (MP3), 2011.
[5] B. R. Pflughoeft and I. E. Schneider, “Social media as E-participation: Can a multiple hierarchy stratification perspective predict public interest?,” Gov. Inf. Q., vol. 37, no. 1, 2020.

[6] J. Ju, L. Liu, and Y. Feng, “Public and private value in citizen participation in E-governance: Evidence from a government-sponsored green commuting platform,” Gov. Inf. Q., vol. 36, no. 4, 2019.

[7] X. H. Wang and T. A. Bryer, “Assessing the Costs of Public Participation: A Case Study of Two Online Participation Mechanisms,” Am. Rev. Public Adm., vol. 43, no. 2, pp. 179–199, 2013.

[8] J. Lee and S. Kim, “Citizens’ e-participation on agenda setting in local governance: Do individual social capital and e-participation management matter?,” Public Manag. Rev., vol. 20, no. 6, pp. 873–895, 2018.

[9] Y. Zheng, H. L. Schachter, and M. Holzer, “The impact of government form on e-participation: A study of New Jersey municipalities,” Gov. Inf. Q., vol. 31, no. 4, pp. 653–659, 2014.

[10] M. Toots, “Why E-participation systems fail: The case of Estonia’s Osale.ee,” Gov. Inf. Q., vol. 36, no. 3, pp. 546–559, 2019.

[11] J. Choi and C. Song, “Factors explaining why some citizens engage in E -participation , while others do not,” Gov. Inf. Q., vol. 37, no. July, 2020.

[12] L. Hassan and J. Hamari, “Gameful civic engagement: A review of the literature on gamification of e-participation,” Gov. Inf. Q., vol. 37, no. 3, 2020

[13] R. N. Landers, E. M. Auer, A. B. Collmus, and M. B. Armstrong, “Gamification science, its history and future: Definitions and a research agenda,” Simul. Gaming, vol. 49, no. 3, pp. 315–337, 2018.

[14] S.-K. Thiel, T. Petra Ertiö, and M. Baldauf, “Why so serious? The role of gamification on motivation and engagement in e-participation,” Interact. Des. Archit. J., vol. 35, no. December 2017, pp. 158–181, 2017

[15] Silva PM, Dias GA. Theories about technology acceptance: why the users accept or reject the information technology? Brazilian J Inf Sci [Internet]. 2007;1(2):69–86

[16] Davis FD, Bagozzi RP, Warshaw PR. User Acceptance of Computer Technology: A Comparison of Two Theoretical Models. Manage Sci [Internet]. 1989;35(8):982–1003. Available from: http://pubsonline.informs.org/doi/abs/10.1287/mnsc.35.8.982

[17] Venkatesh V, Morris M, Davis G. User Acceptance of Information Technology: Toward a Unified View. MIS Q. 2004;28(4):695–704

[18] Zuiderwijk A, Janssen M, Dwivedi YK. Acceptance and Use Predictors of Open Data Technologies: Drawing upon The Unified Theory of Acceptance and Use of Technology. Government Information Quarterly. 2015; 32:429-440

[19] Cimperman M, Brencic MM, Trkman P. Analyzing older users’ home telehealth services acceptancebehavior—aplying an Extended UTAUT model. International Journal of Medical Informatics. 2016; 90: 22-31

[20] Isaac O, Abdullah Z, Aldholay AH, Ameen AA. Antecedents and outcomes of internet usage within organisations in Yemen: An extension of the Unified Theory of Acceptance and Use of Technology (UTAUT) model. Asia Pacific Management Review. 2019; 24: 335-354

[21] Al-Gahtani SS, Hubona GS, Wang J. Information technology (IT) in Saudi Arabia: Culture and the acceptance and use of IT. Inf Manag. 2007;44(8):681–91.

[22] Rodrigues, L. F., Costa, C. J., & Oliveira, A. How gamification can influence the web design and the customer to use the e-banking systems. In Proceedings of the International Conference on Information Systems and Design of Communication - ISDOC ’14 (pp. 35–44). 2014. New York, USA: ACM Press. doi:10.1145/2618168.2618174

[23] Morschheuser B, Hassan L, Werder K, Hamari J. How to design gamification? A method for engineering gamified software. Inf Softw Technol. 2018;95:219–37.
[24] Huotari K, Hamari J. A definition for gamification: anchoring gamification in the service marketing literature. Electron Mark. 2017;27(1):21–31.

[25] Burke, B. Gamification 2020: What is the future of gamification? Gartner. 2012. Retrieved from https://www.gartner.com/doc/2226015/gamification--future-gamification

[26] Mishra, R. K. Infosys Labs briefings gamification: Rediscover the power of engagement. Infosys Labs Briefings, 2013; 11(3)

[27] Baptista G, Oliveira T. Why so serious? Gamification impact in the acceptance of mobile banking services. Internet Research. 2017; 27(1)

[28] Park, J., Yang, S., & Lehto, X. Adoption of mobile technologies for chinese consumers. Journal of Electronic Commerce Research. 2007; 8:196–206