# PERCEIVED EASE OF USE (PEOU) AND PERCEIVED USEFULNESS (PU) OF E-GOVERNMENT SERVICES IN GHANA: THE MODERATION ROLE OF COMPUTER SELF-EFFICACY

**Isaac Kofi Mensah**
School of Management
Harbin Institute of Technology, **CHINA**

## ABSTRACT

The objective of this study is to examine the moderating role of computer self-efficacy on the relationship between PEOU and PU of e-government services. A total of 700 research questionnaire instrument was administered to potential respondents in Ghana, out of which 520 responded, representing 74.2%. SPSS was used to analyze the data. The results indicate that computer self-efficacy does not significantly moderate the relationship between perceived ease of use and perceived usefulness of e-government services. Computer self-efficacy and perceived ease of use were however found to be significant in predicting the perceived usefulness of e-government services. The implications of these findings are discussed.

**Keywords:** E-government services, Perceived Ease of Use, Perceived Usefulness, Computer self-efficacy, Moderation role.

## INTRODUCTION

Electronic government (e-government) is the application of ICT in the public administration processes of government and state institutions to among other purposes to provide efficient public service delivery to citizens and the general public. The potential of e-government to improve public service delivery and enhancing efficiency, transparency, and accountability has been established in studies of Fuliya and Bansal (2005), Kang (2001), Cho and Choi(2004). Heeks (2006) considers e-government as the application of information technology in the public sector. The adoption of e-government is expected to bridge the gap between government and citizens as well the emphasis on the internal administrative efficiency of state and public agencies (Homburg, 2008). There are three core activities of e-government: first to develop and deliver high quality, seamless and integrated public services; secondly , to enable effective relationship between government and its state institutions and management and lastly to support the economic and social development goals of citizens , businesses , and civil society at both local , state , national and international levels( Grant and Chau ,2006) . Further, E-government has also been identified as a tool in the reform and modernization of the public sector (Rafia, 2009).

## RESEARCH THEORETICAL FRAMEWORK

There have been many technology adoption theories which have been used to examine the adoption and use of technology particularly, the acceptance and usage of e-government services. The notable among these theories are the Technology Acceptance Model (TAM) by Davis (1989), the Theory of Reason Action (Fishbein& Ajzen,1975), the Theory of Planned Behavior (Ajzen,1991), The Innovation Diffusion Theory (Rogers ,1995), the Unified Theory

of Acceptance and Use of Technology (UTAUT) (Venkatesh, Morris, Davis& Davis,2003) and the Social Cognitive Theory (SCT) (Bandura,1986). For the purpose of this research, The Technology Acceptance Model (TAM) would be adopted as the theoretical framework for this study because it has been the most widely validated and used for e-government adoption studies in the literature (Carter &Weerakkody, 2008; Gefen et al, 2002; Warkentin et al., 2002).

**Technology Acceptance Model (TAM)**

TAM developed by Davis (1989) proposed two important constructs of intention to use. These are perceived ease of use (PEOU) and perceived usefulness and they are considered the key in predicting intention to use a particular technology. Davis(1989) defines Perceived Usefulness as "the degree to which an individual believes that using a particular system would enhance his or her productivity" while perceived ease of used is the degree to which an individual believes that using a particular system or technology would be free of challenge or effort (Davis,1989). Studies have found that there is a direct effect of perceived ease of use on both perceived usefulness and actual technology usage (Davis, 1989; Adams et al, 1992).

**E-Government Adoption Studies**

The literature indicates that there many studies by researchers on the adoption and use of e-government services from perspectives of citizens from diverse and different countries. For instance in the study of (Shin-Yuan Hing et al 2013) which attempted to examine the factors determining user acceptance of mobile e-government services in Taiwan, found that perceived usefulness, perceived ease of use and external factors such as self-efficacy were critical factors in determining user acceptance of mobile e-government services in Taiwan. In similar findings, (Yong Liu et 2014) indicated that perceived ease of use and perceived usefulness have a significant and positive influence on the intention to use mobile g-government in Zhejiang province. In determining the determinants adoption of e-government in The Netherlands, it was found that perceived usefulness was the main determinant of the intention to use e-government services (Horst et al, 2007). Further, the study of (Lin et 2011) showed that the core constructs of TAM (i.e. Perceived ease of use and perceived usefulness) have a strong influence on user intention to use e-government services in the Gambia.
In the study of (Lean, et al 2009), perceived ease was found to be the main factor influencing intention of citizens of Malaysia to use e-government services. In another study, the results show that there is a significant positive relationship between perceived usefulness and perceived ease of use intention to use e-government services ( Almahamid et al, 2010). The same conclusion was reported in the work of (wangpipatwong et al 2008) that perceived usefulness and perceived ease of use had a direct impact on the intention to use, it further showed that computer self-efficacy had a positive impact on intention to use e-government among Thai citizens. In investigating Citizens perceptions of e-government in the Kurdistan region of Iraq, Ahmad & Campbell (2015) found that perceived usefulness and other factors such as social influence , trust in government and perceived risk were significantly and directly associated with the intention to use e-government services but contrarily to other studies, the study further showed that perceived ease of use does not have any significant impact on intention to use e-government services in the Kurdistan Region of Iraq.

In the study of (Gao, 2013), it was found that perceived ease of use significantly and directly influences the perceived usefulness of e-government services while Perceived Usefulness, in turn, influenced intention to use e-government services. A further study also showed that

perceived ease of use and perceived usefulness are significant predictors of intention to use e-government services in Ukraine (Shovkovyy,2010). In the case of Jordan, it was found that perceived credibility, perceived ease of use, perceived usefulness as well as computer self-efficacy all have a significant effect on the adoption and use of e-government services in among citizens of Jordan ( Rabaa,2015). The study further indicated that perceived ease of use was the most important factor in predicting the citizens of Jordan's intention to adopt and use e-government services. This finding contradicts the results of (Rabaa et al 2015) which showed that perceived usefulness was the major factor in determining Kuwait citizen's intention to adopt and use e-government services. The research of Rabaa et al (2015) further demonstrated that e-government services adoption in Kuwait could be explained by perceived ease of use, perceived usefulness, and computer self-efficacy.

**The Concept of Self-Efficacy**

The concept of Self-efficacy theory originated from the Social Cognitive Theory developed by Alberta Bandura. Self-efficacy is the belief that one has the power and ability to produce that effect by completing a given task or activated related to that competence (Bandura, 1995). According to Bandura, there are 3 factors which influence self-efficacy, namely, Behaviors, Environment and personal or cognitive factors and they all have an impact or affect each other but noted that the cognitive factors are important. The basic and important principle behind self-efficacy theory is that individuals are more attracted to perform activities of which they have high self-efficacy and less attracted to perform the task in which they have low self-efficacy (Van der Bijl&Shortridge-Baggett, 2002).

There are three dimensions of measuring of self-efficacy; magnitude, strength, and generality. The self-efficacy magnitude measures the difficulty level ( easy, moderate and hard) an individual feels is required to complete a task and the self-efficacy strength is the amount of conviction an individual has of completing a successful task at different levels of difficulty(Van der Bijl&Shortridge-Baggett, 2002). The degree to which the expectation is generalized across situations is referred to as General of self-efficacy (Lunenburg, 2011).

Bandura (1997) identified four sources of self-efficacy: Performance Outcomes, Vicarious experiences, Verbal persuasion and Physiological Feedback (emotional arousal).

- **Performance Outcomes:** Performance outcomes or past experience according to Bandura are the most important source of self-efficacy. The negative and positive experiences can influence the ability of an individual to perform a given task and if one performs the task as a hand so well previously, the person is more likely to feel competent and would perform well at similar tasks at when the same opportunity arises (Bandura, 1977).
- **Vicarious Experience:** This is when people develop high or low self-efficacy vicariously through other person's performance or outcomes. An individual can watch another perform and then compare his own competence with the other individual's competence (Bandura, 1977). The success of another person would indirectly increase the self-efficacy of an individual while the failure will result in low self-efficacy on another person.
- **Verbal Persuasion**: Self-efficacy is determined through encouragement and disappointment with regard to an individual performance (Redmond, 2010).

- **Physiological Feedback (Emotional Arousal):** This is when people experience sensations from their body and how they perceive this emotional arousal influences their extent and belief of efficacy (Bandura, 1977).

The concept of self-efficacy has been applied in various fields of study such as e-commerce, education, management and Technology

## Computer Self-Efficacy

The application of the self-efficacy concept to Information Technology can be explained and defined in three categories (Kao et al, 214): The first is Computer self-efficacy (CSE) which relates to a domain specific that measures a person's potential, belief or ability to perform computer related tasks (Campeau& Higgins, 1995). Secondly, Internet Self-efficacy (ISE) considers the ability of an individual to perform or operate internet applications and thirdly, web-based professional development self-efficacy (WPDSE) which explores teachers confidence or ability to use web-based for professional development. For the purpose of this research, computer self-efficacy is defined as comprising the first and secondly types of self-efficacy related to technology.

The concept of self-efficacy has been applied in e-government to understating its impact on the individual's intention to use e-government services and its considered the major determinates in influencing the adoption of technologies particularly e-government services ( Al-Haderia,2013). In the study of IT usage in the public sector, (Al-Haderia, 2013) provided empirical evidence that self-efficacy has a positive effect on the intention-behavior towards the actual usage of technology in the public sector of Yemen. In the study of Wangpipatwong et 2008), not only did they found that perceived ease of use and perceived usefulness have a positive impact on intention to use e-government services but also indicated that computer self-efficacy directly enhanced citizens continuance intention to use e-government services. Their result was further corroborated by (Susanto and Goodwin, 2010), which showed that self-efficacy was a factor influencing citizens of 25 countries intention to use and adopt e-government services. Further, in the study of Zhao and Khan (2013), they found that computer self-efficacy was a significant factor affecting citizen's intention to use e-government services in the UAE.

## RESEARCH MODEL AND HYPOTHESES

The dependent variable is perceived Usefulness (PU) while the perceived ease of use (PEOU) is the independent variable and computer self-efficacy (CSE) as the moderating variable for this study. The research model is depicted in Figure 1 and the research model with an interaction term is shown in Figure 2.
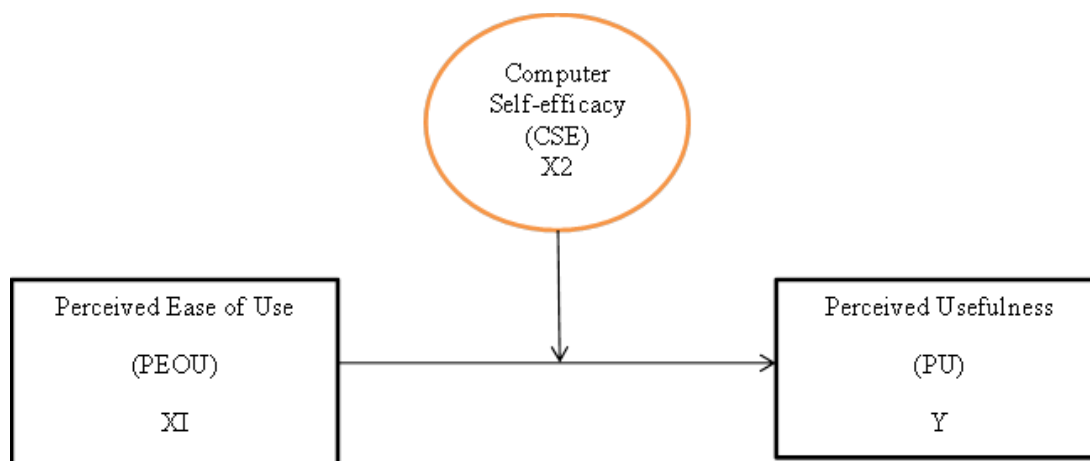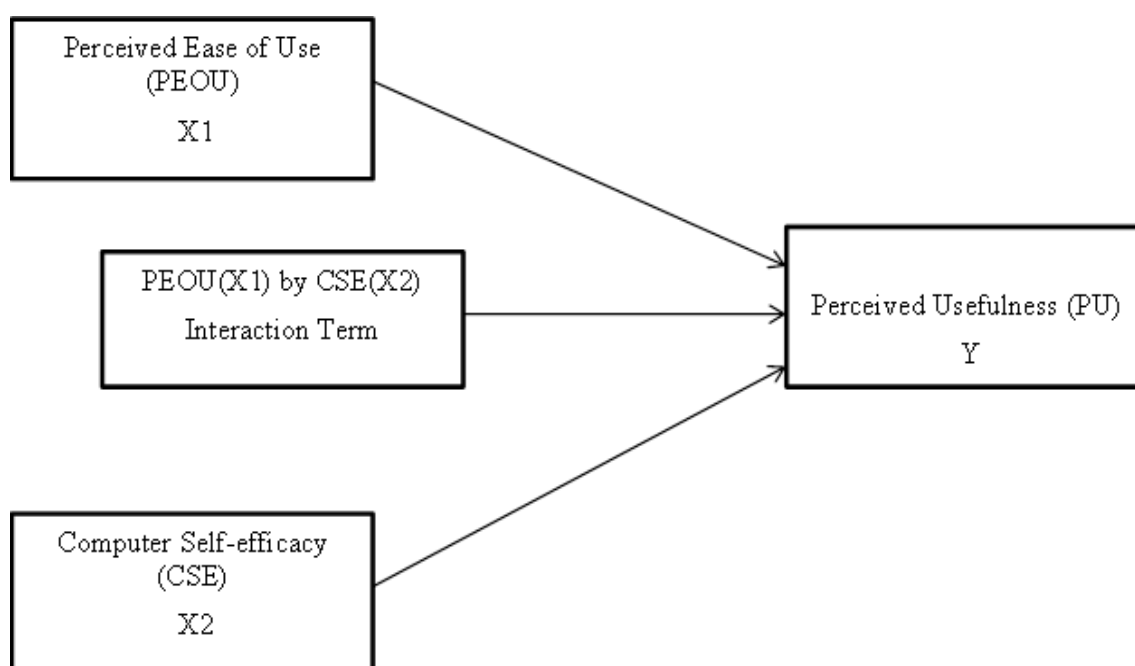
**Figure 1 Research Model**



**Figure 2 Research Model (with an Interaction Term)**

**RESEARCH HYPOTHESES**

Based on the research model, this research would investigate the following hypotheses:

**Hypothesis One (1):** Perceived Ease of Use (PEOU) has a positive significant impact on perceived usefulness of e-government services.

**Hypothesis Two (2):** Computer Self-efficacy has a positive significant impact on Perceived Usefulness (PU) of e-government services.

**Hypothesis Three (3):** The Interaction Term (PEOU * CSE) has a positive significant impact on Perceived Usefulness (PU) of e-government services.

**METHODOLOGY**

In the conduct of this research, the qualitative and quantitative research approaches were applied due to the strength and advantages of using this mixed approach over a single approach. A research questionnaire was designed and administered to 700 potential

respondents (public sector workers, senior high school teachers, and university students) in Ghana. A response rate of 74.2% was recorded. The data gathered was captured and analyzed with SPSS version 20. The questionnaire instrument consisted of 5 questions each with 5 points Likert scale of measurement ranging from 1-Strongly Disagree to 5-Strongdly Agree.

**Demographic Statistics**

A total number of two hundred and forty-four (244) females responded representing 46.9% while 276 males responded (53.1%). The majority (236) of the respondents' age ranges were between 18-25 years representing 45.4%. This is followed by the age ranges of 26-30 and 31-35, representing 14.4% and 11.7% respectively. The rest are 36-40(11.2%) ,41-45 (5.2%), 46-50 (5%) and 51 and above (7.1%). The education of respondents' showed that 80.8% were university/polytechnic graduates while 16.7% were Postgraduates (Masters/Ph.D.) holders while 2.5 Senior High School graduates.

**RESULTS**
**Reliability Analysis**

The result of the Cronbach's Alpha (a) in Table 1 shows that the internal consistency of the variables (Perceived Ease of use, Perceived Usefulness, and Computer Self-efficacy) was within the acceptable Alpha (a) values of 0.90 to 0.50. Perceived ease of use had the highest alpha value of .712, followed by computer self-efficacy (.645) and perceived usefulness (.564). The alpha values for this study demonstrated that the measurement instrument was reliable.

**Table 1 Measure of Reliability**

| Constructs | N | Number of Items | Cronbach's Alpha (a) |
|---|---|---|---|
| Perceived Ease of Use (PEOU | 520 | 5 | .712 |
| Computer Self-Efficacy(CSE) | 520 | 5 | .645 |
| Perceived Usefulness (PU) | 520 | 5 | .564 |

**Correlation Analysis**

The result of the Pearson correlation analysis in Table 2 indicates that there was a positive significant correlation among the entire variable considered in this study. Perceived ease of use showed significant positive relationships with perceived usefulness at r= .454 and p < .01, computer self-efficacy at r= .440 and p< .01 and the Interaction Term at r= .850 and p < .01. Perceived usefulness also showed positive significant relationships with computer self-efficacy at r= .224 and p< .01 and interaction term at r =.415 and p < .01. Further, there was a positive relationship between computer self-efficacy and the Interaction Term at r .824 and p < .01.

**Table 2 Correlation**

|  | PEOU | PU | CSE | Interaction Term |
|---|---|---|---|---|
| Perceived Ease of Use | - |  |  |  |
| Perceived Usefulness | .454 | - |  |  |
| Computer Self-efficacy | .440 | .224 | - |  |
| Interaction Term | .850 | .415 | .824 | - |
| *Mean* | 3.7313 | 3.9896 | 3.8453 | 14.5915 |
| *Standard Deviation* | .66880 | .73682 | .82873 | 4.73825 |

**. Correlation is significant at the 0.01 level (2-tailed).

Also in Table 2 the Mean and Standard Deviation of the variable are displayed. The mean and standard deviations for each of the variables are: Perceived ease of use 3.7313 (.66880), Perceived Usefulness 3.9896 (.73682), Computer Self-efficacy 3.8453 (.82873) and Interaction Term 14.5915 (4.73825)

**Regression Analysis**

The causal effects of each of the variables on the dependent variable are shown in Table 3.

**Table 3 Regression Analysis for Main Impact**

| Hypothesis | Beta | t | Sig. | R2 | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | .454 | 13.395 | .000 | .206 | 179.428 | .000 |
| 2 | .415 | 11.978 | .000 | .172 | 143.467 | .000 |
| 3 | .224 | 6.033 | .000 | .050 | 36.402 | .000 |

**Hypothesis One: Relationship between PEOU and PU**

The result in Table 3 showed that perceived ease of use significantly predicted the perceived usefulness of e-government services (B = .454, t = 13.395, p < 0.1). It was also found that perceived ease of use explained about 20.6% of the variations in perceived usefulness ($R^2$ = .206, F = 179.428, p < .01). Hence this hypothesis was supported

**Hypothesis Two: Relationship between Interaction Term and PU**

The result in table 3 further shows that the Interaction Term had a positive significant impact on the perceived usefulness of e-government services (B = .415, t = 11.978, p < .01) and it also explains the significant variations towards perceived usefulness ($R^2$ = .172, F = 143.467, P < .01). This hypothesis is also supported.

**Hypothesis Three: Relationship between Computer Self-efficacy and PU**

The result in Table 3 again indicates that Computer self-efficacy is positively significant in predicting PU of e-government services (B = .224, t = 6.033, p < 0.1) and it somehow explains a portion of the variations toward PU ($R^2$ = 0.50 , F = 36.402 , p < .01)

## Moderation Impact of Computer Self-efficacy on Perceived Ease of Use and Perceived Usefulness

To under the moderating role of computer self-efficacy, an interaction term was created and then regressed together with the independent variable (PEOU), dependent variable (PU) and the moderator (Computer Self-efficacy). The results are displayed in Tables 4 to 6. In table 4, the model explains only 21.6% of the contributing factors in predicting the dependent variable, perceived usefulness.

### Table 4 Model of Summary

| Model | R | R -square | Adjusted R square | Std. error of the estimate |
|---|---|---|---|---|
| 1 | .464a | .216 | .212 | .65398 |

   a.   Predictor (Constant), Interaction Term(Self-efficacy*PEOU), Computer Self-efficacy, Perceived Ease of Use

   b.   Dependent variable: Perceived Usefulness

In table 5, the overall model indicates that the model was found to be significant. This means that all the factors (Interaction Term, Computer Self-efficacy and Perceived Ease of Use) been tested for jointly have a positive effect in predicting perceived usefulness of e-government services (p-value = .000).

### Table 5 ANOVA

| Model | Sum of Squares | df | Mean square | F | Sig |
|---|---|---|---|---|---|
| Regression | 81.010 | 3 | 27.003 | 63.138 | .000a |
| Residual | 294.675 | 516 | .428 | | |
| Total | 375.685 | 519 | | | |

   a.   Predictors: (constant), Interaction Term(Self-efficacy*PEOU), Computer Self-efficacy, Perceived Ease of Use

   b.   Dependent Variable: Perceived Usefulness

For a moderation to occur, the entire variable including the Interaction term should return a positive significant value of p =< .05 and in this case, while computer self-efficacy and the interaction term were significant, perceived ease of use was not.

### Table 6 Coefficients

| Model | Unstandardized coefficients | | Standardized coefficients | t | Sig. |
|---|---|---|---|---|---|
| | B | Std. Error | Beta | | |
| (constant) | 3.303 | .468 | | 7.059 | .000 |
| Perceived Ease of Use | .100 | .145 | .091 | .694 | .488 |
| Computer Self-efficacy | .090 | .032 | .578 | 2.777 | .006 |
| Interaction Term | -.260 | .108 | -.292 | -2.398 | .017 |

   a.   Dependent Variable: Perceived Usefulness

## Summary of Result Findings

Table 7 displays the summary result findings of this research.

## Table 7 Summary of Result findings

| Hypothesis | Results | Supported (YES/NO) |
|---|---|---|
| **H1**-Perceived Ease of Use (PEOU) has a positive significant impact on perceived usefulness of e-government services in Ghana. | B = .454, t = 13.395, p < 0.1 | YES |
| **H2**-Computer Self-efficacy has a positive significant impact on Perceived Usefulness (PU) of e-government services in Ghana | B = .415, t = 11.978, p < .01 | YES |
| **H3-** The Interaction Term (PEOU * CSE) has a positive significant impact on Perceived Usefulness (PU) of e-government services in Ghana | B = .224, t = 6.033, p < .01 | YES |
| **The moderation effect of Computer Self-efficacy on PEOU and PU** | *PEOU* <br> B = .091, t = .694, p >.01 <br><br> *CSE* <br> B = .578, t = 2.777, p >.01 <br> *Interaction Term* <br> B =.-.292, t = -2.938, p >.01 | NO |

## DISCUSSION

The result findings of this research showed that there is no significant positive moderation effect of computer self-efficacy on the positive relationship between perceived ease of use and perceived usefulness of e-government services. Apart from providing empirical evidence that the relationship between PEOU and PU is not significantly moderated by computer self-efficacy, this study has further corroborated the findings of other studies which demonstrated that perceived ease of use and computer self-efficacy have a direct impact on perceived usefulness of e-government services (Gao, 2013; Shovkovyy,2010 ).

The theoretical implication of this study is that the inclusion of a third mediator variable such as computer self-efficacy on the significant positive relationship between PEOU and PU does not in any way alter or change the predicting power of the already established strong relationship between perceived ease of use and perceived usefulness of e-government services. The implication for policy and decision makers is that computer self-efficacy and PEOU should be considered in the implementation of e-government services for citizens.

## CONCLUSIONS

This study has shown that computer self-efficacy is very important factor in determining the perceived usefulness of e-government services, computer self-efficacy as a moderator does not have any positive moderation impact on the significant relationship between perceived ease of use and perceived usefulness of e-government services. However, factors such as perceived ease of use (PEOU) and computer self-efficacy (CSE) are determinates to consider in designing an e-government service delivery system for Ghanaian citizens.

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