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An Empirical Study of E-learning Readiness Factors Influencing E-learning Systems Outcomes in Ghana's Tertiary Education Institutions

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Abstract:

This study explored the impact of E-learning readiness factors on E-learning systems outcome in a tertiary education setting. Data was collected from 516 respondents consisting of faculty members and students from selected tertiary institutions in Ghana, through a survey questionnaire. Partial least squares structural equation modeling (PLS-SEM) was used to validate the research variables, their relationships, and impact on each other using SmartPLS 3.0. The study extended its analysis of data by carrying out the Importance-Performance Map Analysis (IPMA) in other to prioritize managerial actions. The results of the data analyzed demonstrated the proposed research model's effectiveness in explaining E-learning system outcomes. Technological readiness was notably found to be substantially related to outcomes of E-learning in tertiary education institutions in Ghana.

Key words: E-learning system outcome, E-learning Readiness, Tertiary Education, Importance Performance Map Analysis, Ghana.

1. Introduction and Background:

According to Contreras & Shadi, (2015), E-learning is the application of electronic multi-media, educational and information and communication technology (ICT) tools in impacting knowledge or skill. Coming after the widespread adoption of computers and other information communication telecommunication tools across campuses of higher educational institutions, the use of E-learning systems have become an essential component in higher education provision in the 21st century. Indeed, a study conducted by Tarus et al., (2015) revealed that E-learning is progressively becoming a popular and simplified approach to teaching and learning in tertiary education all over the world. E-learning can take place in many settings including; corporate organizations. Also, it is important to note that for the purpose this study, the term institution refers to higher education, since, Clarke (2004) defined an "institution" as an environment which can be instantiated as a university with its faculties and departments.

Increasingly, tertiary institutions are investing in E-learning systems to boast and establish their competitive advantage, due to its attractiveness to learners and viewed as very essential and necessary by governments, parents, employers, and managers of higher education. In Ghana, for instance, tertiary institutions are putting in place various policies geared towards the enhancement and integration of ICTs in teaching and learning. For instance, The World Bank's financial support through the Teaching and Learning Innovation Fund (TALIF), the Ghana Education Trust Fund (GETFund) as well as other developmental partners continue to

provide infrastructural, technology and capacity building support to distance learning programmes in public tertiary institutions. Elsewhere other African countries, Kenyatta University currently offers a wide-range of E-learning and ICT-supported learning and teaching environment (ela Report, 2015). Likewise, Eduardo Mondlane University (Mozambique), Makerere University (Uganda), Obafemi Awolowo University (Nigeria), and University of Dar es Salaam (Tanzania), all have E-learning implementation institutional roadmap that is into agreement with their university strategic plans (Beebe, 2004). In fact, there is a general belief that the deployment of E-learning systems in the tertiary education system will result in the creation of new opportunities and possibilities for learners and teachers. However, Arkorful & Abaidoo (2015) observe that even though E-learning has made a substantial impact on teaching and learning, there still exist challenges with its implementation.

Wang et al., (2009) revealed that one of the most critical variables affecting E-learning implementation was the E-learning readiness factor. Hence, there is the need for institutions to continually improve and raise the level of E-learning readiness to be assured of maximum returns. Machado, (2007) described E-learning readiness as the capabilities and capacities of implementing institutions and educational authorities in ensuring that the effective and practical application of E-learning systems is not in doubt. Indeed, Borotis & Poulymenakou (2004) explained E-learning readiness as the mental or physical preparedness of an institution for some E-learning experience, therefore, in the process of E-learning implementation, it is always imperative that institutions evaluate their level of readiness, regarding their capacity and the capability to implement E-learning system.

Prior studies undertaken by (Arbaugh & Duray, 2002; Chen & Bagakas, 2003) proposed several factors that are responsible for a successful of E-learning outcome; ranging from; student, teacher, course, technology, system design, and environmental dimension. For example, AbuSneineh & Zairi (2010) argues that accessibility and easiness of using technology are the most critical factors that lead to an efficient E-learning system outcome, while, Bhuasiri et al. (2012) highlighted technological aspect as an essential factor in E-learning system outcome. Technology users are strongly motivated when they perceive the presence of necessary resources. Therefore, the assumption that perceived E-learning readiness will impact on E-learning system outcome cannot be farfetched. Nevertheless, recent reviews of studies on E-learning observed a shortcoming regarding studies aimed at ascertaining the role and impact of E-learning readiness on E-learning systems outcome, especially in the context of higher education delivery in developing countries. To overcome this shortcoming, this study sort to investigate and ascertain the impact of three antecedences of E-learning readiness and how they impact E-learning systems outcome in a developing country like Ghana. By so doing, the study will endeavor to fill a gap, by identifying the effects of technological readiness, institutional readiness, and self-efficacy in the measurement of the success or either wise of E-learning systems implementation. The study is organized as follows; we address the theoretical background and hypothesis for the study, a research design based on the research model of the study is described and examined. Finally, the results are analyzed and presented.

2. Literature Review

2.1 A Review of E-learning Readiness Models and Frameworks

Many factors influence E-learning implementation and effectiveness in the context of higher education provision environment; however, readiness is the critical factor in the implementation process (Albarrak, 2010). In this part of the study, we present a brief review of some models and frameworks on E-learning readiness. Darab & Montazer (2011) proposed a model for evaluating E-learning readiness within the context of higher education in a developing country. In their model, the technological attributes are regarded as readiness related to equipment, security, and communication network. The factors identified by the model to be key to E-learning readiness included; the existence of E-learning policy, networks, equipment, management, standards, content regulations, financial and human resource sources, culture and security. Then also, Keramati et al. (2011) came out with a model aimed at determining the impact of factors affecting the outcomes of E-learning implementation in high schools settings. In their study, E-learning readiness factors that were identified were technology, organizational factors, and social factors. They concluded that the interplay of E-learning factors and readiness factors affected E-learning system outcomes. Besides, Omoda & Lubega (2011) conducted a study to determine the factors that influence the E-learning readiness among higher education institutions in an African country. In their findings, it was revealed that awareness and culture, technology, pedagogy, and content were the most as important factors necessary for E-learning readiness. Also, Akaslan & Law (2011) investigated the extent to which higher education institutions were prepared for the application of E-learning system for teaching and learning. Their study demonstrated various factors that can

influence a full-scale implementation of E-learning systems by categorizing E-learning readiness in three phases. Chapnick (2000) also provided a framework to evaluate Institutional readiness for E-learning implementation; emphasizing on psychological readiness, sociological readiness, environmental readiness, human resource and other factors, while Psycharis (2005) model assessed E-learning readiness based on resources, education, and the environment. The education category related to content and institutional readiness; environment dimension had leadership, culture and entrepreneurial readiness. Finally, Aydin & Tasci (2005) identified technology, innovation, people and self-development as the primary determinants of accessing how ready an organization is, in implementing an E-learning system with a positive outcome, whiles Adjei et al. (2018) investigated the impact of behavioral intention on E-learning systems usage using an empirical study on tertiary education institutions in Ghana.

3. Theoretical Background And Hypothesis

3.1 E-learning System Readiness and E-learning system Outcomes

A higher percentage of the failures of E-learning systems implementation by higher education providers can be attributed to lack of readiness assessment (Hanafizadeh & Ravasan, 2011; Odunaik et al., 2013). Albarrak (2010) mentioned that the effective outcome of E-learning systems in an institution is affected by different factors. However, readiness is the most critical success factor of any E-learning implementation process; and for that matter, institutions have to continually improve and upgrade their readiness to use this system (Wang et al., 2009).

Since E-learning readiness relates to the capabilities of an institution, regarding the effective and efficient integration

and application of ICTs in teaching and learning process, measuring E-learning readiness will go a long way in assisting higher education providers and policymakers to put in place appropriate strategies, policy framework, and required facilities that will provide maximum result outcome (Kaur, 2004). For instance, Piccoli et al. (2001) believed, human dimension and design dimension impacts the effectiveness of E-learning outcomes and its utilization. Whiles recently, Yilmaz, (2017) identified E-learning readiness as a factor likely to affect learner's motivation and satisfaction in flipped classroom systems. Similarly, James-Springer (2016) stated, that a positive E-learning outcome requires investment in technological infrastructure. Before that, Forcheri & Molfino (2000) reported that the integration of well managed technological infrastructures is needed in other for the objective of E-learning systems implementation in higher institutions of learning to be realized.

Prior studies such as (Piccoli, 2001; Alavi, 1994) empirically evaluated the effectiveness and efficiency of computer-mediated collaborative learning and revealed that Technology-mediated learning and teaching environments might positively impact students' achievement. Likewise, Lim et al. 2007 identified a positive relationship between the individual, organizational and online training design constructs and training effectiveness construct. Based on the previous findings in the literature review regarding E-learning readiness and E-learning system outcome, the study hypothesis that;
H1: E-learning Readiness will significantly impact E-learning systems outcomes in Tertiary Education Institutions.

3.2 Technological Readiness (TR)

In the process of implementing E-learning systems readiness, it is essential to consider one important and crucial aspect, that is, technology. Bhuasiri et al. (2012) stressed on technological

characteristics as a key factor in an E-learning implementation and utilization process. Therefore the preparedness of the technological aspects needs to be comprehensively explored to assess the readiness of an E-learning process. Some technological characteristics such as proper software, hardware, and internet connectivity play an essential role and are indispensable in E-learning systems outcomes (Keramati et al., 2011). This calls for the necessary technological readiness assessment before and during the implementation of E-learning systems. Alshaher, (2013) proposed that to realize the full benefits associated with E-learning, and also to reduce problems likely to be faced in the process of implementation; there is the need to measure the E-learning readiness in supporting a successful E-learning implementation in higher education (Rohayani, Kurniabudi, & Sharipuddin, 2015). Before that, Darab and Montazer (2011) had put forward a model for assessing E-learning readiness in higher education. In their model, technological readiness was viewed concerning the equipment, security, and communication network. AbuSneineh & Zairi (2010) re-emphasized that accessibility and easiness of technology are the most important factors that influence the overall effectiveness of an E-learning system. Based on previous findings in the literature review, this study hypothesis that;

H2: Technological readiness will positively impact E-learning readiness in Tertiary Education Institutions

3.3 Institutional Readiness (IR)

Organizational or institutional goals and strategies are among the influential factors of E-learning readiness. (Omoda-Onyait & Lubega, 2011; Chapnick, 2000). Whiles Psycharis (2005) proposed that E-learning systems should be built into organizational strategies. James-Springer (2016), identified three factors about Institutional readiness for E-learning,

namely; the culture of the organization, human resource and financial. Psycharis (2005) explained cultural readiness towards E-learning as staff behavior and attitudes toward E-learning systems. Expatiating further on the role of human resource on E-learning readiness, Psycharis (2005) suggests that people involved in the implementation process should be well-informed about E-learning. Since E-learning does not include only students and teachers, other people affected directly or indirectly must have the necessary skill and experience for the delivery and maintenance of the system. Darab & Montazer (2011) in their model proposed in evaluating E-learning readiness for a higher education institution identified by the model include policy, management, standards, financial and human resource sources, culture among others. In a more recent study by Mosa et al. (2016) asserted that Culture is a factor that significantly contributes to the E-learning systems utilization. They justified this statement by explaining that the institutional culture must be such that faculty members, students, and employees appreciate the important benefits of E-learning, and this will influence their decision to accept the use of the system. Furthermore, culture is the combination, assemblage or collection of values, beliefs, norms, and behaviors that are followed by teachers, students, and the institution. Therefore an E-learning systems implementation stands the risk of resistance due to issues that border on culture. Hence, it is the responsibility of organizations planning or implementing E-learning systems to put in place an implementation strategy which is meant to ensure that all stakeholders are fully prepared culturally.

Based on the above literature and findings from previous research, this study hypothesis that;

H3: Institutional readiness will positively influence E-learning readiness in Tertiary Education Institutions.

3.4 Self-efficacy (SE)

According to Bandura (1977), Self-efficacy is the replication of a persons belief in his or her capabilities to complete tasks has demonstrated its ability to affect learning and performance outcomes in different settings such as education (Pajares & Urdan, 1996; Schunk, 1991), organizational training (Gist, Schwoerer, & Rosen, 1989), computer training (Compeau & Higgins, 1995; Johnson & Marakas, 2000), and E-learning (Johnson, Hornik, & Salas, 2008; Sun, Tsai, Finger, Chen, & Yeh, 2008). As a whole, individuals with the higher degree of self-efficacy perform better and more persistent more when they face obstacles, have higher learning outcomes, and are more motivated than individuals with lower self-efficacy (Gist & Mitchell, 1992). It is not only performance that self-efficacy affects, but it also impacts cognitive processes, feelings, and motivation. Individuals with higher self-efficacy are more likely to view difficult tasks as challenges rather than threats (Pajares & Valiante, 1997). However, a relatively lower degree of self-efficacy undermines performance, weakens engagement, and leads to quicker abandonment of tasks (Bandura, 1989). Self-efficacy estimates vary on three dimensions: magnitude, strength, and generality (Bandura, 1977). Magnitude focuses on the belief of an individual that he or she can complete the task. Strength reflects an individual's confidence at completing the various components of the task or at multiple levels of difficulty. Chu & Chu 2010, validating a proposed model to evaluate E-learning outcomes for adult learners, asserted that Self-Efficacy fully mediates the relationship between peer support and E-learning outcomes. Based on the above literature, this study hypothesis that;

H4: E-learning Self-Efficacy will positively impact E-learning readiness in Tertiary Education Institutions.

3.5 Research Model

The research model of the study is shown in figure 1 below.

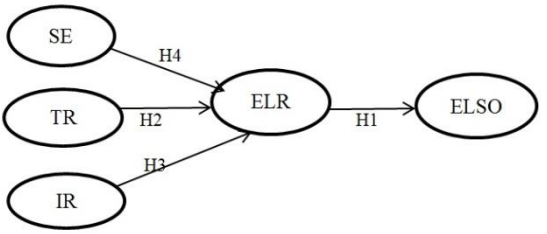

Figure 1. Research Model

4. Methodology

To achieve the research study aims and objectives, the study utilized a survey method to collect data, through a questionnaire, from faculty members and students of five tertiary education institutions in Ghana. This methodology was adopted based on Kerlinger's (1973) assertion of its appropriateness for obtaining personal beliefs and the capacity to improve the generalizability of results, and also, its suitability for studies that have individual people as the unit of analysis. Part one of the questionnaire was to inquire about respondents demographic characteristics, whiles the second part was to solicit information for the five constructs, namely; technological readiness, Institutional readiness, self-efficacy, E-learning readiness and E-learning utilization outcomes. Items for all the constructs were adapted from prior studies. Items for technological readiness were adopted (Chapnick, 2000) and (Aydin & Tasci, 2005). Items used in measuring institutional readiness were adopted from (Omoda-Onyait, & Lubega, 2011). Items used in measuring self-efficacy were adopted from Joo et al., (2000), and Liaw et al., (2007). Items used in measuring E-learning readiness were adopted (Chapnick, 2000). Finally,

the study adopted items from Wan et al. (2008) to measure E-learning system outcomes. The items are anchored on a 7-point Likert scale (1=strongly disagree to 7= strongly agree).

The study collected data from faculty members and students in five tertiary universities in Ghana. Libraries in the selected tertiary institutions were utilized during the data collection process. The questionnaire was handed over to students as they enter the library, and asked to complete it and return to the library assistant when leaving the library. Also, other copies of the questionnaire were made available to the offices' of the Dean of Students and Student's Representative Councils (SRC) to expand the sample size to others who were not available at the time of distribution. Questionnaires meant for faculty members were made available directly into their office letterboxes. Samples of 516 usable responses were obtained out of the 580 distributed; this is an 88.9% response rate of all respondent. 352 questionnaires were obtained from students, while 150 from faculty members.

4.1 Demographic Information

Majority of the responses were found to be male (55.9%) and the rest (44.1%), with close to a half of them falling within the ages of 18 and 25 years old (43.4%), followed with those within the ages of 40 plus (29.8%). 37.5% of the respondents were affiliated with public tertiary institutions, 35.7% from technical universities and the remaining 26.8% from private universities. Also, 38.3% were faculty members, with the remaining (61.5%) being students. With respects to respondent's daily utilization of internet; 0.4% reported that they have never used the internet, 4.0% seldom uses the internet, 21.3% sometimes uses the internet, 41.2% usually utilizes the internet, with 31.1 % always using the internet. Finally, 3.7% were a novice, 58.5 were intermediary, and 37.9% as experts respectively as far as their computer literacy was concerned.

Table 1. Respondent demographic features (N=516)

Variable		Frequency	%
Gender	Female	227	44.1
	Male	289	55.9
Age	Less than 18	1	0.19
	18 – 25 years	224	43.41
	26 – 30 years	44	8.53
	31 – 39 years	93	18.02
	40 years +	154	29.84
Category of Tertiary Institution	Public University	193	37.50
	Technical University	184	35.70
	Private University	139	26.80
Status	Faculty Member	198	38.37
	Student	318	61.63
Usage of the internet (Daily)	Never	2	0.40
	Seldom	21	4.00
	Sometimes	110	21.30
	Usually	212	41.20
	Always	171	33.10
Competence in Internet Usage	Poor	9	1.74
	Good	112	21.71
	Very Good	194	37.60
	Excellent	201	38.95
Computer Literacy	Novice	19	3.68
	Intermediary	302	58.53
	Expert	195	37.79

5. Data Analysis

The research aims at ascertaining the function and impact of E-learning readiness on E-learning system outcome in Ghana's tertiary education delivery system. In analyzing the proposed research model, partial least square structural equation modeling analysis (PLS-SEM) technique was applied, using the SmartPLS 3.0 software (Ringle et al., 2015). Also, as recommended by Hair Jr et al. (2014), the study adopted a two-phase analytical procedure, that is, testing the measurement model (validity and reliability of the measures) and structural model (Hypothesis testing).

To achieve valid results before the assessment of the structural model, the study evaluated the measurement model of the latent constructs to determine their dimensionality,

validity, and reliability. In evaluating internal consistency reliability, Composite reliability (CR) was utilized. On the other hand, to establish convergent validity on the construct level, the average variance extracted (AVE) was applied. Finally, in establishing discriminant validity, the Fornell-Larcker criterion was applied.

5.1 Internal Consistency Reliability Analysis

According to Hair et al., (2014), internal consistency reliability, which is used to estimate the consistency of results across items of the same test, is the first criterion to be examined in typical PLS-SEM. The conventional criterion for internal consistency is Cronbach's alpha, and it offers an estimate of the reliability based on the inter-correlations of the observed indicator constructs. However, Hair et al., (2014) argue that Cronbach's alpha is sensitive to the number of items in the scale, which usually tends to over, or underestimate the internal consistency or scale reliability. Due to this limitation, as far as the use of Cronbach's alpha in measuring the internal consistency reliability is concerned, this study applied an alternative measure of internal consistency reliability, known as composite reliability, as proposed by Hair et al., (2014). Composite reliability is preferred amongst researchers in PLS-SEM based studies as it may result in higher estimates of true reliability. Indeed, (Chin, 1998; Nunally & Bernstein (1994) advocate that for an exploratory study composite reliability values of 0.60, and 0.70 is acceptable. In this study, composite reliability values shown in table 2, suggest that all constructs could be regarded as reliable since they are all above the recommended threshold of 0.70.

5.2 Convergent and Discriminant Validities

Hair et al., (2014) explain convergent validity, as the level to which a measure correlates positively alongside alternative

measures on the same construct. On the other hand, discriminant validity measures the degree to which a construct is genuinely distinct from other constructs, with regards to how they correlate with other constructs and the extent to which measured items represents only one single variable or construct. Convergent validity is demonstrated in this study's data by considering and examining the Fornell and Larcker (1981) proposed criterion of convergent validity, in this case, average variance extracted (AVE). To emphasize, (Chin, 1989; Höck & Ringle 2006) suggests that AVE must be greater than 0.50, to demonstrate that, on the average, the constructs explain more than half of the variance of the measuring items or indicators. Results presented in Table 2 demonstrate that the average variance extracted for all constructs were above the 0.50 threshold, thus establishing an acceptable convergent validity of the latent constructs used in the research model, and all the constructs explain more than half of the variance of its indicators.

Table 2. Mean, Standard deviation and Convergent Validity Analysis (N=516)

Constructs	Indicators Discriminant	Standardized Loadings	Cronbach's Alpha	Composite Reliability	AVE	Validity?
Technological Readiness	TR1	0.602	0.743	0.841	0.573	Yes
	TR2	0.763				
	TR3	0.765				
	TR4	0.874				
Institutional Readiness	IR1	0.789	0.801	0.871	0.628	Yes
	IR2	0.784				
	IR3	0.73				
	IR4	0.862				
Self – Efficacy	SE1	0.658	0.715	0.824	0.542	Yes
	SE2	0.69				
	SE3	0.848				
	SE4	0.756				
E-learning Readiness	ELR1	0.773	0.757	0.847	0.583	Yes
	ELR2	0.642				
	ELR3	0.807				
	ELR4	0.735				
E-learning Utilization Outcomes	ELSO1	0.659	0.77	0.854	0.598	Yes
	ELSO2	0.889				
	ELSO3	0.806				
	ELSO4	0.718				

Furthermore, discriminant validity examines the extent to which a construct is genuinely distinct from other constructs, how measuring items represent only a single construct (Hair et al., (2014). In other words, discriminant validity analysis statistically tests whether two constructs differ or not. In this study, discriminate validity was ascertained by applying a more conservative approach; that is the Fornell-Larcker criterion, which validates constructs by comparing the square root of Average Variance Extracted (AVE) with the results of the latent variable correlation (Fornell & Larcker, 1981; Hair et al., 2011). Table 3 demonstrates that the square root of AVEs appearing in the diagonal cells was higher than the corresponding row and column values, thus, establishing discriminant validity.

Table 3. Discriminant Validity Measurement by Fornell-Lacker.

	E-learning Readiness	**E-learning System Outcome**	**Institutional Readiness**	**Self-Efficacy**	**Technological Readiness**
E-learning Readiness	**0.764**				
E-learning System Outcome	0.661	**0.773**			
Institutional Readiness	0.502	0.649	**0.793**		
Self-Efficacy	0.616	0.531	0.613	**0.736**	
Technological Readiness	0.407	0.651	0.658	0.682	**0.756**

5.3 Evaluation of Structural Model

Having established internal consistency reliability, convergent validity, and discriminant validity, the study utilized the Smart PLS 3.0 software (Ringle et al., 2015) to carry out the PLS-SEM. This is intended to assist us in evaluating the intensity of the structural model proposed for the study. By so doing, R^2 values and their corresponding t-values were assessed, as recommended by (Hair et al., 2016). Before the assessment of the structural model, a multicollinearity assessment was done on the entire constructs. According to Hair, et al., (2014)

collinearity arises when two indicators are highly correlated. However, when more than two indicators are involved, it is referred to as multicollinearity. Accordingly, a related measure of collinearity is the variance inflation factor (VIF), which is the reciprocal of tolerance. Hence, Hair, Ringle, & Sarstedt (2011) argues that in PLS-SEM, the tolerance level of 0.20 or lower and a VIF value of 5 and higher respectively demonstrate a possible collinearity problem. Consequently, an analysis of the inner (structural) model proved the non-existence of multicollinearity, as all variance inflation factors obtained were between 1.1, to 3.8. In this case, falling within the conservative threshold of 5 (Rogerson, 2001).

Again, it is essential to realize the fact that one of the most commonly used measures in evaluating structural models is the coefficient of determination (R^2 value), which measure the model's predictive accuracy (Hair et al., 2014). Henseler et al., (2009) proposes that R^2 values of 0.75, 0.50, or 0.25 for endogenous latent variables can be respectively described as substantial, moderate, or weak. As illustrated in figure 2, the two latent variables in the research model are explained in more than half of their respective variances, That is, E-learning readiness (R^2 =0.867) and E-learning system outcomes (R^2 =0.602). These R^2 values can be regarded as substantial. In addition to assessing the magnitude of R^2 values as a criterion or benchmark for predictive accuracy, (Geisser, 1974; Stone, 1974) recommends that Q^2 measure which is an indicator of the model's predictive relevance must be considered. In this regard, Hair et al., (2016) recommended that the Blindfolding procedure to PLS-SEM must be applied to endogenous constructs that have reflective measures, and if the Q^2 values are greater than 0, the implication is that the model has predictive success for specific endogenous construct (Cohen, 1988; Hair et al., 2016). Again, Hair et al., (2016) advocate that as a relative measure of predictive relevance, values of 0.02,

0.15, and 0.35 is a signal that an exogenous construct has a small, medium, or large predictive relevance for a specific endogenous construct.

In this study, Q^2 values 0.453 and 0.401 for E-learning readiness and E-learning system outcomes respectively, is an indication that all the endogenous constructs, in the research model can be considered as having high predictive relevance.

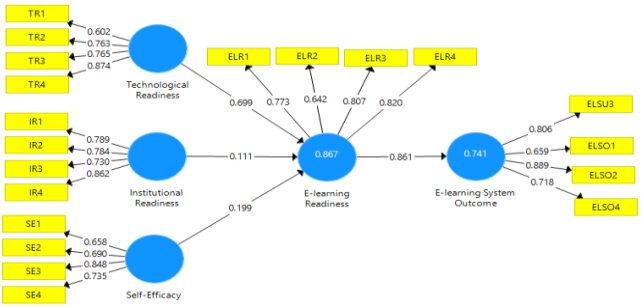

Figure 2. Results of the structural model assessment

6. Hypothesis Testing

The strength of the structural model and the testing of the hypothesis were ascertained by applying bootstrapping. This is a resampling method that draws a large number of subsamples retrieved from the original dataset. In this study, we utilized 5000 subsamples in establishing the significance of paths within the structural model, as proposed by (Hair et al., 2014).

Table 4. Results of structural model analysis and hypothesis testing

Hypothesis	Independent Variable		Dependent Variable	Path Coefficient	T-statistics	P-Value	Decision
H1	ELR	→	ELSO	0.861	28.108	0.000	Supported
H2	TR	→	ELR	0.699	11.421	0.000	Supported
H3	IR	→	ELR	0.111	1.967	0.069	Supported
H4	SE	→	ELR	0.199	3.378	0.002	Supported

The results reveal that all four hypotheses had a significant relationship with their respective endogenous or dependent variables. Therefore, as illustrated in Table 4, the relationship between E-learning readiness and E-learning system outcome is supported by H1: (β= 0.861, $p < 0.01$). Besides, the relationship between technological readiness and E-learning readiness is supported by H2: (β= 0699, $p < 0.01$). H3 shows establish that institutional readiness is positively related to E-learning readiness by (β= 0.111, $p < 0.01$). To conclude, the results of H5, which depicted the relationship between Self-efficacy and E-learning readiness was hypothesized to be positive is affirmed by (β= 0.199, $p < 0.01$).

6.1 Important Performance Map Analysis (IPMA) Results

A basic PLS-SEM analysis identifies the relative importance of constructs in the structural model by deducing estimates of the direct, indirect and relationships. However, IPMA prolongs or extends these PLS-SEM results with another dimension, through the actual performance of each independent variable (Hair et al., 2016). Our study extends the SEM analysis by carrying out importance-performance map analysis (IPMA), in other to prioritize managerial actions on E-learning readiness toward enhancing E-learning systems outcomes. The IPMA shown in figure 3, has the x-axis representing the total effects of the independent variables (E-learning Readiness, Institutional Readiness, Self-Efficacy and Technological Readiness) on the target construct E-learning system outcomes. The y-axis depicts the average constructs scores of behavioral intention to use, perceived ease of use, perceived usefulness, and self-efficacy (performance). Table 5 exhibits the total effect and index value scores. The results reveal that E-learning readiness is the most important constructs in explaining E-learning system outcomes; although, it has a relatively lower performance. With regards to the indirect predecessors of E-

learning system outcomes, technological readiness has the highest impact on E-learning system outcomes, as well as relatively higher performance. Other indirect predecessors; self-efficacy and institutional readiness have relatively little relevance because of their low importance, although, their performance can be considered as appreciably high.

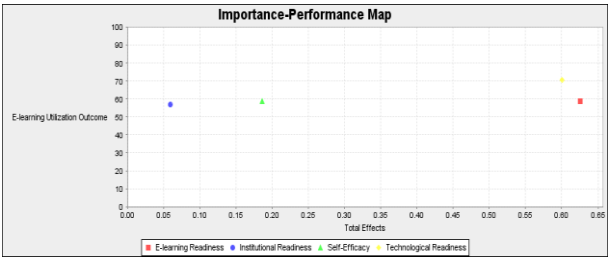

Figure 3. IPMA results of E-learning system outcomes as target construct

Table 5. Total effect and index values for the IPMA of E-learning systems outcomes

	Importance (Total Effects)	Performance (Index Values)
E-learning Readiness	0.861	58.7
Institutional Readiness	0.096	56.9
Self-Efficacy	0.171	59.0
Technological Readiness	0.601	70.8

6.2 Discussion

As earlier stated, this study forms part of broader research targeted at improving our understanding of E-learning system outcomes in higher education delivery, with emphasis on developing countries. The paper's objective was to investigate the role of E-learning readiness factors toward the attainment of acceptable E-learning system outcomes in Ghanaian tertiary education institutions. By so doing, we attempted filling the gap of identifying the effect of E-readiness such as technological readiness, institutional readiness, and self-efficacy toward E-

learning systems outcome, since this study is amongst the foremost to be conducted to investigate E-learning readiness and its impact on E-learning system implementation in Ghana's tertiary education delivery. The results of the data analyzed to demonstrate that the proposed research model is effective in explaining E-learning outcomes. Consequently, E-learning system outcome is significantly influenced by E-learning readiness. Also, other indirect predecessors of E-learning system outcomes such as; technological readiness, Institutional readiness, and E-learning self-efficacy were found to be positively related to successful outcomes of E-learning system in tertiary education institutions in Ghana. The results provide valuable insight to higher education providers and researchers in appreciating how the existence of required technological infrastructure, institutional readiness, and individual self-efficacy impact on E-learning readiness, which is arguably an effective indicator of measuring an E-learning system outcome. Consistent with Nyoni (2014), this study supports the assertion that E-learning readiness assessment provides the key information that institutions need in tackling specific needs of E-learning system users, E-learning readiness was significantly related the E-learning system outcome (β= 0.861). Mosa et al., (2016) examined various factors that can be used to measure how prepared a higher education institution is, as far as the utilization of E-learning systems was concerned. Among other factors, technological readiness was found to be the most dominant in all the E-learning readiness models or frameworks.

6.3 Theoretical and Practical Implications

The study has introduced another dimension of measuring E-learning success by highlighting the pivotal role of E-learning readiness factors in measuring an E-learning system outcome in higher education delivery. Also, it proposed a validated

model underpinned by relevant E-learning readiness models and frameworks. This is based on our conviction that E-learning readiness is a key factor in a successful E-learning systems outcome. The empirical evidence provided to support the belief that the existence of technological infrastructure, institutional readiness and individual's self-efficacy are key factors pertinent to E-learning systems success in higher education provision. Ultimately, the findings are significant regarding the practical implications of an accelerated provision of technological infrastructure in higher education institutions in Ghana, to increase accessibility to higher education through the integration of ICTs in teaching and learning.

Further, the findings of this study have revealed that the preparedness of an institution to provide requisite technological infrastructure, Institutional culture, and awareness, management leadership, improvement of user's self-efficacy are paramount toward the outcome of E-learning system implementation. This study revealed that the single most important readiness factor impacting on E-learning system outcome was technological readiness. This was a confirmation of Alaskan & Law (2011) view that technology is the fundamental factor of E-learning, and apart from that, other critical elements are fundamentally based on computer and internet. To this end, managerial actions are needed to provide policy direction relating to the delivery of hardware and software infrastructures. Hardware refers to physical components whereas software is the information aspect of technology. Management of institutions must endeavor to provide all necessary technical support services for students and teachers. A brought policy on technological infrastructure must be put in place to address issues that have to do with the provision of physical and technical resources.

Amongst information systems (IS) literature, Skok et al. (2001) utilized IPMA to assess the success of investments in

information systems in the health club industry, while O'Neill et al. (2001), applied IPMA in evaluating the service quality perceptions of online library services. Magal et al., (2009) evaluated the use of e-business applications among SMEs, to test the robustness of importance-performance (IP) analysis models and to present IP mapping as a tool for decision making. This study also contributes significantly by applying the concept of Important-Performance Matrix Analysis (IPMA) to determine the most relevant drivers of E-learning readiness on E-learning systems outcome in Ghana's tertiary education institutions by comparing their perceived importance and performance. Consequently, managerial actions targeted at improving E-learning system must focus on improving the performance of E-learning readiness, institutional readiness, and self-efficacy. Finally, future research aimed at investigation E-learning systems outcome in the context of higher education in developing countries can apply this model to investigate the intervening role of readiness factors towards E-learning implementation success.

7. Conclusion

The ultimate objective of this paper was to ascertain and investigate the role of E-learning readiness factors toward the attainment of acceptable E-learning system outcomes in Ghanaian tertiary education institutions. By so doing, we attempted filling the gap of identifying the effect of E-learning readiness antecedence such as; technological readiness, institutional readiness, and self-efficacy, toward E-learning systems outcome, since this study is amongst the foremost to be conducted in the context of Ghana's tertiary education delivery. The results provide valuable insight to higher education providers and researchers in appreciating how the existence of required technological infrastructure, institutional readiness,

and individual self-efficacy impact on E-learning readiness, which is arguably an effective indicator of measuring an E-learning system outcome.

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