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Readiness factors for information system strategic planning among universities in developing countries: a systematic review

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Readiness factors for information system strategic planning among universities in developing countries: a systematic review

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Abstract. The implementation of information system strategic planning (ISSP) in higher education institutions is to improve work efficiency, management effectiveness in order to improve organizational competitive advantage. However, the question of whether all universities are ready to implement ISSP as a way to achieve organizational goals has not been answered. This study aims to investigate the readiness phenomena through literature study. The method used is by using the Systematic Literature Review (SLR) instrument to identify readiness factors on the implementation of ISSP, especially among the institutions of higher education in developing countries. This study has identified 10 readiness measurement. There are three categories of measurement, namely people, processes and technologies that represent 11 factors of ISSP readiness measurement in universities.

1. Introduction

Every organization, either universities, governments or companies, has a vision to be achieved. There is a challenge to achieve the vision of the organizations because the vision is a future that has not happened. The vision can be achieved by looking at the current conditions and predicting future conditions. Vision can be realized and become a reality if every function has a good understanding of the system, the initiative to grow, a commitment to achieve the vision and able to work hard [1]–[3].

The universities in developing countries that have a vision and purposes, consciously need to grow and have competitive advantages. The role of information technology (IT) to achieve the vision and the objectives of the organizations is very significant. The existing conditions of IT at universities in developing countries have not run well because of high cost, IT literacy issues, and the IT is used only as a tool of the organizational population, not as a strategy to achieve the vision. On the other hand, the previous studies [4]–[8] show that the success of IT development projects still tends to be unsatisfactory. Based on these issues, the attention to ISSPs needs to be a concern of stakeholders in higher education institutions [9]–[12].

According to John Ward and Joe Peppard [13], there are three main goals of the implementation of information system or IT in an organization. The first goal is to improve work efficiency by automating various information processes. The second is to improve the effectiveness of management by satisfying the information needs for decision making. Lastly, the goal of IT is to improve the

competitive advantages of organizations by changing the business way and style. By using IT, universities in developing countries are expected to achieve their vision and goals, be able to develop education, research and community services, be able to improve competitiveness, have effective and efficient management [9], [10], [12], [14].

The goals of using IT are to gain competitive advantages from business opportunities generated by IT, save costs for future infrastructure development, develop the resources and competencies to make IT successful in the organizations. The steps that must be taken to identify the readiness of the system is to integrate management and business knowledge with technical knowledge, develop business strategies, determine IT strategy, stakeholder interaction with IT and stakeholder business collaboration vision [15]–[17].

To achieve those goals, it is necessary to measure the readiness for implementing ISSP in the universities of developing countries. To determine the success of its implementation, E-Readiness is one of the most important aspects of the tool used [1], [17]–[21]. Therefore, the purpose of this study is to identify the existing mechanisms for measuring readiness, and to know the factors of readiness instruments for ISSP implementation at universities.

This paper is organized into four sections. First, the introduction section that explains the background, problems, and objectives of the study. Second, the research methods section that describes the review methods used for LSR. Third, finding and discussions. The last section is conclusion.

2. Research Methods

The method used in literature review is SLR. The SLR is a method to conduct the process of identifying, evaluating and interpreting relevant research and according to the topic area, phenomenon, and relevant interest. The SLR will perform an analysis of how data is obtained and generated [22]. The development of the review literature is done to summarize the results of the study and identify the readiness for the ISSP implementation. The process is carried out based on the instructions and guidelines for performing the SLR. Regarding with the LSR guidelines, to conduct LR there are three steps to be done: formulating LR questions, determining and selecting research and evaluation [18], [22]–[24].

The research questions were based on Population, Intervention, Comparison, Outcome, and Context (PICOC) [22], [23]. The criteria and scope of research questions are shown in Table I. Based on table I, the SLR question is as follows:

RQ1: How to explore the study of the readiness of ISSP implementation in higher education? RQ2: How to know the readiness factors used for ISSP implementation in higher education?

Table 1. Criteria and scope

No	Criteria	Scope
1	Population	Any organizations
2	Intervention	Implementation of ISSP, issues and factors of readiness and measurement mechanism
3	Comparison	Mechanism of the readiness measurement of industry and academic
4	Outcome	Mechanism of the readiness measurement and factos of ISSP implementation
5	Context	Review of each study on ISSP implementation and preparedness factors and measurement mechanism

Search online is done on a publisher database or digital library such as IEEEXplore, Google Scholar, Emerald, EBSCO, Elsavier, Science Direct, Proquest and digital campus library or professional associations. The results are in the form of research from Journal, Proceedings, thesis

reports and scientific books. The basic keywords for search are "Information System", "Information Technology", "Strategic Planning", "Readiness", and "Higher Education". For optimization and accuracy of database search results (title, abstract and metadata), Boolean logic "AND" and "OR" are added. Year of search is started from 2010 to 2017 on articles in English.

At the beginning, around 500 relevant articles were found. After investigating the titles and abstracts, approximately 25 articles that were considered relevant to the topic of ISSP readiness were found. The results of article review are then grouped according to related criteria. After reading and reviewing the suitable and relevant articles, 10 research articles are accepted for the synthesis of SLR.

3.   Finding and Discussion

Based on search results, papers, journals, books and research dissertations on the readiness of ICT application have been done by researchers and practitioners. This is reinforced by the number of literature studies on the readiness of the application of ICT to organizations. Here are the results of research based on the development of Research Questions. The result is a synthesis of the SLR that is the factors affecting the readiness of ISSP implementation.

3.1 Mechanism to measure readiness

According to [25], there are several frameworks and instruments to assess the readiness of ICT implementation. Through SLR, 10 mechanisms used to measure ICT readiness can be identified. Mechanisms can measure the readiness of ICT initiatives in organizations. Therefore, this mechanism can be used to measure the readiness of the ISSP implementation in the organizations.

Table 2. List of Mechanisms to Measure Readiness

Mechanisms to Measure Readiness	Reference	Factor	Purpose
A Conceptual Green-ICT Implementation Model Based-on ZEN and G-Readiness Framework	[26]	i. Attitude ii. Policy iii. Practice iv. Technology v. Governance	To develop a conceptual implementation model to adopt green-based ICT readiness
Influence of Social Technical Factors on ICT Readiness for Primary Schools in Bungoma County, Kenya	[19]	i. Professional Development ii. Accessibility of ICT iii. Ease of Use iv. Usefulness v. Technical Support vi. Leadership Support	To develop conceptual model for integrating technology in teaching
E – Readiness Assessment Of Large Organization In A Developing Country: The Case Of Iran	[27]	i. Culture & Resource ii. Leadership iii. Strategy and Policy iv. IT Security v. Process vi. Infrastructure	To measure an organization's ability to take advantage of the Internet as an engine of economic growth and human development
A Model for Organizational Readiness In Information Technology (IT) Project Implementation In The Malaysian Construction Industry	[28]	i. Infrastructure ii. People iii. Process iv. Work Environment	To develop readiness model In Information Technology (IT) Project Implementation

Green ICT Readiness Model for Developing Economies: Case of Kenya	[29]	i. Attitude ii. Policy iii. Practice iv. Technology v. Governance	To develop a conceptual implementation model to adopt green-based ICT readiness
ICT Readiness Assessment Model for Public and Private Organizations in Developing Country	[25]	i. Software and IS ii. ICT Hardware iii. ICT Infrastructure iv. People and Human Resource	Deliver model and assess readiness ICT for Public and Private
Measuring Organizational Readiness in Information Systems Adoption	[21]	i. Attributes of change ii. Leadership support iii. Internal context iv. Attributes of change targets v. It support	To measure the amount of readiness before implementing IS adoption
IT Readiness Assessment for Government Organizations	[30]	i. Architecture ii. Infrastructure iii. Processes	To Assess IT readiness and Evaluation Framework
E-Readiness to G-Readiness: Developing a Green Information Technology Readiness Framework	[31]	i. Attitude ii. Policy iii. Practice iv. Technology v. Governance	To develop a conceptual implementation model to adopt green-based ICT readiness
E-readiness assessment of nonprofit ICT SMEs in a developing country: The case of Iran	[32]	i. Awareness ii. Resources iii. Commitment iv. Governance	To assess the e-readiness of non-profit SMEs in a developing country.

3.2 Factors for Readiness in Implementing ICT

Universities in developing countries need to reorganize their business processes, people and technology. These three elements can be aligned by changing business strategy and relationship between them. The main factors of ICT implementation in developing country universities are process, people and technology. The three factors will be explained and their related attributes in the following table:

Table 3. Factors Related to Readiness in ISSP Implementation

ICT Readiness Mechanism	Factors										
	People					Process				Technology	
	WC	L	Cp	R	CM	CI	G	A	S	I	Sc
1. A Conceptual Green-ICT Implementation Model Based-on ZEN and G-Readiness Framework [26]		√					√	√		√	√
2. Influence of Social Technical Factors on ICT Readiness for Primary Schools in Bungoma Country, Kenya [19]	√	√	√	√		√	√	√	√		
3. E – Readiness Assessment Of Large Organization In A Developing						√	√	√	√	√	√

	WC	L	Cp	R	CM	Cl	G	A	S	I	Sc
Country: The Case Of Iran [27]											
4. A Model For Organizational Readiness In Information Technology (IT) Project Implementation In The Malaysian Construction Industry [28]	√	√					√	√	√	√	√
5. Green ICT Readiness Model for Developing Economies: Case of Kenya [33]					√		√	√		√	√
6. ICT Readiness Assessment Model for Public and Private Organizations in Developing Country[25]			√	√						√	
7. Measuring Organizational Readiness in Information Systems Adoption [21]	√	√				√					
8. IT Readiness Assessment for Government Organizations [30]							√	√	√	√	√
9. E-Readiness to G-Readiness: Developing a Green Information Technology Readiness Framework [31]							√	√	√	√	
10. E-readiness assessment of non-profit ICT SMEs in a developing country: The case of Iran [32]				√	√	√	√				

Legend:

WC – Workforce Capability, L – Leadership, Cp- Competency, R – Resources, CM – Change Management, Cl – Culture, G – Governance, A - Awareness, S – Strategy, I – Infrastructure, Sc – Security

Table 4. Definition of Factors

Factor	Definition	Reference
Workplace Capability	Refers to the effectiveness of ICT training and capability of human resources	[19] [28] [21]
Leadership	Refers to highest hierarchy in organisation or stakeholders	[19] [21] [26]
Competency	Refers to skills, experience and knowledge	[25]
Resources	Refers to human resources, ICT resources and budget resources	[32]
Change Management	Refers to change commitment and change efficacy	[33]
Culture	Refers to activities in the environment of an organization	[19] [27] [31]
Governance	Refers to structure, procedures and routines, and communications involving business and IT	[26] [30]
Awareness	Refers to the understanding of the concept, sharing of experience and raising the level of knowledge	[27] [30]
Strategy	Refers to business and ICT strategy	[27] [31]
Infrastructure	Refers to technology, including software and hardware	[25] [26] [27]
Security	Refers to policy, information safety, and the legal and regulatory environment.	[26] [27] [33]

4.   Conclusion

Research on ISSP which is mostly done by academics and practitioners especially about the readiness of ISSP implementation in universities or companies is still limited. This shows that research on this topic will contribute to higher education to measure the readiness of IT/SI implementation in universities. Based on factors related to readiness in ISSP implementation, process and technology are the most dominant factors to measure the readiness of ISSP implementation on organizations, while some research articles do not include the people factor as the influencing factor for the ISSP implementation on the organizations. Therefore, in order to produce a readiness model for the implementation of ISSP at universities comprehensively, the future research needs to add a readiness factor that can improve the role of the people factor by adding the factor of policy (ZEN Framework) to measure the readiness of universities to implement and adopt ISSP [26].

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