

# Staying Relevant in the Digital Age: Developing Innovation Capability in Higher Education Institution

Andreas Ronald Setianan<sup>1,\*</sup> Wika Harisa Putri<sup>2</sup>

<sup>1,2</sup> Janabadra University

\*Corresponding author. Email: andre@janabadra.ac.id

## ABSTRACT

Higher education industry in Indonesia is currently undergoing a significant transformation driven by contemporary technology. Unfortunately, little attention has been given to the intersection between digital innovation, organizational capabilities, and higher education institutions. This paper examines the way in which higher education institution is thriving in the era of digital economy by analyzing its innovative capability. This study identifies such capability utilizing technology/systems innovation readiness scale (OITIRS) using the case of Janabadra University, one of the oldest private university in Indonesia. Data is obtained from primary sources as well as secondary data. Results shows that there are several gap that can be closed and a number of recommendation are proposed to improve the relevance of higher education institution in the digital economy era. It is expected that the findings of this study can also be adopted and implemented in other public institutions as well.

**Keywords:** OITIRS, Innovation, University, Public Sector, Indonesia

## 1. INTRODUCTION

Higher institutions nowadays have to keep up with changing technologies and market dynamics. Globalization increases the power of competition. Technology encourages transparency and accountability. Accreditation requires objective and measurable set of standards and indicators. If throughout the history of national universities it has never been truly rivaled except by one another, global competition and technological innovation forced university management to improve [1].

We do not have to look too far to realize that higher institutions need to transform themselves into a more innovative and flexible institutions. Technology—particularly information technology or information system (IT/S)—has become one of the most important strategic tool for any organization to increase their strategic capability (e.g. [5]). Thus, central to this research is how is the higher education institution's readiness to deal with IT/S innovation? Using the case of Janabadra University, we attempt to analyze their internal capabilities and propose suggestions to enhance their readiness level.

In so doing, this study uses organizational information technology/systems innovation models (OITIM), a strategic orientation toward service innovation (SOSI), and enabling mechanism for service innovation (EMSI). A brief description of the conceptual theorem and framework will be elaborated in the next section. We will cover the methodologies being used in this study in Section 3. Meanwhile, results and discussions are presented in Section 4. Last but not least, Section 5 concludes the paper, along with implications and suggestions for further researches.

## 2. LITERATURE REVIEW

Credit risk is ranked first in the risks expressed by banking. The framework of organizational information technology/systems innovation model (OITIM), a strategic orientation toward service innovation (SOSI), and enabling mechanism for service innovation (EMSI). OITIM looks at the readiness of innovation in an organization through several factors: organizational values and goals, resources, organizational processes, operations, technology, personnel and skills, and knowledge [8]. SOSI assesses organizational readiness from two dimensions: strategic investment and risk

tolerance, while EMSI measures organizational readiness from four dimensions: superior service innovation, collaboration in organizations, innovation experience, and information technology experience. These aspects become multidimensional constructs that are accurate enough to measure the organization’s internal readiness in surviving in the digital economy era.

The concept of innovation readiness has received limited consideration in the literature of organizational change. For example, Egan et al. [3] developed eight hierarchical conditions and related criteria that can be utilized to assess hospital readiness for a new research program (Egan et al., 1981). These elements addressed external environment, staff, resources and organizational characteristics.

Similarly, Snyder [7], identified 64 organizational attributes that decision makers considered critically important to the achievement of these programs. These attributes, which were similar to those addressed hospital staff, resources and environmental characteristics. Meanwhile, Ingersoll et al. [6], described the relationship of health care organizational culture and readiness for change to employee commitment to the organization. The study, which focused on an sample of representatives employees participating in a hospital-wide redesign process, found that organizational readiness for change was the strongest predictor of employee commitment to the organization.

In a more recent study, Iman [4] uses similar approach and framework to test the readiness of an incumbent banks against new fintech startups. While the context of study is totally different, it can be seen how important are knowledge, administrative support, and management structure in promoting IT/S innovation in an organization.

In the IT/S literature, the concept of organizational innovation readiness has been described as the level fit between new IT/S and the organization. This writing hypothesizes that, a higher level of readiness leads to a lower level of innovation risk and more successful IT/S innovation outcome. It further hypothesizes that a lack of information about medicinal services readiness for new IT/S expands vulnerability for decision makers and decreases their ability to make effective decisions that will mitigate IT/S innovation risk [9]. While this study features the importance of organizational readiness for successful IT/S innovation, it does not clearly identify what indicators must be assessed to decide the dimension of hierarchical readiness. A heuristic organizational information technology/systems innovation model (OITIM) was developed.

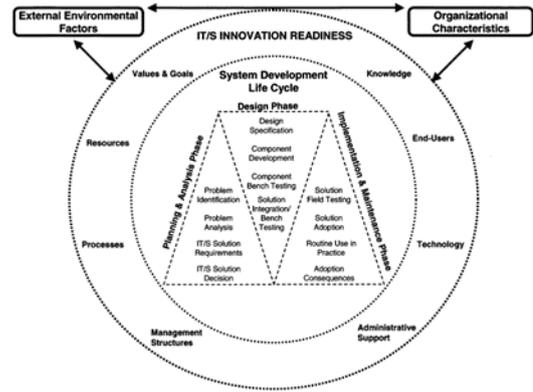


Figure 1. Heuristic Organizational OITIM

Source: Snyder [7]

A multi-phased research program was initiated that is focused on healthcare organizational change related to IT/S innovation. Initial program studies addressed the concept of innovational readiness. In phase one, a heuristic Organizational Information Technology/Systems Innovation Model (OITIM) was developed [8]. The OITIM is supported by four assumptions:

- 1) IT/S innovations function as lending digital process organization interventions.
- 2) Increased IT/S innovation readiness leads to lower innovation risk and increased innovation success.
- 3) External environmental factors and organizational characteristic interact to influence the level of IT/S innovation readiness and the innovation development life cycle.
- 4) Tightly linked innovation development life cycle sub-dimensions enhance IT/S innovation readiness.

Based on extensive literature review, seven hypothetical innovation readiness sub-dimensions were identified for the model: resources; staffing and skill; technology; knowledge; process; values and goals; and operations. The purpose of the study was to identify and validate OITIM innovation readiness sub-dimensions were validated; resources; end-user; technology; knowledge; processes; value and goals; Management Structures; and administrative support [7]. The sub-dimensions and their definitions are presented in Table 1

Table 1. Sub-Dimensions and Definitions

Sub-Dimensions	Definitions
Resources	IT/S innovation support mechanisms.
End-User	End-user profile.
Technology	IT/S infrastructure (e.g. hardware, software, network, wiring and system integration).

Sub-Dimensions	Definitions
Knowledge	Organizational knowledge of external and internal driving forces influencing IT/S innovation.
Processes	Organizational processes that influence IT/S innovation.
Value & Goals	Individual and organizational values and goals supportive of IT/S innovation.
Management Structures	Organizational management structures and operations that influence IT/S innovation.
Administrative Support	Administrative leadership and practices supportive of IT/S innovation.

Source: Snyder [7]

The sub dimension and range of indicators per theme, along with highest number indicators are presented in the following table.

**Table 2.** Range of Indicators per Theme

Sub-Dimension	Range of Indicators Per Theme	Theme with Highest Number of Indicators
Resources	1-6	Financial Support
End-User	1-12	IT/S Skill and Experience
Technology	1-8	IT/S Infrastructure and Performance
Knowledge	2-8	<ul style="list-style-type: none"> <li>IT/S Budget and Finance Patters</li> <li>IT/S Strategic Planning Patterns</li> </ul>
Processes	1-6	IT/S Communications Process
Value & Goals	1-7	Corporate IT/S Philosophy
Management Structures	1-4	<ul style="list-style-type: none"> <li>Business Plan</li> <li>Communication Structure</li> <li>IT/S Organizational Structure</li> </ul>
Administrative Support	1-8	<ul style="list-style-type: none"> <li>Executive Champions for IT/S Projects</li> </ul>

		<ul style="list-style-type: none"> <li>Integration of Organizational and IT/S Strategies</li> </ul>
--	--	---

Source: Snyder [7]

Organizational Information Technology Innovation Model provides IT decision makers in organizations with an organizational assessment framework [7]. The framework defines several dimensions/factors that influence the project implementation. The dimensions are External environmental factors, organization characteristics and Information technology innovation readiness [7]. Seven innovation readiness sub-dimensions were identified for the model. The readiness sub-dimensions are: resources readiness, staffing and skills readiness, technology readiness, knowledge readiness, process readiness, values and goals readiness and operational readiness.

### 3. METHODS

To ensure the research objectives are achieved, and the research questions are answered thoroughly, the right methodology is necessary [2]. For this reason, this research activity was designed using a set of approaches and analyzes that were felt to be most appropriate to answer research questions. In addition, this study also involved various primary and secondary data sources in obtaining an accurate and comprehensive picture of the phenomena [6].

To analyze the internal conditions and innovation capabilities of Janabadra University, several questionnaires were distributed to employees, staffs, and university management -- both those involved in the IT-related division, and those in non-IT divisions. The questionnaire was then further analyzed to be assessed and verified. Through this process of discussion and workshop, it is expected that more comprehensive information will be obtained to develop strategic recommendations for Janabadra University as well as other higher education institutions that share similar characteristics.

In general, this research activity was designed as descriptive-exploratory and qualitative-quantitative research [2]. Descriptive-exploratory focus is directed at exploring information and providing an explanation of the dynamics of innovation occurring in higher education institution in Indonesia. The data and information used are qualitative and quantitative. All data and information obtained will go through the triangulation phase to verify and match existing phenomena and reality. The method of data collection is done through desk research, interviews with key informants, as well as a direct observation.

As for getting data related to Janabadra University's internal capabilities, this study uses the conceptual framework of OITIM [7]. Before being distributed, the questionnaire was translated into the Indonesian language. The questionnaire was then discussed with the research team to ensure compliance and confidentiality. Next, the

questionnaire was distributed online and offline by the author and the research team.

Janabadra University was established on October 7, 1958 by Mr. KPH. Soedarisman Poerwokoesoemo. His name is now enshrined to be the name of the Janabadra University Auditorium. Along with the enactment of Law No. 22 of 1961 concerning "Higher Education" the name was changed to the University of Janabadra.

The name Janabadra comes from the name of a native Javanese poet who lived in the seventh century named D'Nanabadra which later to facilitate his speech became Janabadra until now. At its inception the Janabadra University in Yogyakarta had three faculties namely the Faculty of Economics, Law and Engineering. Each faculty only organizes one study program, which is Corporate Management for the Faculty of Economics, Legal Studies for the Faculty of Law, and Civil Engineering for the Faculty of Engineering.

In the mid-1990s, the Janabadra University was included as one of the most interested private universities in Yogyakarta and at that time applicants accepted to study at the Janabadra University reached approximately 10,000 students. This condition lasted until 2006 when a large earthquake occurred in Yogyakarta. Currently there are 3,773 registered students at the Janabadra University with 139 lecturers and 119 employees, while there are 16,706 alumni from the Janabadra University.

Samples for this study are presented in Table 3 below. The average age of our respondents are 42.3 years old. Most of them have been working with Janabadra University for more than 10 years. The proportion of male and female are almost equal. Most of them are married, have permanent employment status, and have postgraduate educational background. Most of our respondents spend Rp100.001-Rp300.000 every day and spend Rp50.000-Rp100.000 per month for data/internet expenditure

**Table 3.** Descriptive Statistics

Variable	Item	n	%
Sex	Male	27	51.92%
	Female	25	48.08%
Marital Status	Married	45	86.54%
	Others	7	13.46%
Employment Status	Private Employee	1	1.92%
	Permanent Employee	40	76.92%
	Civil Servant	8	15.38%
	Contract Employee	1	1.92%
	Retired	1	1.92%
Educational Background	Senior High School	2	3.85%
	Diploma (D1/D3)	1	1.92%
	Undergraduate	7	13.46%

Variable	Item	n	%
	Postgraduate	35	67.31%
	Doctorate	7	13.46%
Average Daily Expenditures	<Rp100.000	13	25.00%
	Rp100.001-Rp300.000	32	61.54%
	Rp300.001-Rp500.000	3	5.77%
	>Rp500.000	4	7.69%
The Use of Internet	Rarely	0	0.00%
	Adequate	3	5.77%
	Often	18	34.62%
	Very often	31	59.62%
Monthly Internet Data Expenditures	<Rp25.000	1	1.92%
	Rp25.000-Rp50.000	7	13.46%
	Rp50.000-Rp100.000	20	38.46%
	>Rp100.000	24	46.15%
Length of Employment	1-5 years	7	13.46%
	5-10 years	3	5.77%
	>10 years	42	80.77%
Experience in IT	None	0	0.00%
	Low	2	3.85%
	Adequate	40	76.92%
	High	10	19.23%
	Very high	0	0.00%
Work Unit	BAAK	2	3.85%
	BAKU	1	1.92%
	BPM	1	1.92%
	FE	28	53.85%
	FH	6	11.54%
	FP	2	3.85%
	FT	4	7.69%
	LP3M	2	3.85%
	MM	1	1.92%
	MTS	1	1.92%
	Library	1	1.92%
	Rectorate	2	3.85%
Siskom	1	1.92%	
Type of Work	Non-IT related	21	40.38%
	IT related	31	59.62%

## 4. RESULTS AND DISCUSSIONS

### 4.1. Validity and Reliability Analysis

Validity to be able to state that the instrument is valid is to test the level of significance of the correlation between the indicator and the total construct score  $<0.05$ . Pearson correlation coefficient for our sample is  $r = 0.7569$  and  $p\text{-value} = 0.0182$ .

To be considered as reliable, the total Cronbach's alpha coefficient is higher than 0.8 and the coefficients of each factor are lower than 0.7. The detailed description of our data are presented in Table 4 below

**Table 4.** Cronbach Alpha and Related Statistics

Items	Cronbach Alpha	Std. Alpha	G6(smC)	Average R
All itmes	0.9589	0.9587	0.999	0.3128
X1.1 excluded	0.9587	0.9585	0.9988	0.3158
X1.2 excluded	0.9586	0.9584	0.9986	0.3152
X1.3 excluded	0.959	0.9588	0.9985	0.3175
X1.4 excluded	0.9583	0.958	0.9984	0.3134
X1.5 excluded	0.958	0.9578	0.9986	0.3123
X1.6 excluded	0.9575	0.9573	0.9988	0.3098
X2.1 excluded	0.9595	0.9593	0.9984	0.3203
X2.2 excluded	0.9593	0.9591	0.9986	0.3193
X2.3 excluded	0.9588	0.9586	0.9986	0.3166
X2.4 excluded	0.9596	0.9592	0.9983	0.3197
X2.5 excluded	0.9581	0.9578	0.9984	0.3123
X2.6 excluded	0.9582	0.9579	0.9983	0.313
X3.1 excluded	0.958	0.9578	0.9988	0.3122
X3.2 excluded	0.9576	0.9573	0.9981	0.3097
X3.3 excluded	0.9582	0.9579	0.9984	0.3129

Items	Cronbach Alpha	Std. Alpha	G6(smC)	Average R
X3.4 excluded	0.9582	0.958	0.9987	0.3134
X3.5 excluded	0.9577	0.9575	0.998	0.3109
X3.6 excluded	0.9574	0.9572	0.9984	0.3091
X3.7 excluded	0.9575	0.9572	0.9989	0.3092
X4.1 excluded	0.9574	0.9572	0.9986	0.309
X4.2 excluded	0.9583	0.958	0.9988	0.3134
X4.3 excluded	0.9579	0.9577	0.9983	0.3114
X4.4 excluded	0.9576	0.9574	0.9987	0.31
X4.5 excluded	0.9583	0.9581	0.9986	0.3136
X4.6 excluded	0.9582	0.9579	0.9985	0.3128
X4.7 excluded	0.9579	0.9576	0.9985	0.3114
X4.8 excluded	0.9584	0.9581	0.9987	0.3139
X4.9 excluded	0.9577	0.9575	0.9985	0.3104
X5.1 excluded	0.9579	0.9576	0.9987	0.3113
X5.2 excluded	0.9583	0.958	0.9985	0.3133
X5.3 excluded	0.958	0.9578	0.9987	0.3122
X5.4 excluded	0.9577	0.9574	0.9984	0.3102
X5.5 excluded	0.9576	0.9573	0.9986	0.3097
X5.6 excluded	0.959	0.9589	0.9982	0.3183
X5.7 excluded	0.9579	0.9576	0.9986	0.3114
X5.8 excluded	0.9582	0.958	0.9986	0.3131

Items	Cronbach Alpha	Std. Alpha	G6(sm)	Average R
X5.9 excluded	0.9583	0.958	0.9983	0.3134
X5.10 excluded	0.9585	0.9583	0.9985	0.3148
X6.1 excluded	0.9597	0.9594	0.9987	0.3211
X6.2 excluded	0.9571	0.957	0.9981	0.3081
X6.3 excluded	0.9576	0.9574	0.9985	0.3101
X7.1 excluded	0.9581	0.9579	0.9986	0.3128
X7.2 excluded	0.9575	0.9573	0.9989	0.3094
X7.3 excluded	0.9576	0.9574	0.9982	0.3102
X7.4 excluded	0.9576	0.9574	0.9986	0.3099
X7.5 excluded	0.9577	0.9574	0.9987	0.3101
X7.6 excluded	0.9575	0.9573	0.9985	0.3094
X7.7 excluded	0.9585	0.9583	0.9986	0.3149
X7.8 excluded	0.9584	0.9582	0.9989	0.3143
X8.1 excluded	0.9584	0.9582	0.9985	0.3141
X8.2 excluded	0.9585	0.9582	0.9986	0.3144

**4.2. Innovation Capability Analysis**

By borrowing the OITIM theorem [7], online questionnaires are compiled and distributed internally for further analysis. Filling out questionnaires involves all employees, both those related to IT and in business (non-IT). The results of our analysis is presented in Table 5 below.

**Table 5.** OITIM Questionnaire Results

		Overall	IT	Non-IT
Resources	Mean	3.24194	3.3718	3.1984
	Stdev	0.84648	0.8526	0.8270
End-user	Mean	3.41398	3.4551	3.4603
	Stdev	0.87163	0.8094	0.8422

		Overall	IT	Non-IT
Technology	Mean	3.01843	3.1209	3.0136
	Stdev	0.90718	0.8344	0.8629
Knowledge	Mean	3.10036	3.1538	3.0847
	Stdev	0.88387	0.8251	0.8522
Process	Mean	3.25448	3.2671	3.1111
	Stdev	0.81641	0.7687	0.8135
Values and goals	Mean	3.54839	3.4936	3.2063
	Stdev	0.97857	0.9266	0.9350
Management structure	Mean	3.16129	3.2380	3.0179
	Stdev	0.88632	0.8286	0.8633
Administrative support	Mean	3.37097	3.4327	3.4524
	Stdev	0.80326	0.7695	0.7352

Referring to the OITIM scale (1 to 7), it can be seen that the scores obtained indicate that Janabadra University is considered to be slightly above average, or 4.8 out of 7.0 (see Table 6). The lowest mean are resources, followed by administrative support and end users. On the other hand, the highest contributing factors are knowledge, management structure, and technology. This implies that if Janabadra University wants to improve its IT/S capabilities, the university has to focus on those factors with the lowest mean score: resources, administrative support, and end users.

**Table 6.** OITIM Calculation

	Standard Deviation	Mean
Resources	1.90	4.5
End Users	1.50	4.8
Technology	1.82	5.0
Knowledge	1.88	5.0
Process	1.90	4.9
Values and Goals	1.70	4.9
Management Structure	1.61	5.0
Administrative Support	1.55	4.6
<b>Total</b>		<b>4.8</b>

**5. CONCLUSION**

As expected, the overall IT/S capabilities of the university can be considered to be above average. This is very important for any university, including Janabadra University, to improve and enhance their strategic capabilities [7]. However, when we take a look closely, resources, administrative support, and end users are among the contributing factors that have to be assessed and

examined further. If Janabadra University wants to enhance its overall capability, then those factors should become the first priority.

All in all, as this research suggests, the development of the innovative capabilities of university such as Janabadra University is generally above average. In responding to the current dynamics of technological innovation in higher education institutions, several suggestions and recommendations can be implemented. For example, the university could invests more in tangible and intangible resources, provides better administrative supports, and trains their end-users to utilize IT/S more effectively.

## REFERENCES

- [1] C. M. Christensen, H. J. Eyring, *The Innovative University: Changing the DNA of Higher Education from the Inside Out*. John Wiley & Sons, 2011.
- [2] J. W. Creswell, *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*, 2nd eds. Sage: Thousand Oaks, CA, 2003.
- [3] E. C. Egan, B. J. McElmurray, H. M. Jameson. *Practice-based research: assessing your department's readiness*, *Journal of Nursing Administration*, vol. 10, 1981, pp. 26-32.
- [4] N. Iman, *Traditional banks against fintech startups: A field investigation of a regional bank in Indonesia*, *Banks and Bank Systems*, vol. 14(3), 2019, pp. 20-33.
- [5] G. L. Ingersoll, J. C. Kirsch, S. E. Merk, J. Lightfoot, *Relationship of organizational culture and readiness for change to employee commitment to the organization*. *Journal of Nursing Administration*, vol. 30(1), 2000, pp. 11-20.
- [6] M.B. Miles, A.M. Huberman, *Qualitative Data Analysis: An Expanded Sourcebook*, 2nd ed., Sage publication: Thousand Oaks, 1994.
- [7] R. Snyder-Halpern, *Indicators of organizational readiness for clinical information technology/systems innovation: a Delphi study*. *International Journal of Medical Informatics*, vol. 63(3), 2001, pp. 179-204.
- [8] T. A. Stewart, *Your company's most valuable asset: intellectual capital*. *Fortune*, October 3, 1994, pp. 68-74
- [9] G. Zaltman, R. Duncan, & J. Holbek, *Innovations and organizations*, New York: Wiley, 1973.