

Information Technology Adoption in Islamic Higher Education Institutions in Indonesia

Yusuf Amrozi^{1,2}, Mujib Ridwan¹, and Eni Purwati¹

¹Department of Information System, Sunan Ampel State Islamic University, Surabaya, Indonesia

²Department of Management, Airlangga University, Surabaya, Indonesia

¹Department of Technology, Sunan Ampel State Islamic University, Surabaya, Indonesia

¹Faculty of Islamic Education, Sunan Ampel State Islamic University, Surabaya, Indonesia

Keywords: IT Adoption, Organizational Capabilities, SCA, NU University.

Abstract: Business in the higher education sector in Indonesia, especially in the environment of private Islamic higher education, has been showing a significant increase. The winner is largely determined by the business strategies designed, supported by organizational resources, rarity, difficulty to imitate the product, and difficulty to substitute the product, in order to create a sustainable competitive advantage. According to the existing research, support for ERP (enterprise resource planning) information system plays an important role in realizing organizational capabilities towards a sustained competitive advantage (SCA). This research focused on the extent of information technology adoption to encourage Islamic higher education institutions—especially NU Universities—to realize a competitive advantage in order to win the competition. The results show that IT Adoption did not have any significant effect on Organizational Capabilities and Sustained Competitive Advantage, but Organizational Capabilities had a significant effect on Sustained Competitive Advantage. Implications of the research findings will be discussed.

1 INTRODUCTION

Higher education institutions in Indonesia, especially the private ones which are based on Islamic religion and fostered by the Ministry of Religious Affairs, show a significant increase in number, now numbering more than 6,000 (Directorate of Islamic Higher Education–Ministry of Religious Affairs, 2017). The development of higher education amid competition is largely determined by the business strategies designed, supported by the management of rare, valuable, hard-to-imitate resources, creating a sustainable competitive advantage (Barney, 1991). Porter (2008) explains that a competitive advantage basically develops from a value that can be created by a company for its buyers and exceeds the cost of the company that created it. The resources for developing a competitive advantage are the core competencies owned by a company or organization.

In the Indonesian context, the existence of private universities is heavily influenced by organizations or social groups affiliated with religious professions or organizations. In Indonesia, the majority of the population are Muslims. Some of them are affiliated

with religious organizations. These religious organizations were established prior to the state of Indonesia establishment or during the colonial period. There are two major Islamic religious organizations in Indonesia: Nahdlatul Ulama (NU) and Muhammadiyah. The subjects of this research were private Islamic universities affiliated with Nahdlatul Ulama (Nahdlatul Ulama universities). The reason why the researchers focused on Nahdlatul Ulama universities is that early in its development, NU emphasized not secular sciences, but religious education. However, in the last 20 years, it has been concentrating on the establishment of higher education. For quick reference, NU is a civil organization founded by Islamic clerics in 1926 when Indonesia was still in the colonial period. Of the 250 million Indonesian people 90 million join this organization. The distinct characteristic of the NU-style Islamic religion is that it combines the Middle Eastern Islamic values with local values prevailing in a given period. Therefore, later in its development, NU is known as a moderate community organization tolerant toward other traditions, cultures, and tribes or groups. Institutionally, NU universities are managed

by legal entities, either foundations or legal entities of NU associations, of 250 institutions (Data of the National Board of Nahdlatul Ulama/PBNU, 2018).

The growing number of NU universities poses a challenge to their management in generating competitive advantages in order to win the market competition. Competitive advantages can be gained through the application of information technology (Aggarwal, 2017). Information technology can meet the information needs of the business world quickly, effectively, accurately, and relevantly. In addition, to companies, information technology has an important role in the strategy to obtain competitive advantages. Information technology will contribute an effect on almost all aspects of business management and can provide an added value if properly managed and designed into an effective information system. Jogyanto (2007) argues that the information technology system has developed very rapidly and is seen to be quite significant in this era. In relation to the development of higher education, Indrajit (2013) argues that universities can utilize information technology in three ways: by providing support for services and administration; by using it as a teaching aid and means of communication; and by using it for decision-making.

Therefore, it is necessary to support ERP (enterprise resource planning) information systems, such as academic information systems, which can play a real role in realizing organizational capabilities toward a sustained competitive advantage (SCA). The early view of the research target (NU Universities) in relation to the adoption and use of information technology, according to the vision, is how to become excellent universities in the national and local contexts to be able to compete with other universities, especially Islamic universities, in Indonesia. Meanwhile, the vision of IT utilization is how IT is able to support the universities' operational performance. In fact, based on preliminary observations, some technological mastery and environmental problems were found, requiring more in-depth research.

This research focused on how far the adoption of ERP information technology encourages private higher education institutions to realize competitive advantages that can empower them to win the competition eventually. This research was conducted quantitatively at NU universities as private universities in Indonesia which had adopted information technology.

Some studies have been carried out by several researchers, for example, one by Miranda et al. (2016) on the adoption of ERP technology at non-profit organizations such as higher education organizations.

The results of the study show that process factors and administrative service innovations that used technology could effectively reach organizational goals. The connection with our research is that at NU universities, the adoption of information technology is relatively new. Meanwhile, Abugabah, Sanzogni, and Alfarraj (2015) examined the impact of the implementation of ERP information systems in universities. The results of the study indicate that the quality of the system adopted at a university, the suitability of the role of technology, and the quality of information were the most important factors in the university's performance. Another study was conducted by Melitski and Gavin (2010), which was about technology adoption and organizational culture in public organizations. The study found that there was a relationship between individuals' perception of organizational culture and their willingness to adopt a technology.

None of the related research that we have described above studied other factors besides the use of technology, for example, an organization's capabilities to improve its performance. Therefore, the addition of the factor organizational capabilities is expected to be a differentiator from previous studies in relation to factors of technology adoption in higher education.

2 LITERATURE REVIEW

2.1 IT Adoption

Adoption is a person's new behavior in accordance with the background of knowledge, awareness, and attitude towards excitement or stimuli (Notoatmodjo, 2003). Adoption may essentially be interpreted as the process of accepting an innovation and/or changing good behavior in the form of knowledge (*cognitive*), attitude (*affective*), and skill (*psycho-motoric*) after receiving the "innovation" received by a target community. In this context, "adoption" refers to the stage at which technology is accepted and preferred to be used by an individual or organization.

Technology adoption basically aims to raise human awareness of learning technology, with a technology being utilized, applied, and adopted to improve the quality of learning in all aspects of life. As Prawiradilaga (2012) says, the existence of technology in education permits the programming of education, thus an educational process can be organized and detailed. This includes a technology model that is intentionally created to facilitate the learning process to achieve educational goals.

According to the explanation above, it can be seen that the adoption of an information technology is the

release of an idea (innovation) until it is accepted and implemented by someone so that it becomes a behavior which is a combination of knowledge (*cognitive*), attitude (*affective*), and skills (*psychomotor*) in using information technology. In the context of technology adoption and organizational environment changes, Aggarwal (2017) points out two influencing factors, namely inducement to adapt and difficulty of adaptation.

2.2 Organizational Capabilities

An organizational capability is defined as the ability of a company to mobilize both tangible and intangible resources in order to perform tasks or activities to improve its performance (Amit and Schoemaker, 1993; Grant, 1991; Teece et al., 1997). Helfat and Peteraf (2003) define it as an organization's ability to coordinate a series of tasks to utilize organizational resources to achieve its ultimate goal.

Organizational capability is very important for an organization to solve organizational problems effectively. Sampurno (2011) describes capabilities as representing a set of integrated sources used to carry out important activities. The ability is integrated into the knowledge (capability) and skills of workers or individuals in the company or organization.

Furthermore, Sampurno (2011) explained that organizational capability is the capacity of an organization to place and utilize resources to fulfil its desires and achieve expected outcomes. Organizational capability requires a variety of individual skills that are integrated with technology, equipment, and various other resources.

According to Teece (2017), organizational capabilities go through three processes, namely sensing, seizing, and transforming. Meanwhile, Gurkan (2015) states that a collaboration can take place in two ways: strategy development and implementation as well as continuous improvement process.

2.3 Sustained Competitive Advantage

According to Schermerhorn (2011), a competitive advantage is the ability to do something so well that one outperforms competitors. Kotler and Armstrong (2015) define competitive advantage as an advantage over competitors obtained by offering value to consumers, either through lower prices or by providing more benefits that support higher price revenues. David (2010) describes competitive advantage as a situation where a company can do

something and other companies cannot or has something their competitors want.

Grant (2011) proposes five steps to achieve competitive advantages through the company's resources:

1. Identifying and classifying resources that can affect the strengths and weaknesses of the company.
2. Combining the strength of the company with the specific capabilities of the company. Company capability (commonly referred to as core competence) is everything that the company can do very well. When the capability/competency is superior to its competitors', it becomes a special competence for the company.
3. Assessing the potential benefits of the resources and the potential capabilities the company has to be able to gain benefits generated and to achieve a sustainable competitive advantage.
4. Selecting strategies that can well exploit the company's resources and capabilities to achieve *external opportunities*.
5. Identifying resource gaps and invest in transforming weaknesses into strengths.

Competitive advantages in this research can be measured by three indicators proposed in Tuan and Yoshi's research (2010):

1. Cost strategy, measured by emphasizing cost reduction through process innovation in the operating system business, investment in machinery, and increase in employee productivity and operations.
2. Quality strategy, measured through product quality, strict quality control, fulfilment of customer needs, and handling of customer's product requirements.
3. Innovation strategy, measured by the level at which the company strives to introduce new products, emphasis in the innovation in the production process, and engagement in new marketing.

Barney (1991) explains that, based on Resource Base theory, a competitive advantage needs to be sustainable (*sustained competitive advantage*). In his opinion, there are five pre-requisites for the creation of a sustainable competitive advantage. The company must have organizational resources which are (a) valuable, (b) substitutable, (c) imitable, and (d) rare.

3 RESEARCH METHODS

In this study, data were collected using questionnaires and analysed quantitatively. This research is categorised as causal research because one variable as an independent variable was related to another variable as a dependent variable. According to Sugiyono (2014), a causal relationship is a relationship in which independent variables (affecting variables) are related to a dependent variable (influenced variable).

Population is an area of generalization consisting of objects or subjects that have the quality and characteristics set by researchers to be studied and from which conclusions are drawn (Sugiyono, 2014). The population in this study consisted of all of the 250 Islamic private higher education institutions in Indonesia which were affiliated with Nahdlatul Ulama. The sample used consisted of NU universities spread across East Java and outside East Java, such as those in Central Java, West Java, Jakarta, Sumatera, Kalimantan, and Sulawesi. Nonetheless, the majority of members of NU and NU universities were more likely to be spread in East Java province. The analysis unit was institutional (one questionnaire for each campus). There were 52 validated questionnaires.

3.1 Hypotheses

- H1 : IT Adoption has a significant effect on Sustained Competitive Advantage.
 H2 : IT Adoption has a significant effect on Organizational Capabilities.
 H3 : Organizational Capabilities have a significant effect on Sustained Competitive Advantage.

3.2 Operational Definition

3.2.1 IT Adoption (X_1)

IT Adoption is the release of an idea (innovation) until it is accepted and implemented by someone so that it becomes a behavior which is a combination of knowledge (cognitive), attitude (affective), and skills (psychomotor) in using information technology. The indicator of the variable IT Adoption, according to Aggarwal (2017), are the following:

1. *Inducements to adapt*
 In this context, researchers operationalized into five things, namely: encouragement of IT acceptance from organizational culture, organizational conditions, internal drive to

adopt IT, and encouragement from external stakeholders.

2. *Difficulty of adaptation*

In this context, researchers operated into three things, namely: resistance of the organizational culture in adopting IT, organizational resource conditions, and the absence of external stakeholders who help adopt IT.

3.2.2 Organizational Capabilities (X_2)

Organizational Capabilities are the capacity of an organization to place and utilize resources to fulfil its desires and achieve expected outcomes. The indicators of the variable Organizational Capabilities, according to Teece (2017) and Gurkan (2015), are as follows: (a) Sensing; (b) Seizing; (c) Transforming; (d) Strategy of Development & Implementation; and (e) Continuous Improvement Process.

3.2.3 Sustained Competitive Advantage (Y)

Sustained Competitive Advantage (SCA) is an advantage over competitors that is obtained by offering values to consumers, either through lower prices or by providing more benefits that support higher price revenues. The indicators of the variable Sustained Competitive Advantage, according to Barney (1991), are as follows: (a) Rarity; (b) Substitutability; (c) Imitability; and (d) State of Being Valuable.

In the context of this research, the four SCA indicators above were transformed into higher education performance that could be operationalized better, namely (a) SCA implications for the performance of college, (b) institutional reputation, (c) graduates' achievements, and (d) product knowledge.

3.3 Data Collection Technique

The method used by the researchers in this research was a survey method using questionnaire. According to Sugiyono (2014), questionnaire is a data collection technique that is carried out by giving a set of written statements to respondents to be responded to. A Likert scale was used. The variables measured by the Likert scale were re-elaborated into sub-variables, which were reinterpreted into components that could be measured.

3.4 Data Analysis Technique

The analysis technique chosen to analyze the data and test the hypotheses in this study was Structural Equation Model (SEM). To answer the hypotheses, Partial Least Square (PLS) was used. Calculations were carried out using Smart Partial Least Square (PLS) following Ghozali (2012) due to the multi-lane shape and model used in the form of reflective. The calculations were performed using Smart PLS because this study had a multi-lane, formative, reflective relationship.

4 DATA ANALYSIS

The analysis used structural model testing to specify the relationship between research variables. In some references it is referred to as the inner model. The results of the suitability analysis of the structural model built show that the overall model was "relevant" to explain the variables studied and their relationship between each other. The Q2 value calculated was 0.579. It exceeded the critical limit of 0.5, and, thus, the structural model was declared suitable and appropriate.

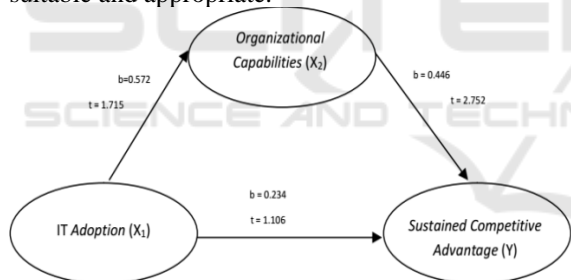


Figure 1: Research findings

The exogenous variables studied in the inner model were IT Adoption and Organizational Capability, while the endogenous variable was Sustained Competitive Advantage. The results of the inner weight shown in Figure 1 above shows that the variable Sustained Competitive Advantage was influenced by the variables IT Adoption and Organizational Capabilities, while the variable Organizational Capabilities was influenced by the variable IT Adoption following the equation below:

$$Y = 0.234 X_1 + 0.446 X_2$$

$$X_2 = 0.572 X_1$$

The effect of the variable IT Adoption on the variable Organizational Capabilities had an R² score of 0.328, which indicates a "weak" model.

Meanwhile, the effect of the variables IT Adoption and Organizational Capabilities on the variable Sustained Competitive Advantage had an R² score of 0.373, which indicates a "moderate" model.

4.1 Hypothesis testing

The first hypothesis in this study was not proven true because the results of the data analysis show a t value of 1.106, which was smaller than 1.96. Thus, it can be said that IT Adoption had no significant effect. However, it had a positive direction toward Sustained Competitive Advantage. The positive relationship that occurred indicates that better IT Adoption would be increasingly able to improve Sustained Competitive Advantage at a value of 0.234.

The second hypothesis in this research was not proven true because the results of the data analysis show a t value of 1.715, which was smaller than 1.96. Thus, it can be said that IT Adoption had no significant effect but had a positive direction toward Organizational Capabilities. The direction of the relationship between the two variables was positive, which means that better IT Adoption would be able to increase Organizational Capabilities at a value of 0.572.

The third hypothesis in this research was proven true because the results of the data analysis show a t score of 2.752, which was greater than 1.96. Thus, it can be said that Organizational Capabilities had a significant influence on Sustained Competitive Advantage. The direction of the relationship between the two variables was positive, which means that better Organizational Capabilities would be able to improve Sustained Competitive Advantage at a value of 0.446.

5 RESULTS AND DISCUSSION

The results of the data analysis show that IT Adoption had no significant effect but had a positive direction toward Sustained Competitive Advantage. With a t score of 1.106, which was smaller than 1.96, it can be explained that an increase in Sustained Competitive Advantage could not necessarily be formed through good IT Adoption. The effect of IT Adoption on Sustained Competitive Advantage was positive, which shows that the better IT Adoption, the greater the Sustained Competitive Advantage.

The findings in this study indicate that IT Adoption had an important role in enhancing the Sustained Competitive Advantage of private Islamic higher education institutions in Indonesia. Thus, if the

universities want to improve their Sustained Competitive Advantage, it is critical to pay attention to IT Adoption. This is relevant to Aggarwal's research (2017), which shows that IT Adoption played an important role in realizing organizational performance, which in the context of this research was Sustained Competitive Advantage.

The results of the analysis also show that IT Adoption had no significant effect but had a positive direction toward Organizational Capabilities. With a t value of 1.715, which was smaller than 1.96, it can be explained that an increase in Organizational Capabilities might not be formed through good IT Adoption. The influence of IT Adoption on Organizational Capabilities was positive, which indicates that better IT Adoption would be able to improve Sustained Competitive Advantage.

The findings of this study prove that IT Adoption played an important role in increasing Organizational Capabilities. In other words, the organizational capabilities of a higher education institution could be formed with good IT Adoption. Therefore, if it wants to increase its organizational capabilities, it is necessary for it to pay attention to IT adoption. This result is in line with the research conducted by Azim and Sattar (2011), which proved that IT adoption affects organizational capabilities.

The results of the analysis also prove that Organizational Capabilities had a significant influence on the Sustained Competitive Advantage of private universities as evidenced by a t score of 2.752, which was greater than 1.96. Thus, it can be explained that an increase in Sustained Competitive Advantage could be formed by good Organizational Capabilities. The influence of Organizational Capabilities on Sustained Competitive Advantage was positive, which shows that the higher the Organizational Capabilities possessed, the greater the Sustained Competitive Advantage.

The findings in this study prove that Organizational Capabilities played an important role in improving the Sustained Competitive Advantage of private universities. In other words, Sustained Competitive Advantage of private universities could be formed by the Organizational Capabilities of the private universities. Wang and Ang (2004) revealed that Sustained Competitive Advantage is generated by organizational capabilities that are measured by reducing costs, quality, and innovation. Tuan and Yoshi (2010) explain that Organizational Capabilities are the skills or expertise of employees or intangible resources such as reputation or culture.

6 CONCLUSIONS AND SUGGESTIONS

The researchers concluded the following: (a) in the case of this study, IT Adoption did not have any significant effect on Sustained Competitive Advantage; (b) IT Adoption had no significant effect on the Organizational Capabilities of private Islamic higher education institutions; and (c) Organizational Capabilities had a significant effect on Sustained Competitive Advantage. It is recommended that the next research should explore why IT Adoption has no significant influence on SCA and Organizational Capabilities. It is also necessary to conduct comparative studies on different research objects, for example, public universities with different cultures and resource conditions.

The results of the study have the following managerial implications: (a) for private Islamic universities to be able to improve their sustained competitive advantage, especially in terms of organizational resources optimisation, it is necessary to pay attention to cost efficiency strategies, quality strategies, and innovation strategies (Tuan and Yoshi (2010), and (b) a higher education institution can improve its sustained competitive advantage through IT adoption, in combination with the formulation of appropriate strategies to encourage the performance of organizational capabilities.

REFERENCES

- Aggarwal, et al. 2017. *Adaptive Capacity to Technological Change: A Microfoundational Approach*. Strategic Management Journal, 38: 1212–1231.
- Abugabah, Sanzogni, Alfarraj, 2015. *Evaluating the impact of ERP systems in higher education*, The International Journal of Information and Learning Technology, Vol. 32 Iss 1 pp. 45 - 64 <http://dx.doi.org/10.1108/IJILT-10-2013-0058>
- Armstrong, Kotler, 2015. *Marketing an Introducing Prentice Hall twelfth edition*. England: Pearson Education, Inc.
- Azim, M., Ali, A., and Sattar, J. 2011. *Factors influencing adoption of information technology based banking services (a case study of pakistan)*. IEEE Computer Society, 45-50

- Barney, J. B. 1991. *Firm Resources and Sustained Competitive Advantage*. Journal of Management 17: 99–120.
- David, Fred R. 2010. *Strategic Management: A Competitive Advantage Approach, Concepts and Cases (13th Edition)*. Prentice Hall International, London.
- Ghozali, I. 2012. *Aplikasi Analisis Multivariate dengan Program IBM SPSS*. 20. Semarang: Undip.
- Grant, R. M., 2011. *The Resource - Based Theory of Competitive Advantage: Implications for Strategy Formulation*. California Management Review. 33 (3). Pp. 114-135
- Gurkan, I. G., & Bititci, Umit Sezer., 2015. *Understanding Organizational Capabilities and Dynamic Capabilities in the Context of MicroEnterprises: A Research Agenda*. Procedia - Social and Behavioral Sciences. DOI: 10.1016/j.sbspro.2015.11.371
- Indrajit, Richardus Eko, 2013. *Menilai Kesiapan Kampus dalam Menerapkan Teknologi Informasi dan Komunikasi*, Presented on https://www.academia.edu/14370907/Menilai_Kesiapan_Kampus_dalam_Menerapkan_Teknologi_Informasi_dan_Komunikasi?auto=download
- Jogiyanto. 2007. *Sistem Informasi Keperilakuan*. Yogyakarta: Andi.
- Melitski, David Gavin, Joanne Gavin, 2010. *Technology adoption and organizational culture in public organizations*, International Journal of Organization Theory & Behavior, Vol. 13 Issue: 4, pp.546-568, <https://doi.org/10.1108/IJOTB-13-04-2010-B005>
- Miranda, et al. 2016. *Technology Adoption in diffusion of innovations perspective: introduction of an ERP System in a non-profit organization*, RAI Revista de administracao e inovacao 13 (2016) 48—57.
- Notoatmodjo, S. 2003. *Pendidikan dan Perilaku Kesehatan*. Rineka. Cipta. Jakarta.
- Prawiradilaga. 2008. *Mozaik Teknologi Pendidikan*. Jakarta: Kencana Prenada Media Group.
- Sampurno. 2011. *Manajemen strategi*. Gadjah Mada University Press: Yogyakarta
- Schermerhorn, J. R. 2011. *Organizational behavior*. New Jersey: Prentice Hall Inc.
- Sugiyono. 2014. *Metode penelitian kuantitatif, kualitatif, dan R&D*. Bandung: Alfabeta.
- Teece, David J., 2017. *Dynamic Capabilities and (Digital) Platform Lifecycles*, in Jeffrey Furman , Annabelle Gawer , Brian S. Silverman , Scott Stern (ed.) Entrepreneurship, Innovation, and Platforms (Advances in Strategic Management, Volume 37) Emerald Publishing Limited, pp. 211 – 225
- Tuan, N. P., dan Yoshi, T. 2010. *Organisational capabilities, competitive advantage and performance in supporting industries in Vietnam*. Asian Academy of Management Journal, Vol. 15, No. 1, 1–21
- Wang, C. K., dan Ang, B. L. 2004. *Determinants of venture performance in Singapore*. Journal of Small Business Management, 42(4), 347–363.