Digital Branch: Competitive Advantage of Banking in Indonesia Through Information and Communication Technology to Face the 4 th Industrial Era

by Agus Riyanto

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Digital Branch: Competitive Advantage of Banking in Indonesia Through Information and Communication Technology to Face the 4th Industrial Era

Agus Riyanto[1,5], Ina Primiana[2], Yunizar[3], Yudi Azis[4]

Abstract:

This research look at the influence of information and communication technology on operational services' changes from conventional to digital on the process of deposits opening with digital branch through business process reengineering (BPR) to achieve competitive advantage.

This research uses mixed methods, namely quantitative method through SEM SmartPLS statistical test to measure how the influence of information and communication technology on business process engineering to achieve competitive advantage and qualitative methods with development through the IDEF0 framework model through digital branch. Conventional services, customers served by customer service banks to make deposit opening transactions.

The innovation in the operational service of digital deposit opening through digital branch makes it become superior for Indonesian banking to compete with other existing banks and improve services to customers.

Keywords: *Business Process Reengineering, Information and Communication Technology and Model Framework IDEF0.*

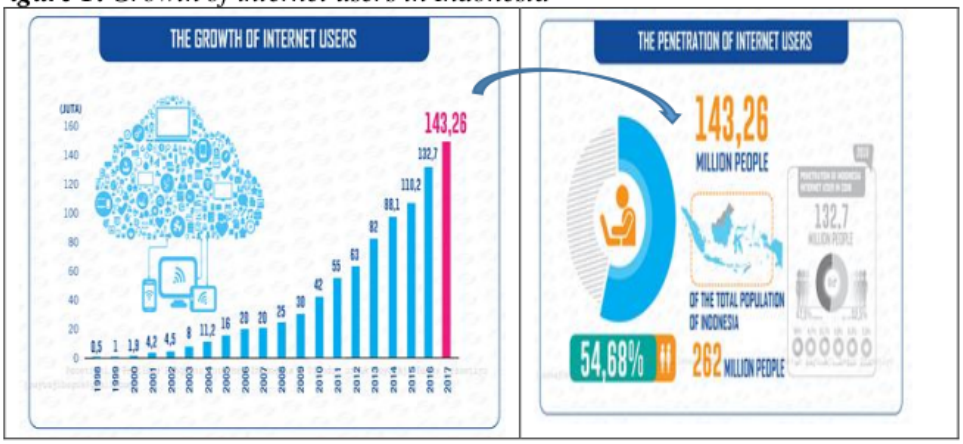
JEL code: *A12, B16, B21, B30, B41, B50, C21.*

[1]*Universitas Padjadjaran, Faculty of Economic and Business, Doctoral Science and Management*
2 *Universitas Padjadjaran, Faculty of Economic and Business, email: ina.primiana@unpad.ac.id*
3 *Universitas Padjadjaran, Faculty of Economic and Business, email: yunizar2016@unpad.ac.id*
4 *Universitas Padjadjaran, Faculty of Economic and Business, email: yudi.azis@unpad.ac.id*
5 *Universitas Komputer Indonesia, Faculty of Engineering, email corespondence: agus.riyanto@email.unikom.ac.id*

1. Introduction

Changes to the digital economy has brought the world on business transformation through the industrial revolution which is currently at the stage of 4.0 era (an era of the internet) by using digital technology. For this reason, another strategy undertaken by the Indonesian government regarding financial inclusion is digital financial services (DFS). Internet users in Indonesia have experienced an increase from year to year. According to Siregar A.E (2016), a report by the Indonesian Internet Service Provider Association in November 2015 that in Indonesia, internet users amounted to 88.1 million (34% of the population), social media users amounted to 79 million (31%) and mobile users were 318.5 million (125%). In figure 1. explaining the increase that occurred in 2017, internet users in Indonesia reached 143.26 million (54.68% of the population). This shows that the use of digital technology in Indonesia is very large.

Figure 1. *Growth of internet users in Indonesia*



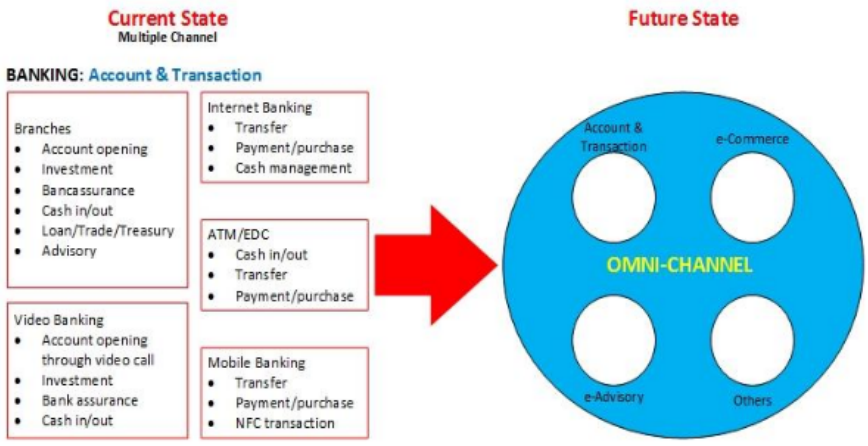
Source: *Indonesian internet service provider association, 2017.*

Competitive advantage can occur if information technology is implemented according to Breznik Lidija, (2012). This is supported by the statement that information technology through knowledge, operations and objects has a strong influence with competitive advantage according to Ong (2008). Competitive advantages are currently being carried out in the implementation of digital branch in banking in Indonesia. However, the implementation of digital branch have not been implemented in all banks in Indonesia, only 8 banks (9.64%) in Indonesia which have implemented the digital branch implementation policy, there are still 75 banks (90.36%) that have not yet implemented digital branch. With the existing of digital branch, banks will be able to increase profits because the number of branch offices will decrease so that operational costs will also decrease. This research is contrary to the opinion from Akhisar Batu and Necla Tunay (2015) which states that banking performance comes from profits due to the number of branch offices.

Competitive advantage can be done through business process reengineering (Hammer and Champy, 1993) that is carried out in its business process. The current performed business process is to transform conventional operational services into digital operational services through digital branch. This research is in line with the opinion of Magutu Peterson *et al*. (2010) which explains that a competitive advantage can be achieved if a company carries out business process reengineering in business processes towards digital. To improve competitive advantage in banking, it can be achieved in specific, simple and strong business processes, use of information and communication technology, and focus on services to customers so that they can attract more customers from the market. Information technology has a strong relationship with business process reengineering and performance (Huang Yan Shaio *et al*., 2014). The same thing was explained by research from Maroofi Fakhraddin *et al*. (2013), which said that Information Technology has a strong influence with business process reengineering, internal process business, organization, customer satisfaction and financial performance.

Development of bank operational services in the future by using digital branch in its branch offices. The technology developed for the implementation of digital branch such as shown in Figure 2 is caused by the rapid development of information and communication technology, changes behavior in people's lifestyles according to the development of information and communication technology, customer needs for effective and efficient service. Can be accessed wherever and whenever, the current banking industry competition and banking needs in a more efficient and integrated operation.

Figure 2. *Digital branch implementation technology*



Source: *Lintasarta, 2016*.

Osano and Okwena (2015) explain one of the systems used in business process reengineering is the use of information and communication technology that cannot be ignored during the radical redesign of an organization. Information and communication technology explains changes in organizations, especially changes

in the nature of work, integration of business functions, and transformation to compete. The ability of management information systems explains the extent to which an organization is equipped with information technology infrastructure, knowledge and experience of information technology skills and the utilization of effective information technology operations. Feldmann (1998) says that a business process reengineering can be developed and supported properly using the IDEF0 (Integration Definition Language 0) framework model. The results of this research are also supported by research conducted by Dachyar and Novita (2016) and research from Tsironis *et al*. (2018) which explains that a model created can be developed with the IDEF0 framework model because this model can be easy in reading a change model on business processes in organizations.

The high level of use of information and communication technology enables the smooth implementation of business process reengineering especially when a new management information system is obtained. Competence in the function of information technology and the use of effective software has been proposed as some of the most important factors that contribute to the success of business process reengineering. This includes building effective information technology infrastructure, investing in adequate information technology infrastructure, measuring the effectiveness of adequate infrastructure, and integrating appropriate infrastructure for existing business processes and systems. Information technology investment, risk management and operations have a strong influence with competitive advantage (Momanyi *et al*., 2016).

2. Literature Review

2.1 Competitive Advantage

The company has superiority through more eminent resources and capabilities than the competitors, as long as the company implements a strategy that utilizes these resources and capabilities effectively, then it is possible to create competitive advantage. This is achieved by banks through planning and management strategies, which is a sustainable process that evaluates, controls and examines business, competitors and the industry as a whole and sets goals and strategies to overcome obstacles to achieve success (Nimsith, Rifas and Cader, 2016).

Porter (1998) assumes that competitive advantage is the ability of a company to achieve economic benefits above the profits that competitors can achieve on the market in the same industry. Companies that have competitive advantages always have the ability to understand changes in market structure and are able to choose effective marketing strategies. Porter's study further establishes generic strategies that are classified into three categories, namely cost leadership, differentiation, and focus. The choice of each company for the generic strategy above will depend on analysis of the business environment to determine opportunities and threats. Ferreira and Kittsteiner (2012) said that competitive advantage can be developed

from a model where competitive pressure can trigger organizational change. Competitive advantages can be through business strategies based on differentiation, coordination and focus.

Al-alak Abbas Basheer and Tarabieh Saeed (2011), explained that the dimensions of banking competitive advantage are innovation differentiation, market differentiation and organizational performance. Customer orientation contributes positively to organizational performance by providing innovation differentiation and market differentiation. The effect of innovation differentiation on organizational performance is greater than market differentiation. Innovation differentiation and market differentiation simultaneously achieves greater competitive advantage that produces the best results in organizational performance. Momanyi *et al*. (2016) explained that the dimensions of competitive advantage are profits, new products, assets and new members. Rules and regulations are required to achieve competitive advantage.

2.2 Business Process Reengineering

The concept of reengineering or process redesign was popularized by scientists Hammer and Champy (1993), which mentioned business process reengineering as a process redesign using technology to achieve improved performance in cost reduction, quality services and increased corporate profits. Business process reengineering in an organization will allow it to gain several benefits because it will improve organizational performance in the business. Business process reengineering helps organizations in manufacturing and financial services to overcome efficiency process and operational performance. Business process reengineering seeks to separate itself from the old and current processes to produce better procedures in new ways that allow the use of information technology with the support of people in the organization. Ringim Kabiru Jinjiri *et al*. (2013) said that business process reengineering is defined as a complete, radical process transformation that changes the structure of bureaucracy in organizations for core process specialization.

The dimensions of business process reengineering according to Xiaoli Liao (2010) are business process reengineering programs, implementation of business process reengineering and business process reengineering platforms. Elements of the business process reengineering program can be divided into two indicators, namely business processes and risk control. Elements of the implementation of business process reengineering can be divided into four indicators, namely policies, procedures and business process results. Elements of the BPR platform can be divided into three indicators, namely information technology applications, organizational structure optimization, and the use of exterior sources. Information technology applications means that they can use information techniques in the business process reengineering process, organizational structure optimization means they can optimize their organizational structure to support business process

reengineering strategies, the use of exterior sources means use exterior sources to improve the efficiency of conducting business process reengineering.

2.3 Integration Definition Language 0 (IDEF0)

IDEF0 (Integration Definition Language 0) framework model, is a modeling method based on SADT (Structure Analysis and Design Technique) system developed by Douglas T. Ross and SofTech, Inc. In its original form IDEF0 includes definition language and graphical modeling (syntax and semantics) which describe a comprehensive methodology for building models. IDEF0 (Integration DEFinition language 0) is a modeling language that uses images with a comprehensive explanation to explain the stages / methodology of development of a system. The system is modeled as a group of functions that are interconnected with one another to form a major function. These functions explain what is done by the system, so that anything that controls, processes, is processed, and is produced by the system can be known.

The depiction of the model in IDEF0 is done in a hierarchical manner from general activities to the details. At the highest level is called the Context Page which contains an activity that shows the entire system as an activity and also shows the system interface with its environment. Context Diagrams are also commonly called A0 Diagrams or Parent Diagrams. At the next level, a Decomposition Page or Child Diagram is created which is further details of the system. Each description in the Decomposition Page is called the A1 diagram, A2 diagram, A3 diagram, and so on. Each ICOM that appears on a Parent Diagram will be detailed on the child diagram. Child Diagrams will continue to be formed to the level of the processes that exist in the algorithm for the execution of these activities.

2.4 Information and Communication Technology

Information and communication technology is based on an activity of processing, storing and sending information. These activities use computers, electronic devices such as telephones, mobile phones, fax machines etc. and telecommunications networks. Information and communication technology has challenged all geographical boundaries. Information and communication technology enables sophisticated product development, better market infrastructure, the application of reliable risk control techniques and assists intermediary of part activities to reach distant and geographically diversified markets (Rajesh and Rakesh, 2012).

Information and communication technology gives organizations the flexibility to redesign processes and create organizational design to be able to achieve high performance. Capabilities that were previously not available when many of the existing business processes was originally designed, but required by modern organizations. Enterprise software, offering a common data infrastructure throughout the organization, provides work cells with the ability to access all the

functional data needed to complete the assigned work. A network allows free flow of information, allowing the sharing of critical data in a timely manner with employees regardless of its different location. Internet-based networks also create an effective monitoring environment (Ramirez *et al*, 2010). Information and communication technology has a strong influence with business process reengineering, internal process business, organization, customer satisfaction and financial performance (Maroofi Fakhraddin *et al*., 2013).

3. Methodology

This research uses two methods (mixed methods), namely quantitative methods through hypothesis testing to measure how much influence information and communication technology has on business processes reengineerings to achieve competitive advantage through the implementation of digital branches and qualitative methods with development and support through the IDEF0 framework model. Quantitative data was obtained from questionnaires distributed to 77 commercial banks in Indonesia and questionnaires were asked to the head of the bank or operations manager. Qualitative data is sourced from 5 banks in Indonesia and has implemented digital branch in its operational services. Questions were made in a questionnaire describing the IDEF0 framework model process for the operational service of deposito opening through digital branch to be clarified with banks that have used digital branch services. Questionnaire questions are given to leaders or operational managers of banks that have implemented digital branch services.

4. Results and Discussion

The hypothesis used in this study is the initial hypothesis as follows:
Ho: information and communication technology does not significantly influence competitive advantage directly or through business process reengineering at commercial banks in Indonesia in the implementation of digital branch.

The rival hypothesis is as follows:
H1: information and communication technology has a significant influence on competitive advantage directly or through business process reengineering at commercial banks in Indonesia in implementing digital branch.

The results data from the questionnaire were then subjected to quantitative processing using SEM SmartPLS. The model in this research relates the influence between the variables of competitive advantage (Z) with dimensions is cost (Z1) and differentiation (Z2). Business process reengineering variable (Y) with its dimensions are business process reengineering program (Y1) and the implementation of business process reengineering (Y2), Variables of information and communication technology (X) with dimensions are infrastructure (X1) and technology integration (X2). Table 1 below is the operationalization of variables in

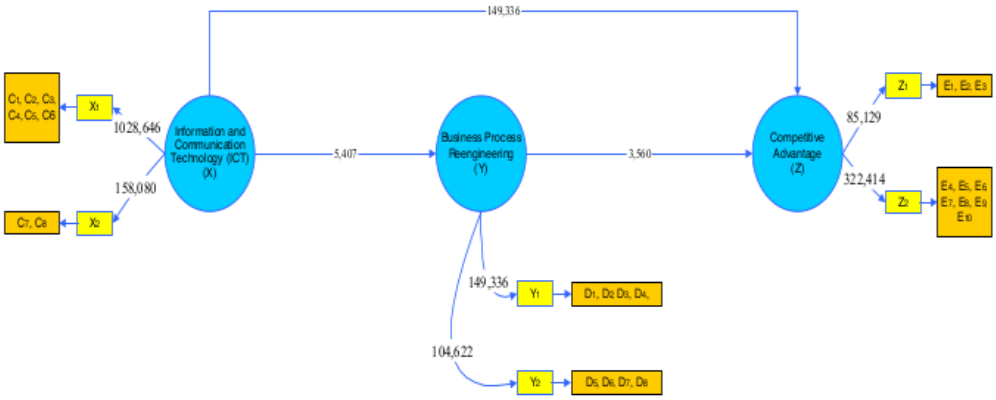
the research conducted.

Table 1. *Operationalization of research variables*

Dimention	Indicator	Standard
Information and Communication Technology (X)		
Infrastructure (X_1)	Hardware	Organization has hardware technology
	Software	Organizations has software application technology
	Internet-based network	Organization has internet-based network technology
Technology Integration (X_2)	Automation	Automation of all work in the organization
	Data integration	All of the work is integrated in the organization
Business Process Reengineering (Y)		
Business Process Reengineering Program (Y_1)	Business Process	Encouragement of changing business processes in the organization
	Risk control	Risk control for organizations from adversity
Business Process Reengineering Implementation (Y_2)	Process policy	Have a policy for business change in the organization
	Process procedure	Have a procedures for business change processes in the organization
	The results of the business change process	The level of results of the business change process in the organization
Competitive Advantage (Z)		
Cost (Z_1)	Funding	Funds availability in the organization
	Operational cost efficiency	The level of operational cost efficiency in the organization
Differentiation (Z_2)	Effectiveness	The level of operational effectiveness in the organization
	Customer desires	Operational services according to customer desires

The results of bootstrapping with SmartPLS produce information and communication technology models that affect directly against competitive advantage or through business process reengineering at commercial banks in Indonesia implementing digital branch. Table 2 below is the result of an analysis of the direct influence of information and communication technology (X) on competitive advantage (Z) and indirectly through business process reengineering (Y) in this research.

Figure 3. *Information and Communication Technology Research Model (X) Against Competitive Advantage (Z) through Business Process Reengineering (Y)*



Source: *SmartPLS Output.*

Table 2. *Hypothesis Test for Information and Communication Technology (X) Against Competitive Advantage (Z) through Business Process Reengineering (Y)*

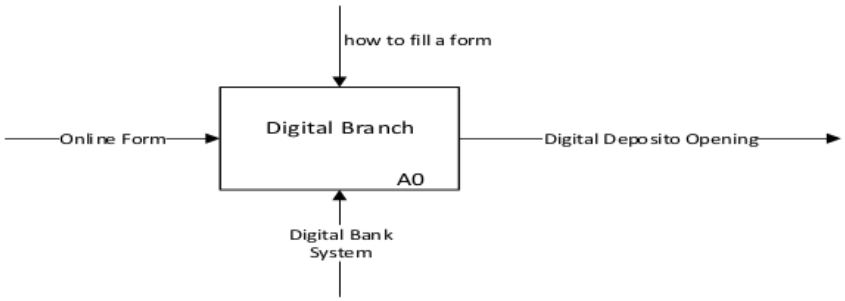
Relationship		**Original Sample (O)**	**Standard Error (STERR)**	**T Statistics (|O/STERR|)**	**T table**	**Conclusion**
Not directly through Y	X -> Y	0,500	0,092	2,938	1,96	accepted
	Y -> Z	0,260	0,073			
Directly	X - > Z	0,416	0,092	4,525	1,96	
VAF = Indirect influence / total influence		**0,238**	**23,8%**		**Partial mediator**	

Source: *SmartPLS Output.*

In the indirect relationship the t value of statistics obtained is 2.938. Because the t statistics value (2,938) is greater than t Table (1.96), it is concluded that the business process reengineering (Y) variable acts as an intervening variable, meaning that there are indirect effects of information and communication technology (TIK) (X) against competitive advantage (Z) through business process reengineering (Y). In the direct relationship the value of t statistics obtained is 5.525. Because the t statistics value (4,525) is greater than t table (1,96), it is concluded that there is a direct influence of information and communication technology (TIK) (X) against competitive advantage (Z). The VAF value obtained is 23.8%. Because it is in the category of 20% to 80% so it is included in the category of partial mediation, so there are other intervening variables that can be intervening variables for other models that are not examined in this research.

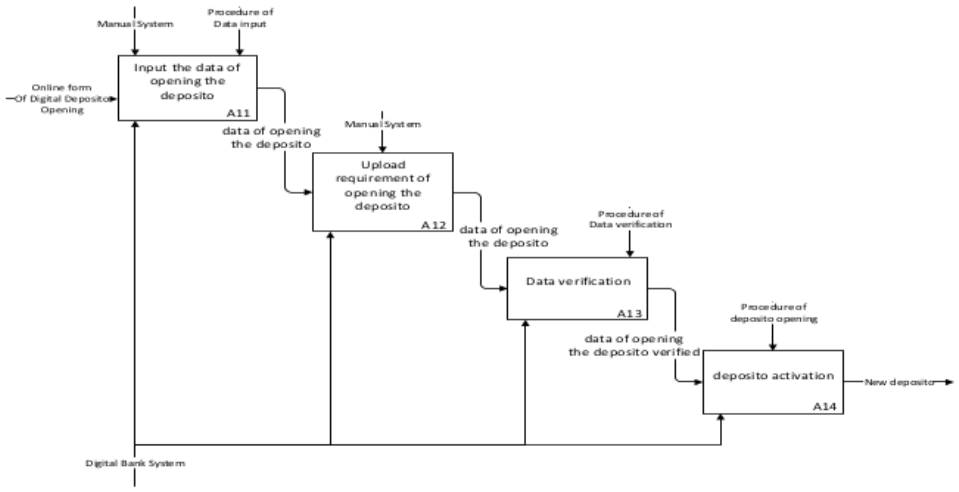
The influence of information and communication technology on competitive advantage through business process reengineering is very large. The business process using information technology is a concern of the bank. The business process reengineering model for digital deposito opening through digital branch can be displayed through the following IDEF0 frame model. Figure 4 shows the mechanism of the IDEF0 framework model, for the input in the parent diagram is the online form and the output is digital deposito opening through digital branch.

Figure 4. *Parent diagram (A0) digital deposito opening through digital branch*



The following child diagram in Figure 5 shows a description of the 4 processes of digital deposito opening through digital branch which consist of processes A1, A2, A3 and A4.

Figure 5. *Child diagram for digital deposito opening through digital branch*

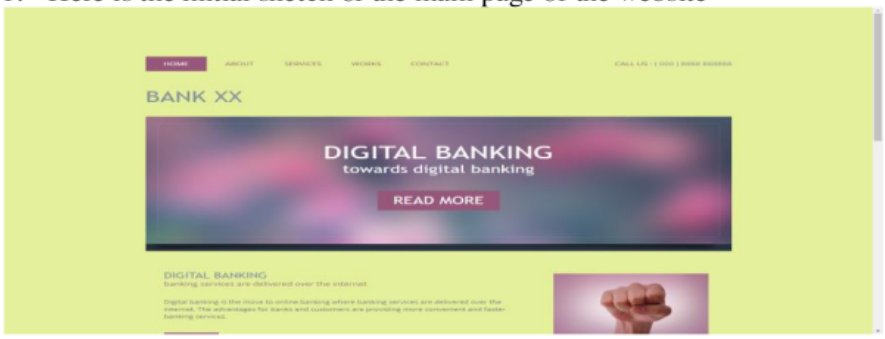


The results from the IDEF0 framework model of digital deposito opening through digital branch are then shown by the design for the machine in the waiting room in the digital branch which is designed to be attractive and comfortable. Below this is

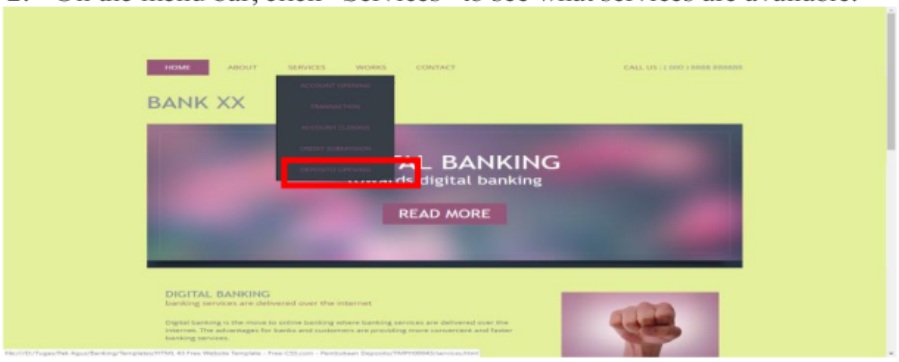
the display design of digital deposito opening through digital branch in figure 6. The steps of the process on digital branch machines for digital deposito opening are as follows.

Figure 6. *Initial sketch on digital branch machine for digital deposito opening services in commercial banks in Indonesia*

1. Here is the initial sketch of the main page of the website



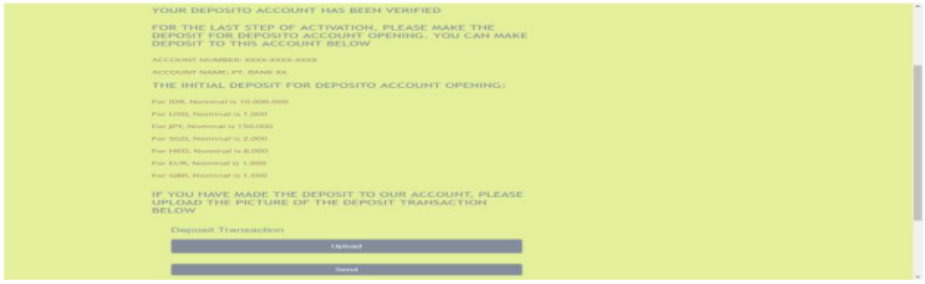
2. On the menu bar, click “Services” to see what services are available.



3. Fill in the form to complete the data that are required to open the deposito. Click ”Save”. The data that are shown on this website are just some of all of the data that are required to open the deposito.

4. You will also be asked to upload the documents required to open an deposito. After all documents have been uploaded, click 'Send'. Note: the document requirements shown on this website are only a few of the many documents required in the deposito opening process.

5. Then you are required to make an initial deposit according to the choice of currency to the account listed. After making a deposit, photograph the proof of the deposit transaction and upload the proof. After uploading, click 'Send'



6. After payment is received, the system will display the status of your deposit opening.

After the data input process and data upload are complete, the system will process the opening the deposito and provide further information about the account that was just created. Figure 6. Display of Initial Sketches on Digital Branch Machines for Digital Deposito Opening Services in Commercial Bank in Indonesia. The digital branch atmosphere at banks in Indonesia is made comfortable and calm so customers can feel relaxed when the deposit opening service process is underway.

5. Conclusion

The results of hypothesis testing use SEM SmartPLS on indirect relationships and direct relationships between information and communication technology variables, business process reengineering and competitive advantage reject the H0 hypothesis

and accept the H1 hypothesis, means that information and communication technology has a significant influence on competitive advantage directly or through business process reengineering at commercial banks in Indonesia in implementing digital branch to deal with digital technology and economics.

Infrastructure provision shows a big influence on information and communication technology. This shows that banks in Indonesia must prepare internet-based hardware, software and networks. Fast internet facilities are a matter that needs to be considered because of the access that connects between digital branches with headquarters to clarify data. Of course the existing hardware and software support each other in the digital deposit opening service process. The implementation of business process reengineering shows a big influence on the business process reengineering variable. Changes in policies and procedures for conventional deposit opening service business processes to become digital have been able to improve service to customers more quickly. Supported by a convenient digital branch place makes customers more relaxed when transacting on digital branches. Differentiation shows a strong influence on the competitive advantage variable. The achievement of operational service effectiveness in digital deposits opening has been able to provide competitive advantages between banks in Indonesia. The services that banks provide will make it easier for customers to transact, customers whenever and wherever can make financial transactions, especially in opening the deposits.

2

The IDEF0 framework model is able to support business process changes in digital deposit opening services at banks. This model is able to describe the business process of digital deposits opening which will be done more simply. Existing processes in the child diagram of digital deposito opening can be displayed through the design that will be designed on the machine in the digital branch.

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