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Review Sheet

Paper ID / Title <i>Please provide the paper ID or manuscript title to identify the paper</i>	9314 THE FUTURE AND THE CHALLENGES OF THE INDONESIAN BANKING INDUSTRY IN THE DIGITAL ERA
Paper Objective <i>Is there a clear objective or research question in the paper?</i>	Not clear The objective of this research is unclear In the abstract it said that .. “to identify the challenges ... ” In methodology it said “the effect of implementation of IT to....”
Abstract <i>Is it clear enough to present the research?</i>	Not clear Explain the population, sample, and analysis tool
Introduction <i>Does the author(s) make a suitable introduction / references for this paper?</i>	Please explain the phenomenon and research gap here
Research Method <i>Is the methodology suitable or support the research?</i>	No. Please explain population and sample here. How are samples selected and determined?
Table / Figure <i>Does the table and figure support the text?</i>	It would be easier to reader if you can summarize the findings on a table or figure
Discussion / Conclusion <i>Do the discussion and conclusions accurately reflect on the findings?</i>	Not clear
References <i>Is it suitable and sufficient to support the paper?</i>	Quite sufficient
Reviewer’s Recommendation <i>Accept, Require Revision, Reject</i>	Accepted with minor

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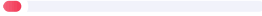
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THE FUTURE AND THE CHALLENGES OF THE INDONESIAN BANKING INDUSTRY
IN THE DIGITAL ERA

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Keywords: Technology, Digital Culture, Fintech, Indonesian Banking Industry.

Abstract: This article focuses on researching the IT challenges faced by the Indonesian banking industry in the digital age. The rapid development of technology has provided benefits for the banking sector in integrating technology to meet the demands of its customers. Although, this advantage comes with its challenges, as with the emergence of the fintech¹ (financial technology) industry. This study uses an action research method, which is applied to identify challenges faced by conventional banks and provide solutions to overcome the identified challenges. Based on the analysis, it was found² that conventional banks have a gap between their digital products and the expectations of their customers; in which majority of the respondent is engaging in the implementation of open application programming interface (API) to facilitate the digital banking activities of its customers via the software and the web-service product created by the Indonesian conventional banks. The implication is that the IT gap between banking services and their customers must be overcome³. For this reason, it is recommended⁴ that

conventional banks work together in order to meet customer expectations and/or ⁵ banks can use a customer-centric approach in product development.

1 INTRODUCTION

With the rapid development and the implementation of new technologies, all the existing industries have started to use new technologies to improve their operational and business activities. Some of the industries have entered the phase of digitalization, especially in the case of the banking industry. According to the report produced by the company of Frost & Sullivan (2019), it is shown that due to the rapid development and increases of implementation of technology in the case of internet penetration and accessibility, the market revenue of electronic commerce (e-commerce) is estimated to reach the value of US\$ 45.2 billion in 2019 and US\$ 62.3 billion in the following year; to be precise, the aspect of business-to-business (B2B) and business-to-consumer (B2C) are said to be increasing in the area of digital market in Indonesia. In other words, the Indonesian banking industry may capitalize on this opportunity to become the facilitator for the customer in the e-commerce market to handle their digital transactions, both in the domestic and international transactions.

Despite the opportunity and the benefits of the rapid development and implementation of new technologies, the Indonesian banking industry may have to consider the potential obstacles and challenges of these advantages. One of the obstacles faced by the banks of the digital era is the rise and the emergence of financial technologies (fintech)⁶ firm. In which, the product that is produced by the fintech⁷ firm has some similarities with the product created by the conventional banks⁸. In general terms, the product of the fintech⁹ firm has

some feature that already exists in the tradition banking product. Furthermore, Anagnostopoulos (2018) stated that the product created by the fintech ¹⁰ firm is easier to use and faster to fulfill the demand of digital transactions of its user compared to the conventional bank, which means that the product of the fintech ¹¹ firms creates challenges to the Indonesian banking industry to facilitate the domestic and international transaction in the field of digital transactions.

Furthermore, the banking sector is one of the sectors that are prone to disruptions (Fichman, ¹² et al., 2014). To be precise, the disruptions which are triggered by the rapid growth and development of technologies. These disruptions are putting the conventional banking industry at risk of maintaining their position as an intermediary for their customers in conducting digital transactions, especially in the case of creating an application that has a better performance to the fintech ¹³ firms. These disruptions are enforced ¹⁴ due to the fintech ¹⁵ firms has the upper hand on implementing their technological innovations to provide better digital financial and banking services compared to the conventional banks.

In regards to the obstacles and challenges faced by the Indonesian banking industry, it is considered naïve to believe that the emergence of fintech ¹⁶ firms solely creates these challenges. The other aspect that needs to be considered ¹⁷ in this matter is the changes in the digital culture. In other words, it is about how the banks' customers perceive the implementation and the benefits of technology in fulfilling their needs in banking and financial demand in a digital manner. It is predicted ¹⁸ that smartphone users will dominate the banking market share by the year 2020 in regards to digital transactions (AT Kearney, 2014; Wirdiyanti, 2018). By this prediction, the Indonesian banking industry must understand the demands and needs of its customers. Oshodin et al.

(2017) explain that due to the improvement of technologies enables the firm to create an application or product in a customer-centric manner to fulfill the needs and demands of the customer and the changes in the customer preference in using a digital product.

In the case of Indonesia, it is reported¹⁹ that the mobile penetration rate stands at the level of 150% with the mobile subscriptions reaching 388.04 million people by the year of 2016 alone (Frost & Sullivan, 2018). By the level of the mobile penetration rate alone, it is expected²⁰ for the Indonesian banking industry to facilitate a better medium for their customers to conduct digital transactions. And yet, the fintech²¹ firms have the capability to produce a better digital product compared to the conventional banks; furthermore, there is an information and knowledge gap on utilizing the latest technology to provide a financial and banking product digitally between the fintech²² firm and the conventional banks (Davis, et al., 2017; Omarini, 2018). In short, the Indonesian banking industry needs to produce an application or a digital product that has the same or exceed the quality of the digital product produced by fintech²⁴ firms. Based on the report and the previous research, it can be indicated²⁵ that for the Indonesian banking industry to be able to capitalize the changes in the trend on conducting digital transactions, then the Indonesian banking industry must adapt to the changes and the shifting of preference of its user on regarding the demands of digital transactions.

In simple terms, the Indonesian banking industry is forced to cope with the sets of challenges that arise from the rapid development of technologies; to be precise, the challenges faced by the Indonesian banking industry are the emergence of fintech²⁶ firms and the changes of digital culture or preference in their customer on conducting digital transactions. If the Indonesian banking industry able to capitalize on the changes and understand the needs of its

customers regarding the demand for digital transactions, then the Indonesian banking industry will be able to become a favorable medium for its current and potential customers in conducting digital transactions.

Based on the introduction above, the primary objectives of this research are to investigate the pattern of changes in the digital culture on conducting digital transactions and providing solutions for the Indonesian banking industry to be able to cope with the challenges from the emergence of fintech²⁷ firms. With the addition of finding the set of challenges or obstacles faced by the Indonesian banking industry in the digital era and determined the future state of the Indonesian banking industry if those challenges are handled correctly or not.

2 LITERATURE REVIEW

In this section, it is provided with the literature regarding the difference between the conventional banking industry and the fintech²⁸ industry, especially in the context of Indonesia.²⁹ Furthermore, it is also included in the literature on the matter of impact due to the rapid development of technology in the banking sector.³⁰

2.1 Conventional Banking Industry vs. Fintech Industry

The primary differences between conventional banking with the fintech³¹ industry are solely lying to the implementation of technology in their financial and banking products. To be precise, in regards to fulfilling the demand for digital products to conduct digital transactions by the current and potential customers. With the addition of the nature of the industry, it is known³² that the fintech³³ industry has the nature of the "highly-innovative industry"; meanwhile, the conventional banking industry has the nature of the "highly-regulated industry." In other words, for the conventional banking industry, all the banks must follow the regulations that are applied by the government or standards to

conduct any banking activities; on the other hand, the fintech³⁴ industry has greater flexibility to implement their innovation in technology to their activity to produce a high-quality product. In which, the fintech³⁵ industry has a competitive advantage against the conventional banking industry in the aspect of technology utilization and has increased the level of competition with conventional banks (Romānova & Kudinska, 2017).

Aspect

Fintech

Incumbents

2016

2017

2016

2017

IT security

28%

27%

58%

63%

Regulatory uncertainty

48%

53%

54%

59%

Differences in management and culture

55%

56%

40%

41%

Differences in the business model

40%

49%

35%

31%

IT compatibility

34%

39%

34%

40%

Differences in the operational process

36%

25%

24%

12%

Differences in knowledge/skills

33%

36%

24%

19%

Required financial investment

16%

4%

17%

9%

Source: PriceWaterhouseCoopers (2017)

Table 1. The Challenges Between the Fintech Industry and Conventional Banking Industry

Furthermore, the fintech³⁶ industry has a diverse product in its application on fulfilling the demand for digital banking and financial services (Davis,³⁷ et al., 2017). The diversity in the product created by the fintech³⁸ firms increases the possibility of the customers to acquire and use the product easily; in which, the product can be obtained³⁹ via the internet. In the case of the conventional banking industry (also known as the incumbents), for every digital product created by the incumbents, it must be validated and checked by the regulators before the public could access it. In other words, the regulators check the digital product produced by the banks to see if the incumbents meet the criteria and the regulation applied in the banking sector. Due to the strict regulations and rules that the incumbents have to follow, the⁴⁰ fintech firms are able to capitalize the gap within the expectations and the demand of the banking customer and the fintech⁴¹ firms are able to create a product that specifically designs to fulfill the demand with superior advantage in digital product compared to the incumbents.⁴²

According to the report published by PriceWaterhouseCoopers (2017) which involving 1.308 respondents globally regarding the challenges faced by the fintech⁴³ industry and the incumbents, it is found that the main challenges in the fintech⁴⁴ industry are focuses in the tree areas, which are (1) regulatory uncertainty, (2) differences in management and culture, and (3) the differences within the business models; meanwhile, in the case of incumbents the main challenges are focuses on (1) information and technology (IT) security, (2)

regulatory uncertainty and (3) the differences in management and culture. The overall percentage regarding the challenges between the two industries is ⁴⁵ presented in Table 1.

Based on Table 1, it is ⁴⁶ shown that there is a high degree of difference in challenges faced by both industries, especially in the case of the different management and culture. Based on the difference, the ⁴⁷ fintech industry and the conventional banking industry has ⁴⁸ an entirely different nature in fulfilling the demand of digital transactions of its customer. To be precise, the ⁴⁹ fintech industry has create six disruptions to the conventional banking industry; namely (1) the pace of technological innovation and adoption, (2) the disintermediation of financial services, (3) industry convergence, (4) low cost and low barriers of entry, (5) borderless platform and (6) the democratization of investment and financial services (Brummer & Gorfine, 2014). In simple terms, the ⁵⁰ fintech has a different culture and management style with the conventional banking industry and capitalize on the benefits of the development of technologies to gain competitive advantages against the conventional banking industry.

2.2 The Impact of Technology in The Banking Sector

The impact of the rapid development of technologies is not only focused on the emergence of the ⁵¹ fintech industry, but it also affects the regulators and nations on how to handling the usage of new technology in the banking and financial sector. Furthermore, the impact of the advanced technology is ⁵² caused by the combination of three factors, namely (1) regulations, (2) technological and (3) economic factors (⁵³ Zavolokina, et al., 2016).

In regards to the regulations, due to the rapid development of technology and its implementation in the banking and financial sector, regulators are forced to make regulations that can ensure every company (⁵⁴ fintech and conventional

banks) to be prudent. In which, these companies are forced to make necessary changes to operate within the law, especially regarding the code of conduct and regulations in the matter of providing financial and banking services to the public. In the case of Indonesia, the regulations that are applied to the fintech industry are only focused on the area of (1) lending and borrowing via the internet and (2) the use of electronic money (Iman, 2018). In which, the Indonesian regulators still lack regulations to control any other type of fintech activities which are operated in Indonesia, such as cryptocurrencies and blockchain.

In terms of technological factors, the incumbents are forced to adapt to the latest technology that can be implemented to increase the quality of their services in regards to fulfilling the needs and demands of digital transactions of their current customers. However, due to the nature of highly regulated characteristics within the banking industry, the incumbents must first be checked and validated by the regulators to ensure their digital product meets the specified standards. Meanwhile, the fintech industry has used technological breakthroughs to provide better services or features within the application to fulfill the demand for digital services of its customers. In which, there are clear relationships between the technologies as an input for the fintech industry to have a transformation in conducting its business (Zavolokina, et al., 2016). Furthermore, the fintech industry does not have the same conventional relationship as the incumbents and its customers, in which the fintech industry is capable of using codifiable information to maintain the relationship with its customers (Vives, 2017). In other words, the fintech industry is capable of noticing the needs of its customers in conducting digital transactions.

Finally, in terms of the economic factor; the economic conditions forced the fintech⁶⁷ industry and the conventional banking industry to find the gaps or areas of improvement to find the state of stability, in the sense of financial and non-financial state. In the case of fintech⁶⁸ firms, the economic conditions encourage the fintech⁶⁹ firms to find the gaps in the banking and financial services provided by the conventional banks and compare them with the expectations level of their customers. By taking this step, the fintech⁷⁰ firms can capitalize on the weakness within the conventional banks to provide better digital services. And,⁷¹ the due to the advancement of technologies and the flexibility of implementing those technologies, the fintech⁷² industry is able to⁷³ adopt and implement the necessary technologies to maintain an adequate standard to meets the criteria of its current and potential customers.⁷⁴

3 METHODOLOGIES

In regards to fulfilling the objectives of this research, the determination of the future state of the Indonesian banking industry and its challenges are analyzed using an action research method. Action research is defined⁷⁵ as a scientific process in a specific problem, in which this process is used to improve the practice or an understanding given in the problem (McKernan, 1988; Sagor, 2000).

In other words, the action research method is used to understand the gap between the fintech⁷⁶ industry and incumbents; this step was taken to provide solutions for old players to overcome the challenges that arise from the fintech⁷ industry. Furthermore, the action research method is also used to analyze the impact of changing preferences in digital culture in connection with the rapid developments in technology occurring in the financial and banking sectors. In terms of understanding the incumbent's views in the Indonesian banking industry in the digital era, especially in terms of the impact of technological

advances in the banking sector; The questionnaire used in this study took a sample of the population of Commissioners and Directors of the Bank as digital service practitioners in Indonesia, consisting of Commissioners, CEOs, and Directors whose main tasks and functions are related to IT. More precisely, this questionnaire has presented the views and opinions of the Indonesian Banking Executives, and they acted as a "Panel of Experts."

To find IT challenges in Indonesian banking in the future, then as an analytical tool, the multivariate regression approach is applied. Multivariate regression analysis was applied to predict any changes in the dependent variable in response to changes in the independent variable (Hair, ⁷⁸ et al., 2014). This approach was taken to understand how incumbents view IT challenges in the future for Indonesian banks, especially in prioritizing the application of IT systems in order to meet the demands of their customers. Furthermore, with the answers given by the expert panel, we can uncover the incumbent's priorities for any aspect of the technological approach in the digital age. ⁷⁹ And this method is also used to find the nature of the relationship between the dependent and the independent variables. ⁸⁰ Hence, the regression formula used in this study is given ⁸¹ as follows:

$$Y = \alpha \pm \beta_1 X_1$$

(1)

Based on equation (1), the impact of IT is presented ⁸² as Y, and the priority of implementing the IT to meet the demand of its customer is presented ⁸³ as X₁. The equation (1) can be determined in which technology the incumbent uses to meet the criteria of its customers in conducting a digital transaction using the financial services provided by the conventional banks. Furthermore, it could

map which technologies the incumbents prioritize in order to cope with challenges rises from the emergence of the fintech⁸⁴ industry and the shifting of preference of its customers in the digital era.

One of the research that is using an action research approach in the banking sector is conducted⁸⁵ by Becker et al. (2010). Becker et al. (2010) found that banks were dissatisfied⁸⁶ in terms of their general-purpose business models, especially in the case of the documentation approach taken by banks that are still considered⁸⁷ traditional. Where the traditional approach taken by banks has an indication of the inefficiency and deficit of information in the bank, Becker et al. (2010) stated that banks could use business process modeling language using semantic process building blocks to identify weaknesses in the bank and evaluate the processes within the bank to be improved. The results of this study indicate a variety of actions. Specifically⁸⁸, the semantic modeling language can be used⁸⁹ in designing a system that can give the capability for the traditional banks in improving its effectiveness in process-oriented analysis in their operational activities.

Also, the action research approach is used in the research conducted by ¹⁷⁸ | Sudyatno et al. (2012), it was found⁹⁰ that there was a negative effect on financial leverage in terms of company performance, (2) positive effect on financial leverage on firm value, (3) incentive managers had a positive influence on company performance and value, (4) capital expenditure was found to have positive influence on company performance even though it has a negative influence on company value and (5) company performance has a positive influence in terms of company value. Based on the findings of Sudyatno et al. (2012), it is recommended⁹¹ that companies make policies to maximize the use of debt in their capital expenditure activities, with the addition of increased management efforts in order to increase company values.

Furthermore, the multivariate regression analysis is used to enrich the analysis of the action research approach in order to understand the nature of the specified dependent and independent variables. Also, the usage of multivariate regression analysis has been performed⁹² in numerous research, such as Sufian & Chong (2008) and Vintillă & Nenu (2016).

In the research conducted by Sufian & Chong (2008), the multivariate regression analysis is applied to analyze the return on asset (ROA) in response to the internal factors and external factors of the Philippines' financial institutions. The variables used by Sufian & Chong (2008) to represent internal factors are total assets, non-interest income, total overhead expense and the book value of stockholder; on the other hand, the external factors are presented⁹³ with money supply growth, market capitalization, annual inflation rate, and gross domestic product. Sufian & Chong (2008) found that the size of the bank, credit risk, and expense preference behavior have negatively related to the bank's profitability; meanwhile, the non-interest income and capitalization are positively related⁹⁴ to the bank's profitability. Based on the findings of Sufian & Chong (2008), it is suggested⁹⁵ that the bank-specific determinant variables are statistically significant to the banks' profitability, even though the non-interest income and capitalization have a positive impact on the bank's profitability.

In terms of the research conducted by Vintillă & Nenu (2016), multivariate regression analysis is implemented⁹⁶ in order to analyze the ROA and return on equity (ROE) in response to the quick ratio, current ratio, leverage, cash conversion, effective tax rate, and working capital; in which the object of the research is the companies listed on the Bucharest Stock Exchange. Based on the findings, it is found⁹⁷ that the variables used in the research of Vintillă & Nenu (2016) are statistically significant; furthermore, it is found⁹⁸ that there is a

negative relationship between liquidity and firms' financial performance.

Based on the findings, it is indicated⁹⁹ that the decrease in the aspect of liquidity can be excluded¹⁰⁰ as a risk factor for the Romanian companies.

Based on the explanations regarding the methodologies used in this research, these methodologies are used to fulfill the research objectives. To be precise, these methodologies are used to determine the challenges faced by the incumbents, analyze the changes of preference in the digital culture, and to provide solutions that can be used by the incumbents to cope with such challenges.

4 FINDINGS

In this section, the methodologies that already explained in section 3 are applied¹⁰¹ in order to fulfill the objectives in this research.¹⁰² The findings of this research and its analysis are given¹⁰³ as follows:

4.1 Multivariate Regression Analysis

Based on the research conducted, it is found¹⁰⁴ that the IT impact in response to the implementation of IT in order to fulfill the demand and criteria of its customer in conducting digital transaction are moving in a positive manner; in other words, the impact of IT is directly related to the level of implementation of IT by the incumbents. The regression equation from the multivariate regression analysis is presented¹⁰⁵ in equation (2).

$$Y = -.801 + 1.067X_1$$

(2)

Based on the equation (2), the regression analysis shows that the impact of IT is dictated by the movement of the implementation of IT applied by the

incumbents. In other words, the degree of implementation of IT determined the scale of IT impact the incumbents may have in their banks, especially in regards to fulfilling the demand and criteria of its customers in conducting digital transactions by using the financial services provided by the banks. Furthermore, the linear regression presented in equation (2), the regression has a p-value of 0.027. In which, the linear regression of equation (2) is statistically significant to analyze the movement of the IT impact in response to the IT implementation of banks in order to the meet the criteria and expectations of its customers.¹⁰⁶ In terms of the implementation of IT, it is found that the p-value of the variable stands at the level of 0.027 (where the p-value of the variable are below the 0.05 or 5% threshold); in which, the variable of IT implementation is statistically significant to describe the movement of the IT impact to the incumbents.¹⁰⁷¹⁰⁸

¹⁰⁹ And finally, in terms of the correlation of the IT impact and the implementation of IT stands at the level of 0.765 or 76.5%.¹¹⁰ The correlation value indicates that the IT impact and the implementation of IT has a positive relationship between one and another. In other words, if one of the variables increases, then the other variable has the tendency to be increasing as well and vice versa.

4.2 Action Research Analysis

In regards to the findings using the research action method, the steps of action research are conducted¹¹¹ by the process defined by Sagor (2000). The analysis of the challenges faced by the conventional banking sector (especially for the Indonesian banking sector) using an action research approach is given¹¹² as follows.

In accordance with the phenomenon of the emergence of the fintech industry,¹¹³ the fintech industry is capable of producing a better application for its customers in terms of using the application for conducting digital financial and¹¹⁴¹¹⁵

¹¹⁶banking services. In which, these applications created by the ¹¹⁷fintech firms consider better than the conventional banking sector due to the rapid development and implementation of its product. As Romānova & Kudinska (2017) explains, the ¹¹⁸fintech firms is categorized into two groups, which are (1) by become the partner for the conventional banking sector in order to produce a digital banking and financial for its customers or (2) by creating an application for its customer to conduct a digital financial and banking services which are already provided by the conventional banks. Furthermore, due there is a gap between the digital product produced by the conventional banks and the expectations of its customers in terms of digital services, the ¹¹⁹fintech industry are able to complete the gaps by creating a product the customers, in which the customers did not acquire in the application created by the conventional banks (¹²⁰Zavolokina, et al., 2016). By noticing the gap between the customer's expectation and the product created by the incumbents, the fintech industry is capable on capitalizing the opportunity by creating a product with better quality and services compared to the incumbents due to greater flexibility in implementing its innovation to its product than the conventional banking sector.

In terms of the changes of preferences in the digital era, Das et al. (2016) explains that there are four disruptions in Indonesia that already happen in regards to the rapid development and advancement of technology, which are (1) mobile internet, (2) cloud technology, (3) internet of things and (4) big data and advanced analytics. Because of these disruptions, the customers of the banking industry are expected to have digital services that enable them to conduct their digital transactions as smooth and seamless as possible. In other words, the trends that already happened in Indonesia is that every digital transaction can be completed just by using their smartphones or mobile

phones. Furthermore, according to the Australian Trade and Investment Commission (2018), the number one reasons the Indonesian customers conducting digital transaction in 2016 (especially in their purchasing activity in the e-commerce market) is due to the practicality factor; in which there are 63% of the respondent engaging in the digital transactions due to the practicality it provides.

Based on that trend, the incumbents use different approaches in fulfilling the demands and the needs of their customers. Specifically, it is found¹²² that (1) 37.5% of total respondent is engaging in the implementation of open application programming interface (API), (2) 25% of total respondent are engaging in the implementation of internet of things (IoT) and (3) 25% of the total respondent are engaging in the implementation of cloud processing. To simplify the findings above,¹²³ Figure 1 is presented¹²⁴ as an overview regarding the Indonesian banks' IT engagement in fulfilling the demands and the needs of its customers. Furthermore, it is found¹²⁵ that 62.5% of the total respondent believes that it is crucial to collaborate with the fintech¹²⁶ firms to improve their implementation of IT in order to meet the criteria of its user. Meanwhile, 50% of the total respondent is considered¹²⁷ the implementation of big data analytics to be important in findings the needs of its customer; in which the conventional banks may have the opportunity to

Figure 1. Indonesian Conventional Banks' IT Engagement

produce an application or system to fill the needs of its customers.

Furthermore, it is indicated¹²⁸ that all of the incumbents have different priorities in regard to the implementation of IT in order to fulfill the criteria and the demands of its customers.¹²⁹ Also, some of the incumbents believe it is essential¹³⁰ to collaborate with the fintech¹³¹ firms in order to produce digital services That

meet the preference of its customer in conducting the digital transaction; in
which, some of the incumbents working together with the fintech firms in order¹³²
to fill the gaps that exist in the digital era.¹³³ Also, it is found that not all the¹³⁴
incumbents prioritize the same technology in their business in order to cope
with the challenges that arise in the digital era; to be precise, in regards to the
emergence of fintech and the changes in the preference of its customer.¹³⁵¹³⁶

In regards to the challenges faced by the Indonesian banking sector due to the emergence of the fintech¹³⁷ industry and the changes of preference in conducting a digital transaction, the Indonesian banking industry is faced¹³⁸ with several problems relating to the implementation of technology in the digital era. Some of the problems that are identified using the action research approach are: (1) the incumbents are still in struggle to produce an application or digital financial and banking services that have the same quality (or better) with the application with the fintech firms, (2) the incumbents are restricted in the implementation of the new technology and implementing its innovations due to the nature of the industry itself (which are a "highly-regulated industry"), (3) there are gaps between the digital product produced by the incumbents and the expectations of its customer (in which, these gaps are capitalized by the fintech industry to provide digital and financial services where the incumbents are not able to provide to its via technology implementation) and (4) due to the rapid development of technology, the banks are needed to provide a better security to protect theirs and customers data from any cybersecurity threats that may occurs in any given time (especially to the data that are used by the incumbents to implements the new technology in their digital services for its customer). Based on the explanations on the challenges faced by the incumbents, the
challenges faced by the incumbents are oriented on the approach to utilize
their technology to understand and fulfill the demands, the criteria, and the

¹³⁹
preferences of its customers in conducting digital transactions. In simple terms, the incumbents should either learn from its competitors (in this case, it is the fintech¹⁴⁰ industry) in regards to provide better applications for its customer in doing digital transactions or by examining the needs of its customers in regards to the trends that already taken place in this digital era.

4.3 Solutions

Based on the challenges that explained in section 4.2, several approaches or solutions can be applied by the incumbents to cope with these challenges (in regards to the changes of preferences of its customers and the emergence of the fintech¹⁴¹ industry). It is identified¹⁴² that conventional banking customers in need of an application or software that can make their digital transactions easier. On the other hand, every customer has their own¹⁴³ preferences or criteria in conducting digital transactions. In which, the Indonesian conventional banks should prioritize the necessary technologies in order to improve the effectiveness of their application in fulfilling the needs and the criteria of its customers in conducting digital transactions or banking activities.

In this regards, some of the solutions are: (1) the incumbents could collaborate with the fintech¹⁴⁴ firms in developing their own digital financial and banking product to fulfill the demand and the criteria of its customers, (2) the incumbents could create or develop their digital banking and financial services using the customer-centric approach in order to obtain the information of the needs of its customer and the incumbents could prioritize which technology to be implemented to meets the criteria, (3) the incumbents should have an adequate security to protect the banks and its customer data in the digital era (especially on the data which are used to facilitate the customers digital transactions) and (4) the implementation of technology by the incumbents

should focus on the aspect of practicality (in which, the application has the characteristic of seamless and easy-to-use feature) to be able to keep up with the trend that are already taken places.

Following the result of the regression analysis presented in equation (2), the incumbents should prioritize the technologies that are needed by its customers. By prioritizing the technologies based on the criteria and the demands of its customers, the incumbents are able to¹⁴⁵ keep up with the trends in conducting digital transactions. Furthermore, by prioritizing the technology to be implemented based on the trends, the incumbents are able to¹⁴⁶ develop their digital product using the customer-centric approach to maximize the performance and the quality of their product to meet the criteria and the expectations of its customers and the trend in the digital culture.

5 CONCLUSIONS

Based on the analysis using the multivariate regression analysis, it is found¹⁴⁷ that the impact of IT in response to the implementation of IT in the Indonesian conventional banks is statistically significant. Furthermore¹⁴⁸, the impact of IT is dictated¹⁴⁹ by the implementation of IT to fulfill the demands of its customers. Meanwhile, in regards to the analysis using correlation analysis, it is found¹⁵⁰ that the impact of IT with the IT implementation in terms of meeting the criteria and the expectation of its customers in conducting digital banking activities is found to be positively related. Thus, the more frequent the conventional banks implementing new technologies, then the impact of IT will be increasing as well and vice versa.

In terms of findings using the action research analysis, it is found¹⁵¹ that the incumbents are faced¹⁵² with the following challenges: (1) the incumbents are in struggle to create an application or digital services that have the same quality with the product created by the fintech¹⁵³ firms, (2) the incumbents are restricted

in implementing their new technology because to the nature of the "highly-regulated industry" in the conventional banking sector, (3) there are still an existing gaps between the product created by the incumbents and the expectations of its customer and (4) due to the rapid development or advancement of technologies that are taken places, the incumbents are needed to provide protection to the cybersecurity threats that may occur at any given time.

As for the changes in the preferences of the conventional banks' customers, the majority of the respondents in this research are engaging in the development of open API within their system.¹⁵⁴ In which, this open API system is improved to facilitate better integration between the software and the web-services product that is created by the conventional banks in facilitating the digital banking activities of its customer. Also, some of the respondents are focusing on other aspects of IT, such as artificial intelligence, cloud processing, and IoT. Hence, these engagements are also focusing on the improvement of the user's experience of its customers while using the application created by the Indonesian conventional banks.¹⁵⁵

In regards to the solutions that can be applied by the incumbents to cope with identified challenges from the action research analysis, the solutions are given¹⁵⁶ as follows: (1) the incumbents should collaborate with the fintech firms in¹⁵⁷ developing or creating their digital product to meet the criteria and the expectations of its customers, (2) it is advisable for the incumbents to develop their digital financial and banking services using a customer-centric approach to obtain the information regarding the trend that already taken places in the digital era, (3) the incumbents should have an adequate security on protecting the banks and its customers data from the cybersecurity threats due to the rapid development of technologies and (4) it is advisable for the incumbents to

¹⁵⁸
develop or create a digital product that is focused on the aspect of practicality to enhance the experience of its customers.

The findings, the challenges and the solutions in this research are in line with the research conducted by Brummer & Gorfine (2014) and Zavolokina et al. (2016) in terms of the emergence and the impact of the ¹⁵⁹fintech industry, with the additions of the changes in the preference of customers in the digital era. ¹⁶⁰
In simple terms, the challenges created are due to the advancement of technologies, and the ¹⁶¹fintech industry is capable of noticing and capitalizing the gap between the digital banking product created by the incumbents and the expectations of its customers to produce a better-quality application compare to the conventional banks.

Finally, the limitation of this research is that it only focuses on the perspectives of the Indonesian conventional banks in the digital era. ¹⁶²Specifically, the perspectives in this research are only using the expert panels of individuals that are operated ¹⁶³in the banks that are classified ¹⁶⁴into the category of Book four banks in terms of the impact of IT and its implementations in Indonesia. ¹⁶⁵Based on the conclusion and the explanations above, the future research regarding the role of IT in the Indonesian banking industry and the ¹⁶⁶fintech industry will be including the perspectives of the incumbents and the ¹⁶⁷fintech in regards to the implementation of technologies that can be used in creating an application or digital product that can meet the criteria and fulfilling the needs of the needs of its customers in Indonesia. ¹⁶⁸

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1.	fintech → fin-tech	Misspelled Words	Correctness
2.	<i>was found</i>	Passive Voice Misuse	Clarity
3.	<i>be overcome</i>	Passive Voice Misuse	Clarity
4.	<i>is recommended</i>	Passive Voice Misuse	Clarity
5.	and/or → and, or	Inappropriate Colloquialisms	Delivery
6.	<i>fintech</i>	Unknown Words	Correctness
7.	<i>fintech</i>	Unknown Words	Correctness
8.	<i>In which, the product that is produced by the fintech firm has some similarities with the product created by the conventional banks.</i>	Wordy Sentences	Clarity
9.	<i>fintech</i>	Unknown Words	Correctness
10.	<i>fintech</i>	Unknown Words	Correctness
11.	<i>fintech</i>	Unknown Words	Correctness
12.	Fichman,	Comma Misuse within Clauses	Correctness
13.	fintech → fin-tech	Misspelled Words	Correctness
14.	<i>are enforced</i>	Passive Voice Misuse	Clarity
15.	<i>fintech</i>	Unknown Words	Correctness
16.	<i>fintech</i>	Unknown Words	Correctness
17.	<i>be considered</i>	Passive Voice Misuse	Clarity
18.	<i>is predicted</i>	Passive Voice Misuse	Clarity
19.	<i>is reported</i>	Passive Voice Misuse	Clarity

20.	<i>is expected</i>	Passive Voice Misuse	Clarity
21.	fintech → fin-tech	Misspelled Words	Correctness
22.	<i>fintech</i>	Unknown Words	Correctness
23.	Davis,	Comma Misuse within Clauses	Correctness
24.	fintech → fin-tech	Misspelled Words	Correctness
25.	<i>be indicated</i>	Passive Voice Misuse	Clarity
26.	<i>fintech</i>	Unknown Words	Correctness
27.	fintech → fin-tech	Misspelled Words	Correctness
28.	fintech → fin-tech	Misspelled Words	Correctness
29.	<i>In this section, it is provided with the literature regarding the difference between the conventional banking industry and the fintech industry, especially in the context of Indonesia.</i>	Wordy Sentences	Clarity
30.	<i>Furthermore, it is also included in the literature on the matter of impact due to the rapid development of technology in the banking sector.</i>	Wordy Sentences	Clarity
31.	<i>fintech</i>	Unknown Words	Correctness
32.	<i>is known</i>	Passive Voice Misuse	Clarity
33.	<i>fintech</i>	Unknown Words	Correctness
34.	<i>fintech</i>	Unknown Words	Correctness
35.	<i>fintech</i>	Unknown Words	Correctness
36.	<i>fintech</i>	Unknown Words	Correctness

37.	Davis,	Comma Misuse within Clauses	Correctness
38.	<i>fintech</i>	Unknown Words	Correctness
39.	<i>be obtained</i>	Passive Voice Misuse	Clarity
40.	<i>fintech</i>	Unknown Words	Correctness
41.	<i>fintech</i>	Unknown Words	Correctness
42.	<i>Due to the strict regulations and rules that the incumbents have to follow, the fintech firms are able to capitalize the gap within the expectations and the demand of the banking customer and the fintech firms are able to create a product that specifically designs to fulfill the demand with superio...</i>	Wordy Sentences	Clarity
43.	<i>fintech</i>	Unknown Words	Correctness
44.	<i>fintech</i>	Unknown Words	Correctness
45.	<i>is presented</i>	Passive Voice Misuse	Clarity
46.	<i>is shown</i>	Passive Voice Misuse	Clarity
47.	<i>fintech</i>	Unknown Words	Correctness
48.	a an <i>entirely</i>	Determiner Use (a/an/the/this, etc.)	Correctness
49.	<i>fintech</i>	Unknown Words	Correctness
50.	<i>fintech</i>	Unknown Words	Correctness
51.	<i>fintech</i>	Unknown Words	Correctness
52.	<i>is caused</i>	Passive Voice Misuse	Clarity
53.	Zavolokina,	Comma Misuse within Clauses	Correctness

54.	<i>fintech</i>	Unknown Words	Correctness
55.	<i>In which, these companies are forced to make necessary changes to operate within the law, especially regarding the code of conduct and regulations in the matter of providing financial and banking services to the public.</i>	Wordy Sentences	Clarity
56.	<i>are applied</i>	Passive Voice Misuse	Clarity
57.	<i>fintech</i>	Unknown Words	Correctness
58.	<i>fintech</i>	Unknown Words	Correctness
59.	<i>are operated</i>	Passive Voice Misuse	Clarity
60.	<i>fintech</i>	Unknown Words	Correctness
61.	clear → transparent	Word Choice	Engagement
62.	<i>fintech</i>	Unknown Words	Correctness
63.	Zavolokina,	Comma Misuse within Clauses	Correctness
64.	<i>fintech</i>	Unknown Words	Correctness
65.	<i>fintech</i>	Unknown Words	Correctness
66.	<i>fintech</i>	Unknown Words	Correctness
67.	<i>fintech</i>	Unknown Words	Correctness
68.	<i>fintech</i>	Unknown Words	Correctness
69.	<i>fintech</i>	Unknown Words	Correctness
70.	<i>fintech</i>	Unknown Words	Correctness
71.	And → Moreover, Furthermore	Inappropriate Colloquialisms	Delivery

72.	<i>fintech</i>	Unknown Words	Correctness
73.	is able to → can	Wordy Sentences	Clarity
74.	<i>And, the due to the advancement of technologies and the flexibility of implementing those technologies, the fintech industry is able to adopt and implement the necessary technologies to maintain an adequate standard to meets the criteria of its current and potential customers.</i>	Wordy Sentences	Clarity
75.	<i>is defined</i>	Passive Voice Misuse	Clarity
76.	<i>fintech</i>	Unknown Words	Correctness
77.	<i>fintech</i>	Unknown Words	Correctness
78.	Hair,	Comma Misuse within Clauses	Correctness
79.	And → Moreover,, Furthermore,	Inappropriate Colloquialisms	Delivery
80.	<i>And this method is also used to find the nature of the relationship between the dependent and the independent variables.</i>	Wordy Sentences	Clarity
81.	<i>is given</i>	Passive Voice Misuse	Clarity
82.	<i>is presented</i>	Passive Voice Misuse	Clarity
83.	<i>is presented</i>	Passive Voice Misuse	Clarity
84.	<i>fintech</i>	Unknown Words	Correctness
85.	<i>is conducted</i>	Passive Voice Misuse	Clarity
86.	<i>were dissatisfied</i>	Passive Voice Misuse	Clarity

87.	<i>are still considered</i>	Passive Voice Misuse	Clarity
88.	Specifically → Correctly	Word Choice	Engagement
89.	<i>be used</i>	Passive Voice Misuse	Clarity
90.	<i>was found</i>	Passive Voice Misuse	Clarity
91.	<i>is recommended</i>	Passive Voice Misuse	Clarity
92.	<i>been performed</i>	Passive Voice Misuse	Clarity
93.	<i>are presented</i>	Passive Voice Misuse	Clarity
94.	<i>are positively related</i>	Passive Voice Misuse	Clarity
95.	<i>is suggested</i>	Passive Voice Misuse	Clarity
96.	<i>is implemented</i>	Passive Voice Misuse	Clarity
97.	<i>is found</i>	Passive Voice Misuse	Clarity
98.	<i>is found</i>	Passive Voice Misuse	Clarity
99.	<i>is indicated</i>	Passive Voice Misuse	Clarity
100.	<i>be excluded</i>	Passive Voice Misuse	Clarity
101.	<i>are applied</i>	Passive Voice Misuse	Clarity
102.	<i>In this section, the methodologies that already explained in section 3 are applied in order to fulfill the objectives in this research.</i>	Wordy Sentences	Clarity
103.	<i>are given</i>	Passive Voice Misuse	Clarity
104.	<i>is found</i>	Passive Voice Misuse	Clarity
105.	<i>is presented</i>	Passive Voice Misuse	Clarity
106.	<i>In which, the linear regression of</i>	Wordy Sentences	Clarity

	<i>equation (2) is statistically significant to analyze the movement of the IT impact in response to the IT implementation of banks in order to the meet the criteria and expectations of its customers.</i>		
107.	<i>is found</i>	Passive Voice Misuse	Clarity
108.	<i>In terms of the implementation of IT, it is found that the p-value of the variable stands at the level of 0.027 (where the p-value of the variable are below the 0.05 or 5% threshold); in which, the variable of IT implementation is statistically significant to describe the movement of the IT impact ...</i>	Wordy Sentences	Clarity
109.	And → Moreover,, Furthermore,	Inappropriate Colloquialisms	Delivery
110.	<i>And finally, in terms of the correlation of the IT impact and the implementation of IT stands at the level of 0.765 or 76.5%.</i>	Wordy Sentences	Clarity
111.	<i>are conducted</i>	Passive Voice Misuse	Clarity
112.	<i>is given</i>	Passive Voice Misuse	Clarity
113.	In accordance with → By, Following, Per, Under	Wordy Sentences	Clarity
114.	<i>fintech</i>	Unknown Words	Correctness
115.	<i>fintech</i>	Unknown Words	Correctness
116.	<i>In accordance with the phenomenon of the emergence of the fintech industry, the fintech industry is capable of producing a better application for its customers in terms of using the application for conducting digital financial and banking services.</i>	Wordy Sentences	Clarity

117.	<i>fintech</i>	Unknown Words	Correctness
118.	<i>fintech</i>	Unknown Words	Correctness
119.	<i>fintech</i>	Unknown Words	Correctness
120.	Zavolokina,	Comma Misuse within Clauses	Correctness
121.	<i>fintech</i>	Unknown Words	Correctness
122.	<i>is found</i>	Passive Voice Misuse	Clarity
123.	<i>To simplify the findings above</i>	Misplaced Words or Phrases	Correctness
124.	<i>is presented</i>	Passive Voice Misuse	Clarity
125.	<i>is found</i>	Passive Voice Misuse	Clarity
126.	<i>fintech</i>	Unknown Words	Correctness
127.	<i>is considered</i>	Passive Voice Misuse	Clarity
128.	<i>is indicated</i>	Passive Voice Misuse	Clarity
129.	in regard to → regarding, concerning, about, with	Wordy Sentences	Clarity
130.	<i>Furthermore, it is indicated that all of the incumbents have different priorities in regard to the implementation of IT in order to fulfill the criteria and the demands of its customers.</i>	Wordy Sentences	Clarity
131.	fintech → fin-tech	Misspelled Words	Correctness
132.	fintech → fin-tech	Misspelled Words	Correctness
133.	<i>Also, some of the incumbents believe it is essential to collaborate with the fintech firms in order to produce digital services That meet the</i>	Wordy Sentences	Clarity

	<i>preference of its customer in conducting the digital transaction; in which, some of the incumbents working together with the fintech firms in order to fill t...</i>		
134.	<i>is found</i>	Passive Voice Misuse	Clarity
135.	<i>fintech</i>	Unknown Words	Correctness
136.	<i>Also, it is found that not all the incumbents prioritize the same technology in their business in order to cope with the challenges that arise in the digital era; to be precise, in regards to the emergence of fintech and the changes in the preference of its customer.</i>	Wordy Sentences	Clarity
137.	<i>fintech</i>	Unknown Words	Correctness
138.	<i>is faced</i>	Passive Voice Misuse	Clarity
139.	<i>Based on the explanations on the challenges faced by the incumbents, the challenges faced by the incumbents are oriented on the approach to utilize their technology to understand and fulfill the demands, the criteria, and the preferences of its customers in conducting digital transactions.</i>	Wordy Sentences	Clarity
140.	<i>fintech</i>	Unknown Words	Correctness
141.	<i>fintech</i>	Unknown Words	Correctness
142.	<i>is identified</i>	Passive Voice Misuse	Clarity
143.	own	Wordy Sentences	Clarity
144.	<i>fintech</i>	Unknown Words	Correctness
145.	are able to → can	Wordy Sentences	Clarity

146.	are able to → can	Wordy Sentences	Clarity
147.	<i>is found</i>	Passive Voice Misuse	Clarity
148.	¶ Furthermore...	Intricate Text	Clarity
149.	<i>is dictated</i>	Passive Voice Misuse	Clarity
150.	<i>is found</i>	Passive Voice Misuse	Clarity
151.	<i>is found</i>	Passive Voice Misuse	Clarity
152.	<i>are faced</i>	Passive Voice Misuse	Clarity
153.	<i>fintech</i>	Unknown Words	Correctness
154.	<i>As for the changes in the preferences of the conventional banks' customers, the majority of the respondents in this research are engaging in the development of open API within their system.</i>	Wordy Sentences	Clarity
155.	<i>Hence, these engagements are also focusing on the improvement of the user's experience of its customers while using the application created by the Indonesian conventional banks.</i>	Wordy Sentences	Clarity
156.	<i>are given</i>	Passive Voice Misuse	Clarity
157.	<i>fintech</i>	Unknown Words	Correctness
158.	the incumbents should develop	Wordy Sentences	Clarity
159.	<i>fintech</i>	Unknown Words	Correctness
160.	<i>The findings, the challenges and the solutions in this research are in line with the research conducted by Brummer & Gorfine (2014) and Zavolokina et al. (2016) in terms of</i>	Wordy Sentences	Clarity

the emergence and the impact of the fintech industry, with the additions of the changes in the preference of customers in the ...

161.	<i>fintech</i>	Unknown Words	Correctness
162.	Specifically → Correctly	Word Choice	Engagement
163.	<i>are operated</i>	Passive Voice Misuse	Clarity
164.	<i>are classified</i>	Passive Voice Misuse	Clarity
165.	<i>Specifically, the perspectives in this research are only using the expert panels of individuals that are operated in the banks that are classified into the category of Book four banks in terms of the impact of IT and its implementations in Indonesia.</i>	Wordy Sentences	Clarity
166.	fintech → fin-tech	Misspelled Words	Correctness
167.	fintech → fin-tech	Misspelled Words	Correctness
168.	<i>Based on the conclusion and the explanations above, the future research regarding the role of IT in the Indonesian banking industry and the fintech industry will be including the perspectives of the incumbents and the fintech in regards to the implementation of technologies that can be used in crea...</i>	Wordy Sentences	Clarity
169.	<i>regtech</i>	Unknown Words	Correctness
170.	indonesia's → Indonesia's	Misspelled Words	Correctness
171.	<i>fintech</i>	Unknown Words	Correctness
172.	<i>fintech</i>	Unknown Words	Correctness

173.	Omarini → Omarion, Omari	Misspelled Words	Correctness
174.	fintech	Unknown Words	Correctness
175.	Navaretti → Navarette	Misspelled Words	Correctness
176.	Europoye → Europe	Misspelled Words	Correctness
177.	srl → Srl	Misspelled Words	Correctness
178.	<i>it was found that there was a negative</i>	Furman University Scholar Exchange - South Carolina Junior ... https://scholarexchange.furman.edu/scjas/2019/all/282/	Originality
179.	<i>are able to keep up with the trends</i>	Gemini Daily Horoscope - astrolis.com https://www.astrolis.com/horoscopes/gemini	Originality
180.	<i>2014. Digital Innovation as A Fundamental and Powerful Concept in The Information Systems Curriculum.</i>	'The Digital Wild West': Managing the Risks of Digital Disruption	Originality
181.	<i>Banks and Fintechs: How to Develop a Digital Open Banking Approach for the Bank's Future.</i>	Banks and Fintechs: How to Develop a Digital Open Banking ... http://www.ccsenet.org/journal/index.php/ibr/article/view/76769	Originality
182.	<i>Contemporary Studies in Economic and Financial Analysis, Volume</i>	Journal Articles CBK https://www.centralbank.go.ke/journal-articles/	Originality
183.	<i>The Company's Policy, Firm Performance, and Firm Value: An Empirical Research on Indonesia Stock Exchange.</i>	The Company's Policy, Firm Performance, and Firm Value: An ... http://aijcrnet.com/journals/Vol_2_No_12_December_2012/4.pdf	Originality
184.	<i>Determinants of bank profitability in a developing economy: Empirical evidence from the</i>	Risk, Profitability, And Competition: Evidence From The Chinese Banking Industry	Originality

185. *Philippines. Asian Academy of Management Journal of Accounting and Finance,* Risk, Profitability, And Competition: Evidence From The Chinese Banking Industry Originality