

ANALYSIS THE EFFECT OF INFORMATION TECHNOLOGY CAPABILITY, BUSINESS INNOVATION, DIGITAL DISRUPTION AND DIGITAL DISRUPTION REACTIONS ON SUSTAINABLE BANKING PERFORMANCE

Amirul Wicaksono, Itjang D. Gunawan, Zulkifli Husin

Abstract

Banks have an exclusive intermediary responsibility in maintaining sustainable development and have a demanding position related to digital technology development that requires banks to make adjustments. Technological innovations in financial services (FinTech) are overgrowing at this time. Referring to that, this research intends to examine more deeply the effect of information technology capabilities, business innovation, digital disruption and digital disruption reactions on sustainable banking performance. The object of the research was 54 banks that were categorized as Book I to Book IV Banks based on the decision of the Financial Services Authority (OJK). The sample used was 205 respondents who served as Chief Executive Officer (CEO)/ Chief Financial Officer (CFO) / Chief Technology Officer (CTO) / General Manager / Manager / Vice President. Purposive sampling used to determine the sample and Structural Equation Model (SEM) used for the analytical method. This study indicates that the direct effects of information technology capability and digital disruption reactions have a positive and significant effect on sustainable banking performance, and digital disruption has a positive and significant effect on digital disruption reactions. Only banking business innovation is having no significant effect on sustainable banking performance. While the indirect effect of digital disruption on sustainable banking performance mediated by the reaction to digital disruption shows positive and significant results.

The ability of qualified information technology supported by digital capabilities and investment in human capital through development with training and dissemination of digital product/service development will encourage higher banking performance. Whereas business innovations that did not significantly effect bank performance, banks must synergize and collaborate with digital service providers outside the bank. Also, digital disruption has a positive effect on digital disruption reaction so that banks are expected to quickly and appropriately integrate digital disruption into the corporate strategy in the form of RBB (Bank Business Plan) because this will positively effect sustainable banking performance. The limited research related to digital reaction makes this research as one of the essential studies for banks so that banking management can blend in the banking strategy so that the banking business system so that bank financial technology can continue to make adjustments to information technology so that it makes banking performance sustainable and competitive.

Keywords: Islamic Motivation Entrepreneurship, Islamic Ethics Business Islamic Business Performance.

Introduction

Demand in the global competitive business environment requires sustainable development commitment and sustainability issues concerns for strategic importance. There are three aspects of sustainability when assessing company performances: economic, social, and environmental performance (Ozcelik and Ozturk, 2014). Incorporating sustainability into the company's strategy requires evaluating the performance of the sustainability strategy as an awareness of the sustainability and activities of the company to improve the sustainability of the organization itself (Goyal et al., 2013).

Sustainable business model innovation is increasingly seen as a driver for system change for sustainability across businesses and industries including the banking industry. The bank holds a unique intermediary role in sustainable development (Yip and Boken, 2018). Modern business, which is characterized by rapid and dynamic change, successful business achievements and competitive advantages, is only

possible if companies implement their capabilities faster and wiser than their competitors through innovation (Cirera and Muzi, 2016) by utilizing investments in information technology (Turulja and Bajgoric, 2016) encourages organizations to achieve allocative efficiency and productivity.

Several studies have shown that investment in information and communication technology has a significant and positive influence on financial performance (Aral et al., 2006; Bresnahan et al., 2002; Brynjolfsson and Hitt, 2003; Dewan et al., 2000). This finding is consistent with Schumpeter's theory which recognizes the importance of change and technological innovation as a major driver of economic growth and company performance (Romer, 1990; David, 1990; Aghion and Howitt, 2007). Technological innovation plays a key role in explaining the dynamic nature of organizations (Cainelli et al., 2006). In the process, the company introduces new products, services and organizational processes, thereby gaining market share at the expense of competitors who do not innovate (Scott et al., 2017).

The company's technology adoption according to Anderson et al. (2006) emphasize that the need for technology development is very urgent in the financial services sector, especially with the current wave of "fintech" (financial technology) innovation, where the use of different technologies has different effects on organizations (Evangelista, 2000; Ajlouni & Al-Hakim, 2018). Fintech is narrowly interpreted by activating technology for financial services (World Economic Forum, 2017). Banks prefer to provide services using information technology-based channels and reduce dependence on branch offices (Gunsel & Tukel, 2011).

The success of digital innovation depends on digital investment and the support of resources. Digital investment is one of the supporting factors of banking related to product/service innovation and helping banks develop new business models to maintain sustainable business performance in the banking industry (Cirera & Muzi, 2016). Developing a new business model aims to create a sustainable banking business. The sustainability business model can be a useful framework for organizational 'system change' (Bocken and Short, 2015) through innovation. According to Girotra and Netessine (2013), business model innovations in various industries and enable systematization of the process of identifying, selecting, and refining innovations. There is an urgent need for a fundamentally different approach to value creation (Coulter et al., 2013). It is important to move from product and process modification to business model innovation (Lüdeke-Freund et al., 2016).

Research related to the impact of digital disruption as a result of technological developments, the support of information technology capabilities and business innovation today greatly affects the performance of sustainable banking. However, comprehensive research related to these three variables was not found because many studies conducted partial research. In 367 small companies in the US showed the significant role of new technologies introduced (Thong et al., 1996; Kuan and Chau, 2001) with the costs and risks associated with adopting and implementing higher ICT for companies in small companies because of limited resources and lack of knowledge related to technology management (Grandon and Pearson, 2004).

Rajapathirana & Hui (2018) in his research explained innovation in product, marketing, and organizational innovation activities on performance. Whereas Bughin & Zeebroeck (2017) research shows that digital disruption has a strong negative and significant effect on bank performance. Failure to react to digital disruption damages company performance. Whereas the mediating effect of strategic alignment on the performance-reaction relationship produces a positive and significant coefficient. This means that digital disruption will be significantly mitigated when integrated into the company's strategy. A strong strategic reaction will have a positive impact on company performance when digital is fully integrated into the company's strategy with higher revenue

growth. In Bughin & Zeebroeck (2017) research, it does not include aspects of human capital and business innovation in its research model. Meanwhile, according to Parimo (2017), human resource development activities should be considered more in the new economic period based on information technology. At the organizational level, human resources play an important role in strategic planning to create a competitive advantage.

The innovation of sustainable business models in addition to human capital is increasingly seen as a lever for system changes for sustainability throughout business and industry. Appiahene et al. (2019) in his research shows that business innovation through information technology investment will support banking performance in various bank branches. Information technology facilities will improve efficiency and effectiveness in terms of service to customers. This is an added value related to information technology investment because it will improve cost efficiency in banking activities and support banking operations to be more effective and competitive. Contrary to Yip & Bocken (2018) who conducted research related to Hongkong banking, explaining that adopting slow business model innovations in business is because the main players are international banks that are quite large and not proactive in screening unsustainable businesses, as well as perceptions of practicing sustainability. Raises short-term costs and involves changes in doing business so this has an impact on the low priority of the banking business agenda.

Referring to the background, this research aims to combine the variables of information technology capability, business innovation and digital disruption and digital disruption reaction on the performance of sustainable banking in the same research framework to produce a comprehensive study.

Literature Review

Business Sustainability

The main idea of all definitions of sustainability is, that there are interactions of three main systems, namely:

environmental, economic and social (Zyadat, 2017).

In the financial and banking industry, the concept of sustainability is the process of designing, building and running a banking business for the long term by taking a holistic view of resources. Sustainability in banking must be a perfect blend of corporate culture, efforts to innovate business and operations, and mutual excellence that leads to sustainable banking (Ramnarain & Pillay, 2016). The concept of a sustainable bank is a bank that reaches a certain level of global satisfaction that is good enough for all its stakeholders (Rebai et.al 2012).

Referring to the perspective of the organization, corporate sustainability is defined as meeting the needs of stakeholders both directly and indirectly, without compromising its ability to meet the needs of future stakeholders (Ozcelik & Ozturk,

2014). Hempel et al. (1994) adopted 4 stakeholder groups; namely surplus units, deficit units, owners and regulators (Rebai et al., 2012). Whereas Avkiran and Morita (2010) revealed that there are five stakeholders as follows: shareholders, customers, managers, employees, and regulators. This shows carefully the consideration of appropriate stakeholder classification. According to Rebai et al. (2012), sustainable banks must adapt to changes in the world. This must be done to create a strong and sustainable business value by respecting the rights of all stakeholders. One of the banking resources used in value creation and value offerings is technology support (Nosratabadi et.al, 2020; Bouwman et al., 2005). The Global Alliance for Banking on Values (GABV) (2012) defines that sustainable banks not only do not harm but actively use finance to 'do good'. For example, a crisis caused by technological disruption will trigger a rethinking of the 'unsustainable' business model adopted by banks (Stephens et al., 2012).

Case (2012) describes the history of the sustainable financial services sector as starting with: a) philanthropy giving back to the public from business profits; b) ethically / socially responsible investments by not investing in businesses that have negative social impacts; c) growth and value creation "manage sustainability risks and capture sustainability opportunities to achieve long-term performance". Sustainability in financial services does not only turn into the concept of "green" or environmentally friendly (Eccles and Serafeim, 2013); but rather the productive value, transparency and accountability to "shareholders" and "other stakeholders. Rogers (2013) highlights that banks and financial institutions have become one of the most untrustworthy organizations due to the lack of sustainable practices that have resulted in several companies going bankrupt.

The main idea, which must be recognized by the banking sector is that activities related to the environment and society can strategically increase profits through environmental stewardship and the promotion of social equality, by serving shareholders and producing greater quality goods/services. When that happens, the bank's value increases through increasing reputation, performance, and appreciation among key stakeholders (Stankeviciene & Nikonorova, 2014).

The Global Alliance for Banking on Values (GABV) formulates sustainable banks as providers of services and products that meet economic and human needs (Karkowska, 2019) with five main principles, namely: (i) triple bottom line approach to the main business model, (ii) community, (iv) long-term relationships with clients and a direct understanding of economic activities and risks that occur, (v) Long-term, independent efforts, and resistance to disruption, and (vi) Transparent and inclusive governance. Integrating sustainability into banking activities is an increasingly necessary but very challenging problem facing financial institutions. Sustainability integration takes two forms (Korzeb & Medina, 2019):

- i. Socially and environmentally responsible initiatives.
- ii. Integration of environmental and social considerations into product design, mission and business strategies

Gelder (2006) and Straw (2013) explain that sustainable banking cannot be created without a cultural change in organizations; Sustainable banking values need to be embedded intrinsically in corporate culture. Ernst & Young (2013) promote cultural factors in sustainable business, operations, products and service design; and ensure that corporate behavior adopted is also sustainable to create a banking company that is well synchronized in creating sustainability (Revell, 2013; Straw, 2013).

Organizational Level Innovation

Innovation is defined as the process of turning ideas into goods or services to create value for customers. Innovation involves the creation and implementation of new processes, technology, delivery methods, and human resources that result in a significant increase in production that makes the company more efficient than its competitors (Chai et al., 2016). Some researchers have advocated focusing on knowledge about capital assets compared to input or innovation results, which lead to new activities, to obtain investment in intangible assets using data from various sources (Corrado et al., 2005, 2006, and 2011; Hulten & Hao, 2012). This approach uses three general categories as activities related to innovation (or ability): (1) computerized information (software and databases); (2) innovative property (R&D and intellectual property protection costs, architectural and engineering designs); and (3) economic competence (brand name, company-specific human capital and organizational capital).

A sustainable business model as sustainable innovation, balancing the competing and complementary interests of the stakeholder segment, and the context of business sustainability must be a manifestation of economic viability and contribute to social and environmental sustainability (Edgeman and Eskildsen, 2013). The sustainable business innovation model seeks to "create significant positive benefits for negative impacts on the environment and society, through changes in the way organizations and values, create networks, deliver and capture value (Bocken and Short, 2015).

Sustainable Business Model for The Banking Industry

Commercial banks, as a service industry, play an important role in allocating financial resources for human and economic activities to develop, not only for now but also in the future. Also, the role of banks is to fund a stable and sustainable economy (Alexander, 2014). Although the direct impact on the environment related to banking operations may be small, the indirect impact is very large. There are opportunities to use the power of banks to address the immediate needs of the community through sustainable business model innovations for

banking (Yip & Bocken, 2018).

Yip and Bocken (2018) introduce a sustainable business model consisting of 1) maximizing material and energy efficiency, 2) replacing with digital processes, 3) encouraging adequacy, 4) adopting the role of stewardship, 5) creating inclusive value, 6) repurposing for the community/environment, 7) resilience in lending, 8) sustainable financial products. Whereas Nosratabadi et al (2020) explained that a sustainable business model includes value propositions, core competencies, financial aspects, business processes, target customers, resources, technology, direct relationships with customers, and partnership networks.

Digital Capability

The ability of corporate information technology according to Turulja and Bajgorić (2016) is defined as the ability of companies to select, accept, configure and implement information technology. In other words, information technology capabilities include information technology infrastructure within the company, as well as supporting processes and knowledge associated with it. According to Turulja and Bajgorić (2016), the concept of information technology capability is seen from three dimensions namely: information technology knowledge, information technology activities, and information technology infrastructure.

The three dimensions of information technology capability interact with each other and have an impact on the level of an organization that can utilize its investment to gain strategic advantage. Information technology resources include information technology infrastructure, human skills using information technology, and the ability of organizations to manipulate information technology which, when combined will form intangible resources called information technology capabilities (Bharadwaj, 2000). Whereas Mazidi et al. (2014) the scope of information technology capabilities includes four very important information technology-based resources, namely information technology infrastructure, human resources information technology, related information technology resources, and information technology business experience. Information technology capability is the ability to manage these resources that are used to compete in the industry or as a reference for gaining a competitive advantage. The information technology resource-based view shows that companies can and do differ from competitors using company information technology resources (Mazidi et al, 2014).

Disruptive Technology

Schumpeter (1942), defines creative destruction as “the process of industrial mutation that continues to revolutionize the economic structure from within, does not stop destroying the old to continue to create new ones. The process of destruction of creativity is related to capitalism (Bughin and Zeebroeck, 2017).

The concept of disruption to technology and innovation is discussed by Bower and Christensen (1995) and Christensen (1997). The starting point for these experts is the constant observation that many incumbent companies fail to adapt to radically new technologies and business models (Bower and Christensen, 1995). This theory argues that disruption occurs when superior technology in a new dimension that is attractive to dominant industries, will try to make improvements to other dimensions that meet the needs of the mass market. Technological inferiority causes incumbents to become unaware or disturbed by change and eventually begin to be disrupted, and with technology, disruptions will improve the business model of new entrants to the industry to attack the full incumbent mass market segment.

The emergence of disruptive innovations creates winners and losers. Winners are companies that have the skills needed to take advantage of innovation. The benefits of innovation in the industry are distributed among different groups such as innovators, customers, suppliers, imitators, and other followers (Rad, 2017).

Responses to Digital Disruption

Christensen (1997) offers two alternative strategies related to response to disruption: ignore disruptions (ie stick to the main strategy) or embrace disruption and this is preferred in separate businesses. Charitou and Markides (2003) challenge this dichotomy and offer richer possibilities: using both extreme scenarios (ignoring or embracing disturbances) and adding the possibility of investing in a business by maintaining existing businesses in parallel with new businesses based on disruptive elements), or Strike back through disruption of a strategy called “leap”. The optimal response depends on the ability and motivation of existing companies to respond to existing disturbances (Bughin and Zeebroeck, 2017).

Adner and Snow (2010a, b) and Adner and Kapoor (2016) emphasize one possibility of overreaction, called “bold retreat”. This is a defensive strategy that consists of refocusing the business on specific market segments that can be maintained where the old market proposition can still dominate the new. But this can be done if digitization leads to new variations in demand. However, Chandy and Tellis (2000), Christensen and Overdorf (2003) and Charitou and Markides (2003) stated that old players would be wiser to adopt offensive responses, capture new products and segments, and usually by accessing new resources through alliances and or acquisition. Kane et al (2015) also recognize that the most appropriate digital strategy is to change original business through a new offensive business model.

Bughin & Zeebroeck (2017) classifies strategic reaction ranks on two vertical and horizontal axes: the level of investment in the source of the disturbance (ie digital technology) and the extent of changes in the company’s or business strategy (ie strategic transformation). Along the

horizontal axis the intensity of digital investment versus the competition and along the vertical axis of strategic transformation combined into 4 (four) special clusters: weak reaction (no reaction), medium reactions, semi bold reactions and bold at scale reactions. Industries that dare on a large scale bring major changes to the company's strategy. These changes involve 3 types of strategies: acquisition or development of new business and/or customer segments, the introduction of new business models (disrupting) even the risk of loss of existing revenue and redefining the company's value chain. The digitalization of media as a disruptive innovation due to demographic factors, behavior and expectations of new consumers, challenges of the ecosystem and technological processes are four types of elements that act as drivers of disruptive innovation (Rad, 2017).

Hypothesis

The Influence of Information Technology Capability on Sustainable Banking Performance.

The relationship between information technology and company performance refers to the capability-based view and uses information technology capabilities as input (Lin, 2007). Information technology investment is assumed to lead to better information technology capabilities which in turn leads to competitive advantage (Ou et al., 2009). The ability of a company's information technology involves its ability to mobilize and disseminate information technology-based resources in combination or in collaboration with other resources and capabilities, which in turn has a significant impact on the company's performance. Information technology resources consist of three parts: (a) tangible resources consisting of information technology infrastructure, (b) human resources related to information technology consisting of technical skills and managerial capabilities of information technology, and (c) intangible resources information technology such as information management capabilities (Bharadwaj, 2000). Information technology resources in combination create

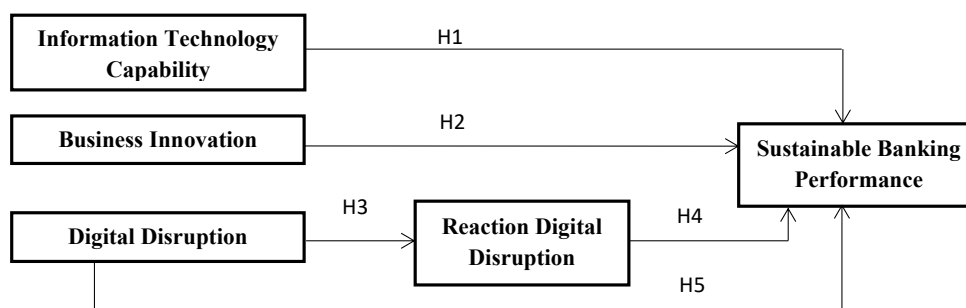
broad information technology capabilities (Bharadwaj, 2000) that lead to competitive advantage and better company performance increasing revenue and lowering costs. Thus the company's information technology strategy must be supported by the human dimension that facilitates organizational learning as the main determinant of information technology success. Referring to the theory and previous research, the research hypothesis is as follows:

Hypothesis 1: Information technology capability has a positive effect on the performance of sustainable banking

The Effect of Business Innovation on Sustainable Banking Performance

A company's ability to innovate is the most important determinant of success (Calontone et al, 2002). Innovation is recognized as one of the main assumptions of the company's competitive advantage and business performance, especially in the modern economy. Business model innovation is a system-oriented approach; not only product processes and innovations (Laukkanen and Patala, 2014; Peric and Djurkin, 2014). Yip and Bocken (2018) view business model innovation as a change of mindset that starts with innovation (product/process) which will serve as a catalyst for further innovation, which will ultimately change the organization's business model. Besides, Yip & Bocken (2018) explained that an innovative business model is the result of a deliberate and sustainable process that includes economic, social and environmental benefits in generating profit regularly. Lüdeke-Freund et al. (2016) explain that the company involved in business model innovation is a deliberate decision. The creation of integrated ecological, social and economic values will likely require a radical new business model. Similar to the archetype of a sustainable business model according to Bocken et al. (2014) can be seen as a key innovation driving sustainable business model innovations. Referring to the theory and research results, the research hypothesis is as follows:

Conceptual Framework



Hypothesis 2: There is a positive influence of business innovation on the performance of sustainable bankin

The Effect of Digital Disruption on Digital Disruption Reaction

Research by Bughin and Zeebroeck (2017) shows that digital disruption has a strong negative and significant effect on firm performance. The effect of digital disruption is very negative and significant in companies that react weakly and react moderately, but it is not significant for companies that are rather brave and brave in responding to digital disruption. This provides further confidence that failure to react to digital disruption damages company performance. So the hypothesis of this study is as follows:

Hypothesis 3: There is a digital effect on digital disruption reactions.

The Effect of Digital Disruption Reaction on Sustainable Banking Performance

Bughin & Zeebroeck (2017) explains that companies that pay attention to and react to disruptions can overcome the most important disruption effects: (i) organizations react boldly in terms of strategic transformation and digital investment and (ii) integrate digital efforts into corporate strategy. Such successful steps require a focus on innovation and new business development that utilizes digital capabilities, rather than maintaining existing business lines and ignoring opportunities through cost-cutting, automation, or improving existing customer service. Therefore, the current empirical research finds that it is consistent with Christensen's (1997) disturbance theory that organizations must dare to react and be offensive and embrace the sources of disturbances. These results are also consistent with the results of Westerman et al. (2014), which shows that digital transformation leads to superior performance. So the hypothesis of this study is as follows:

Hypothesis 4: There is an effect of digital disruption reaction on sustainable banking performance

The Mediation Effects of Digital Disruption Reaction between Digital Disruption to Sustainable Banking Performance

The Bughin & Zeebroeck (2017) study explains that the mediating effect of strategic alignment on the relationship of reaction and performance results in positive and significant coefficients meaning that if digital disruption can be significantly mitigated when integrated into the company's strategy then it will further improve company performance. So the hypothesis of this study is as follows:

Hypothesis 5: The effect of digital disruption on sustainable banking performance is mediated by the digital disruption reaction

Methodology

The design in this study uses a hypothesis testing method that explains the effect of IT capability, business innovation and digital disruption on sustainability banking performance with the mediating variable reaction to digital disruption. The object of the research is the banks in the category of BUKU 1 to BUKU 4. The quantitative approach uses structured interview techniques through questionnaires to Chief Executive Officer (CEO) / Chief Financial Officer (CFO) / Chief Technology Officer (CTO), / General Manager / Manager / Vice President. The qualitative approach in this study uses in-depth interviews with internal stakeholders, namely CEO and Director of the bank. The definitions and measurements of each variable are shown in Table 1. below:

Respondents' answers used a Likert scale, namely: 1 = Strongly Disagree, 2 = Disagree, 3 = Agree, and 4 = Strongly Agree.

The analytical method used for hypothesis testing is the Structural Equation Model (SEM). To test the validity measured using Confirmatory Factor Analysis (CFA). The factor loading value uses a cut off of 0.4 because the total sample used in this study is 205 respondents (Hair et al, 2014). While the reliability test uses the calculation of construct reliability and generally accepted rules are alpha values between 0.6-0.7 indicating an acceptable level of reliability (Ursachi et al., 2015. Based on the results of the study showed that 40 indicators used in this study the study has an adequate level of validity and reliability.

Result

SEM Model Testing is used to test the relationship between constructs developed by research. Therefore SEM analysis is carried out by the AMOS version and simultaneously analyzes the good-of-fit index. The results are supported by a Good fit index. For the whole model, the statistical results show that the CFI indicator with a value of 0.910 is more than the cut-off 0.90 and the RMSEA is 0.068 which is between the cut-off interval of 0.03 to 0.08 so that based on the two indicators the model is declared good fit. After being declared valid, reliable and a good fit model, the hypothesis test is then conducted.

Hypothesis Test

Hypothesis testing using the Structural Equation Model (SEM) method in this study refers to the results of Table 2

Direct Effect

Tests on the influence of information technology capabilities on sustainable banking performance show that the information technology capability coefficient is positive at 0.208 with a p-value of 0.0085 (0.017 / 2) smaller when compared to $\alpha = 0.05$ meaning that information technology capability has a positive effect and significant towards sustainable banking performance. The positive influence shows that the higher

Table 1: Variables and Variable Measurements

Variable	Dimension	Indicator	Source
<p>Sustainable Banking Performance</p>		<ol style="list-style-type: none"> 1. Overall bank business performance has been fulfilled in the previous year (Fortunately) 2. The bank’s overall business performance in the previous year surpassed the bank’s main competitors 3. Top bank management is very satisfied with the overall business performance of the previous year 4. Banks have greater exposure to customers both in the form of funds and loans 5. The bank continues to allocate funds for investment in technology every year to support business development 6. The bank continues to allocate funds for investment every year in increasing the specialization of human resources, especially relating to the application of digital technology 7. The Bank always monitors and evaluates every year related to the effective use of digital technology 8. If there is digital interference due to improper use of technology, the bank’s top management takes action for improvement 9. Banks are quick to respond to market needs related to digital needs and continue to improve performance to improve customer satisfaction 10. With the use of digital technology productivity per employee is higher than last year 11. The use of digital technology at banks creates cost-efficiency. 12. Innovations introduced in the last three years have contributed to the growth of bank revenue 13. The quality of bank products/services is better than the previous year 14. Customer satisfaction is higher than the previous year 15. The market share of bank companies is higher than last year 16. The number of bank customers is higher than last year 	<p>Kmicciak et.al, (2012),Parnel (2010),Olson et.al (2005); Jaworski and Kohli(1993)</p>

Variable	Dimension	Indicator	Source
<i>IT Capability (Information Technology/ IT)</i>	<i>Digital Capability</i>	<ol style="list-style-type: none"> 1. The bank's owner/management is very knowledgeable about new IT-based innovations 2. The Bank has the support of IT technical facilities that meet business needs 3. Bank management continues to update information technology, systems, software, and related tools 4. Bank management continues to increase the capacity of information technology, systems, software, and related tools 5. Bank management focuses on information and communication technology to improve customer relations 	Gunsel and Tukul (2011); Kmiecziak et.al. (2012)
	<i>Human Capital Support</i>	<ol style="list-style-type: none"> 1. The Bank has a training program on new software and systems for employees 2. The Bank has a training program on supporting equipment of new software and systems 3. Banks prefer to hire qualified people who can effectively use new technologies and systems 4. The bank has a high level of IT technical expertise 5. Banks encourage people to think and act in original and new ways. 6. Banks are very flexible and continue to adapt related to changes in the use of information technology 7. Bank employees get a lot of support from managers if they want to try new ways to do something related to IT 8. The bank's reward system encourages employee IT innovation at the bank's internal 	Gunsel and Tukul (2011); Kmiecziak et.al. 2012)
Business Innovation		<ol style="list-style-type: none"> 1. The bank creates digital-based products and services in the banking industry 2. Every year the bank introduces digital-based products and services 3. The bank develops digital products and services with ideas obtained from internal banks. 4. The bank develops digital products and services through collaboration with partners/vendors 5. In the face of competition (Fintech), banks conduct new digital-based business models 	Bircan and Haas (2015)
<i>Digital Disruption</i>		<ol style="list-style-type: none"> 1. Banks face competition with new business models 2. The bank is expanding new markets (new target customers) related to new digital-based businesses 3. At present, the market share owned by other incumbents is missing from the industry as a consequence of the growth of innovation 4. Banks are faced with threats posed by digital innovations with digital business models conducted by competitor banks 	Markides and Charitou (2004)

Variable	Dimension	Indicator	Source
Digital Disruption Reaction		<ol style="list-style-type: none"> 1. The value of digital technology investment in the past three years in banks is greater than in competitor banks 2. The Bank has taken initiatives and actions towards digital transformation by a special division 3. The bank has changed the company's long-term strategy to overcome digital disruption. 4. Banks become leaders in digital transformation in the banking sector compared to competitor banks. 	Bughin and Zeebroeck (2017)

the capability of bank information technology, sustainable banking performance will be higher.

Tests on the effect of business innovation on sustainable banking performance show that the coefficient of business innovation is positive at 0.115 with a p-value of 0.094 (0.188 / 2) greater when compared to $\alpha = 0.05$ meaning that business innovation has no significant effect on sustainable banking performance.

Tests on the effect of digital disruption on the reaction to digital disruption show that the digital disruption coefficient is positive at 0.974 with a p-value of 0.0000 smaller when compared to $\alpha = 0.05$ means that digital disruption has a positive and significant effect on the reaction to digital disruption. The positive effect produced by the coefficient of digital disruption means that if digital disruption is higher the reaction to digital disruption will also be higher.

Tests on the effect of reactions to digital disruption on sustainability banking performance that the reaction coefficient on digital disruption is positive at 0.974 with a p-value of

0.0000 smaller when compared to $\alpha = 0.05$ means the reaction to digital disruption have a positive and significant effect on sustainability banking performance. The positive effect generated by the reaction coefficient on digital disruption means that if the reaction to digital disruption is higher then the sustainability of banking performance will also be higher.

Indirect effect

Test the effect of digital disruption on sustainable banking performance mediated by the reaction to digital disruption shows that there is a direct positive and significant effect of digital disruption on the reaction to digital disruption with a coefficient of 0.974 and also directly there is a positive and significant effect on the reaction to digital disruption in sustainability banking performance with a coefficient of 0.345 with a p-value of 0.0000 smaller than $\alpha = 0.05$ so it can be concluded that indirectly there is a positive and significant effect of digital disruption on sustainable banking performance mediated by reactions to digital disruption, this is indicated by the value of the coefficient indirect effect of 0.33603 (0.974 X 0.345).

Table 2: Hasil Uji Hipotesa Penelitian

Hypothesis		Path	Coefficient	P-Value	Conclusion
Hypothesis 1	Information technology capability (ITC) has a positive effect on sustainable banking performance (SBF)	ITC → SBF	0,208	0,017	Hypothesis 1 Supported
Hypothesis 2	Business Innovation (BI) has a positive effect on sustainable banking performance	BI → SBF	0,115	0,188	Hypothesis 2 Not Supported
Hypothesis 3	Digital disruption (DD) has an effect on the reaction of digital disruption (RDD)	DD → RDD	0.974	0,000	Hypothesis 3 Supported
Hypothesis 4	Digital disruption reaction has an effect on sustainable banking performance	RDD → SBF	0.345	0,000	Hypothesis 4 Supported
Hypothesis 5	Digital disruption has an effect on sustainable banking performance mediated by reactions to digital disruption		0,3363	0,000	Hypothesis 5 Supported

Discussion

The Influence of Information Technology Capability on Sustainable Banking Performance.

The results of this study indicate that there is a positive and significant influence of information technology capabilities on sustainable banking performance. Human resource support or commonly referred to as human capital is very important for organizational improvement that is seen in organizational performance. With the capability of information technology that has competence and quality, it can effectively use new information and communication technology and systems.

Information technology capability enhancements must continue to be carried out routinely related to the type of information technology used in the organization by organizing or sending employees to training programs to use new software, systems, and equipment and tools. Types of training related to banking innovation are Digital Transformation Management; Digital Payment - Application; Big Data - Analytic Data; AI - Artificial Intelligent; API - Intelligent Application Programming; Digital Marketing & Design Thinking, Digital Disruption, Scrum, Design Thinking. The information technology strategy undertaken by 54 banks must also be supported by the human dimension that facilitates organizational learning as the main determinant of information technology success. So, it is important to consider the factors that influence human resources or human resources when evaluating the contribution of information technology to company performance. Supported by banking human capital in the field of information technology will have an impact on-time efficiency, effective service to consumers, and banks that allocate funds in the information technology sector will tend to attract investors to invest their funds in organizations so that the impact of sustainable banking performance will be better. The results of this study support the research conducted by Gungsel and Tukel (2011), Mazidi et.al (2014), Turulja and Bajgoric (2016) and Dantsoho and John (2017).

The effect of business innovation on sustainable banking performance

The results of this study indicate that business innovation in 54 banks which are the objects of this study show no significant effect on the performance of sustainable banks. This happens because the digital-based products and services currently available in 54 banks which are the object of research have been implemented and have not experienced significant changes.

So the impact of business innovation on sustainable banking performance is also insignificant. The business innovation that was carried out did not have a significant impact on changes in profits and expansion of market share, this is because the characteristics of bank products and services tend to be the same and have been applied for a long time for example fund products (savings, current accounts, deposits) and loans (consumptive, productive, commercial). Business model innovation is a system-oriented approach; not only product processes and innovations (Laukkanen and Patala, 2014; Peric and Djurkin, 2014). Yip and Bocken (2018).

Today's, business model innovations by banks use a system, process and product-oriented approach. The system-oriented business approach to banking is an intermediary which consists of funds and loans. The approach oriented to the process of interaction with customers, among others, through electronic and digital means (m-banking, internet banking, sms banking) and product innovation has also been carried out in the form of access to a source of funds, namely the use of savings to make payment transactions. As a payment instrument based on the ownership of a customer's savings account, its use is done by directly debiting the account for payment of economic obligations that arise. However, the application of systems, processes and business products to banks in Indonesia did not experience significant changes. This can be seen in the history of the Indonesian banking business system with the channel transaction model through savings by customers and the year banks started using it in table 3. below:

Technological developments include fintech and blockchain technology, booming crowdfunding and peer-to-peer lending, and the threat of rapid start-up can accelerate the innovation process in the banking industry, because this to a certain extent, facilitates dis-intermediation that threatens the banking business traditional, but there are still banks that have not adjusted to this change, for example, the Regional Development Bank (BPD). So that the test results do not support hypothesis 2 in this study. This study supports the research conducted by Yip and Bocken (2018) because the results indeed show that banks are slow in doing business innovation, and contrary to the results of research conducted by Turulja and Bajgoric (2016) that banks are quick to respond to business changes including information technology investments in the corporate strategy, it will support the sustainability of banking performance.

Brynjolfsson and Hitt (2000) state that information

Table 3: History of the Indonesian Banking Business System with the Transaction Channel Model

<i>Channel</i>	<i>ATM</i>	<i>Phone Banking</i>	<i>SMS Banking</i>	<i>Internet Banking</i>	<i>Mobile Banking</i>
Years	1987-1992	1995-1998	2001-2005	2002-2006	2008-2010

technology investment sometimes require greater investment and more time in organizational change, but in this study, there are still banks that allocate information technology investments whose nominal value is less than Rp 1,000,000,000 so that it causes limited infrastructure provision and the limitations in creating digital-based products and services.

The Effects of Digital Disruption on Digital Disruption Reaction

The digital disruption variable on digital disruption reaction showed a positive and significant effect on 54 banks which were the object of this study. This shows that the higher the digital disruption, the higher the reaction to digital disruption. In 54 banks in this study reacted to digital disruption to overcome the disruption effects related to banking operations by (1) banks reacting boldly in terms of strategic transformation and digital investment and (2) integrating digital efforts into corporate strategy. This can be seen from the bank's response in using information technology support and dare to invest a budget to support information technology infrastructure. The highest budget allocation for information technology investment from 54 banks is more than Rp. 25,000,000,000, while the lowest is less than Rp. 1,000,000,000. With this investment, value shows the high response of banks in adjusting banking business activities with changes in information technology. Digital tools used in supporting banking activities include Digital Payment - Application; Big Data - Analytic Data; Chatbot based AI - Artificial Intelligence; Digital Onboarding - Opening Accounts, Biometric, IoT, RPA, Blockchain, Digital Platform, Cloud Architecture, I-Banking and M Banking.

Increased use of digital information technology will be at risk for the increasing disruption faced by banks. However, digital disruption can be dealt with significantly because banks integrate digital disruption in corporate strategies, among others, with initiatives and actions towards digital transformation by special divisions by (1) setting priorities for digitizing models and business processes that can be done by alternative development alone or synergize with vendors (financial technology) and (2) change the company's long-term strategy to overcome digital disruption by increasing the proportion of investment in information technology infrastructure and digital capabilities (HR).

Effect of Digital Disruption Reaction on Sustainable Banking Performance

A strong strategic reaction has a positive impact on company performance because it encourages higher revenue growth even though it cannot exceed competitors engaged in the banking sector as well. Compared with the medium reaction and not integrated into the company's strategy will only have a small impact on revenue growth if it is not integrated. This is supported by the results of interviews with 7 top-level bank management explaining that the awareness of the banking industry with digital disruption is felt with rapid changes and

disrupting business presence, where disruption is not only changing the way of doing business but business fundamentals. One of them is shown by starting to emerge digital or fintech financial companies that are starting to destroy the function of banks little by little. To face the era of digital disruption, the bank optimizes digital development supported by the use of information technology and product/service innovations that are in line with digital developments marked by improvements in internet telecommunications infrastructure, high smartphone penetration, increased millennial generation, changes in consumer tastes and financial transaction innovations. In anticipation of the disruption condition, banks have tried to develop digital services by following the payment system trend, namely ease of accessing savings accounts that can be easily transacted through electronic channels. It is important to prepare support that supports the readiness of banks in the face of digital disruption, namely: up to date technology systems that support business needs; operational support that can manage transaction reconciliation settlements (transaction settlement systems) and customer service units that conduct direct interactions to ensure bank operations run as expected.

The digital mindset in management of information technology by management as outlined in the RBB (Bank Business Plan) which contains significant initiatives relating to the implementation of digital technology to support the business and operations of the bank. The top-level management (Directors) provides strategic policy direction which is understood that digital disruption must be anticipated by the digital banking business plan which is the policy for short-term and long-term business development. The digital policy is carried out by applying a digital mindset in every business process development in each department, including evaluating old business processes that are tailored to support new digital capabilities. Digital technology has formed a new phenomenon in which the existence of bank businesses is disrupted by the presence of technology-based financial companies (fintech) which are changing the business map of the financial industry including banking. Digital transformation is the key to maintaining the existence of bank businesses, the banking sector must immediately think of the business style of startup companies (start-ups) that offer the ease and convenience of bank transactions through digital channel access.

Customer preferences determine the direction of anticipation of banks facing digital disruption, with business strategies that encourage incumbent or existing banks to try to change the business model to be more adaptive. The use of smartphones by customers is one of the main reasons for banks to focus on developing features in the mobile banking application which is a factor for retention and acquisition of new customers, where increasing the number of users and number of transactions will increase fee base income for banks. The tendency for the bank's future strategy is to become more adaptive, flexible and agile in developing products/services according to the needs and characteristics desired by customers.

The direction of service feature development is based on input from social media, comments from Playstore user applications, responses from customer services that interact directly with customers and the requirements of related parties/institutions in the payment system digital ecosystem. Improving the process of product innovation and solutions at the bank with a customer-centric approach. The mastery and capability of digital technology are done by building a culture of customer-centric product development that is agile (agile adapt), which is to continue the initiation of product development patterns to create a culture of customer-centric product development, not product-centric development. Banks will be faced with two things: ignoring disruption (ie sticking to the main strategy) or embracing disruption and blending in the current banking business strategy as explained by Christensen (1997).

The results of this study support the research of Bughin & Zeebroeck (2017) which explains that digital disruption has a strong negative and significant effect on company performance. The effect of digital disruption is very negative and significant in companies that react weakly and react moderately. The essence of this research is that companies respond quickly and effectively and efficiently to digital disruption. As well as supporting research conducted by Westerman et al. (2014), which states that digital transformation leads to superior business performance.

The Effect of Digital Disruption on Sustainable Banking Performance Through Digital Disruption Reaction

The mediating effect of aligning strategies on the relationship of reaction and performance shows positive results, meaning that the 54 banks that were the object of research succeeded in carrying out practices aimed at tackling digital disruption and providing improvements to banking performance. sustainable. This is supported by the results of interviews at 7 Top-level bank management explained that bank planning in anticipating demands and changing business environment due to digital disruption is by adapting to new developments that support businesses in the digital age, collaborating with support institutions and businesses that have capabilities digital technology and cooperating with banks in the industry to advance certain services/products. Bank synergy and collaboration with fintech provide a good influence for new digital product and service innovations. Ease of transactions provided by applications developed by fintech (for example, gojek with gopay) and collaboration with banks in providing top-up features for electronic money through mobile banking, become a solution digital transactions that can be used by customers/customers in an integrated manner. New business innovations are developed in collaboration with partners from large institutions to digital startups. The strategy that was advanced to deal with digital disruption in its main bank was to innovate digital services according to market trends and collaborate with the same digital services. The alternative to facing the development of digital bank products/services

can form venture capital to be able to finance startups fintech whose products/services are in line with the bank's business strategy, so that technology development efficiency, speed of application system development and business models can be better suited to the needs of customers/customers. The results of this study support the research of Bughin and Zeebroeck (2017) explaining that the mediating effect of digital disruption reaction between digital disruption and performance is positive meaning that if digital disruption can be significantly mitigated when integrated into the company's strategy then it will further improve company performance.

Conclusion, Implications and Suggestions

Referring to the results of the analysis, several conclusions can be drawn, namely: Directly the ability of IT and the reaction to digital disruption have a positive and significant effect on sustainable banking performance. But business innovation has no significant effect on sustainable banking performance. Digital disruption has a positive and significant effect on digital disruption reaction. And indirectly there is a positive and significant effect of digital disruption on sustainable banking performance mediated by the reaction to digital disruption.

Theoretical Implications.

In this research, the theoretical contribution of qualified information technology capabilities will drive the achievement of higher banking performance. Also, digital disruption reaction is a mediating variable between digital disruption and sustainable banking performance. If digital disruption is higher then organizations must respond quickly and make changes because these changes are strategies of competitive advantage among similar businesses. The results of this study indicate that the effects of digital disruption have a positive and significant impact on companies that dare to react and dare to respond to digital disruption to be included in corporate strategy. This provides further confidence that success in reacting to digital disruption will improve company performance so that sustainable banking performance will be better.

Managerial Implications

Referring to the research results obtained that:

1. The capability of information technology is very important supported by digital capabilities and the support of reliable human resources. Digital capability through reliable information technology infrastructure will greatly support banking operations, among others, to meet customer demands to be able to transact banking 24 hours from anywhere, and the efficiency of banking operations so that bank management is advised to allocate an adequate budget for IT infrastructure investment. Also, if there are limited sources of investment budget to support it, banks can collaborate with existing digital banking service providers to obtain costs that are appropriate

to the scale of the bank's business but can still obtain digital services that meet the demands of the banking industry. Besides, human capital support is one of the benchmarks of success in improving sustainable banking performance so that banking management must conduct various developments with training and dissemination of digital product/service development to remain relevant to the development of digital business, which if not carried out will have a negative impact digital disruption will adversely affect bank performance. A digital mindset that must be owned by every employee can be explained that digital disruption is not only related to the technology used, but also the work patterns and business patterns of banks that utilize advances in digital technology.

2. Business innovations undertaken by banks which are the objects of research do not have a significant impact on sustainable banking performance, so that synergies and collaborations with digital service providers outside banks such as financial transaction aggregators and financial technology startups that have grown to become a means for banks to develop product innovations/service according to current customer preferences. Banks need to open themselves to synergize and collaborate by utilizing innovative ideas from fintech companies from outside the bank that bring new business models and business processes, which will get better and more efficient by the development of digital technology. As an institution that traditionally has fairly strict banking business regulations, wherein Indonesia is overseen by Bank Indonesia (BI) related to the payment system and Financial Services Authority (OJK) related to bank products, the speed of the process of licensing a bank service product needs to be accelerated so that the speed of bank business innovation can be comparable to new service products from financial technology startups.

3. Digital disruption has a positive impact on the reaction to digital disruption so that banks are expected to quickly and appropriately integrate digital disruption into the company's strategy, among others, take the initiative and action on digital transformation by special divisions by:

i. Make a priority scale for digitizing models and business processes that can be done by alternatively developing themselves or synergizing with vendors providing transaction services and financial technology (fintech)

ii. Changing the company's long-term strategy to overcome digital disruption by increasing the proportion of Information Technology infrastructure investment and digital capabilities (HR).

4. A strong strategic reaction has a positive impact on the performance of sustainable banking so that a digital mindset in managing information technology is needed by management as outlined in the RBB (Bank Business Plan) which contains significant initiatives relating to:

i. Implementation of digital technology to support business and bank operations, including developing business processes in each department.

ii. Evaluation of old business processes that are adjusted with the support of new digital capabilities that apply start-up business style.

iii. Development of service features is based on social media input, comments on Playstore user applications, customer service responses that interact directly with customers and the requirements of related parties/institutions in the payment system digital ecosystem.

iv. Improving the process of product innovation and solutions at the bank with a customer-centric approach. The mastery and capability of digital technology are done by building a culture of customer-centric product development that is agile (agile adapt), which is to continue the initiation of product development patterns to create a culture of customer-centric product development, not product-centric development.

5. The mediating effect of aligning strategies on the relationship of reaction and performance shows positive results. Bank planning in anticipating the demands and changing business environment due to digital disruption is to adapt to new developments that support business in the digital era, including:

i. Collaborate with support institutions and businesses that have digital technology capabilities such as switching service provider technology aggregators for Indonesian Standard QRIS (Quick Respond Code) transactions so that bank customers can make payment transactions at any merchants that are nationally incorporated.

ii. Co-operate with banks in the industry to advance certain services/products such as using the GPN (National Payment Gateway) transaction standard so that the bank is incorporated in a system that connects various electronic payments or non-cash transactions on debit cards or ATM cards in one payment system that integrated.

iii. Bank synergy and collaboration with fintech such as the utilization of electronic money top-up balances issued by fintech by using various bank-owned electronic transaction channels, namely ATM, mobile banking, sms banking and internet banking, to provide a good influence for the innovation of new digital products and services that people use every day.

Based on the research process and results, the following are limitations and suggestions for future research.

1. The number of banks that succeeded in responding to the filling out of questionnaires and interview interviews was 54 banks out of a total of 112 banks in Indonesia when

they were conducted so that further research is expected to conduct the same study in other financial institutions that also use digital technology as a tool support the operational activities of the organization in the hope that the findings can be generalized throughout the financial services industry. Also, future researchers must use more representative sampling strategies to generalize their research findings.

2. Further research can also be carried out in industries other than the banking industry and the financial services industry so that the results of research related to digital disruption of various industries can be seen in the variation of results to get an understanding of the positive and negative impacts as input to anticipatory responses that must be carried out by companies which have existed in the industry for years.

3. Add research variables and relevant indicators that theoretically affect the sustainability of banking performance such as the example between Dynamic Information Technology Capabilities (DITC) which is proxy through IT knowledge creation, IT infrastructure flexibility, IT personnel expertise and IT management capability (Dantsoho and John, 2017).

References

- Adner, R. and R. Kapoor. (2016). Innovation ecosystems and the pace of substitution: Re-examining technology S-curves. *Strategic Management Journal*, 37, 625–648.
- Adner, R. and D. Snow. (2010). Old technology responses to new technology threats: demand heterogeneity and technology retreats. *Industrial and Corporate Change* 19/5, 1655-1675.
- Aghion, Philippe, Howitt, Peter. (2007). Capital, innovation, and growth accounting. Oxford: *Rev. Econ. Policy* 23 (1), 79–93.
- Ajlouni, Ahmed T.Al & Monir Al-hakim. (2018). Financial Technology in Banking Industry: Challenges and Opportunities. Presented in the *International Conference on Economics and Administrative Sciences ICEAS 2018*. published by: <https://www.researchgate.net/publication/331303690>
- Alexander, K. (2014). Stability and Sustainability in Banking Reform: Are Environmental Risks Missing in Basel III. *CISL & UNEP FI*: Cambridge and Geneva.
- Anderson, Mark C., Banker, Rajiv D., Ravindran, Sury (2006). Value implications of investments in information technology. *Management Science* 52 (9), 1359–1376
- Appiahene, Peter; Yaw Marfo Missah, Ussiph Najim. (2019). Evaluation of information technology impact on bank's performance: The Ghanaian experience. *International Journal of Engineering Business Management*, volume 11: 1–10. <https://journals.sagepub.com>
- Aral, Sinan, Brynjolfsson, Erik, Wu, D.J. (2006). Which came first, IT of productivity? the virtuous cycle of investment and use in enterprise systems. In: *In Proceedings of the 27th International Conference on Information Systems*, Milwaukee, pp. 1–22.
- Avkiran, N. K., Morita, H. (2010). Benchmarking Firm Performance from a Multiple-Stakeholder Perspective with an Application to Chinese banking, Omega. *The International Journal of Management Science*, 38, p. 501.
- Bharadwaj, A. S. (2000). A resource-based perspective on information technology capability and firm performance: an empirical investigation. *MIS Quarterly*, 24 (1), 169-196.
- Bircan, C., & Ralph de Haas. (2015). The Limits of Lending: Banks and Technology Adoption Across Russia. *Center Discussion Paper*; Vol. 2015-011. Tilburg: Finance.
- Bocken, N.M.P., Short, S.W., Rana, P., Evans, S. (2014). A literature and practice review to develop sustainable business model archetypes. *J. Clean. Prod.* 65, 42-56.
- Bower, J. and C. Christensen. (1995). Disruptive technologies: catching the wave. *Harvard Business Review*, January 1995, 43-53.
- Bresnahan TF, Brynjolfsson E, Hitt LM. 2002 Information technology, workplace organization, and the demand for skilled labor: Firm-level evidence. *Quart J Econ*; 117(1):339–76.
- Bocken, N., Short, S. (2015). Towards a sufficiency-driven business model: experiences and opportunities. *Environ. Innov. Soc. Trans.* 18, 41-61.
- Bouwman, H.; Faber, E.; Van der Spek, J. (2005). Connecting future scenarios to business models of insurance intermediaries. In *Proceedings of the 18th Bled Electronic Commerce Conference, Bled, Slovenia, 6–8 June*; Volume 16.
- Brynjolfsson, Erik, Hitt, Lorin M. (2003). Computing productivity: firm-level evidence. *Rev. Econ. Stat.* 85 (4), 793–808.
- Brynjolfsson E, Hitt LM. (2000). Beyond computation: information technology, organizational transformation and business performance. *J Econ Perspect*;14(4):23–48.
- Bughin, Jacques; Nicolas van Zeebroeck. 2017. The case for offensive strategies in response to digital disruption. *iCite Working Paper 2017 - 021*
- Calantone R, Cavusgil T and Zhao Y. (2002). “Learning Orientation, Firm Innovation Capability and Firm Performance”, *Industrial Marketing Management*, Vol. 31, No. 6, pp. 515-524.
- Case, P. (2012). Managing Sustainability risks and opportunities in the financial services sector - Non-Executive Directors Briefing. Available from: https://www.pwc.com/en_JG/jg/publications/ned-sustainability-presentation-may-2012.pdf
- Cainelli, G., Evangelista, R., Savona, M., 2006. Innovation and economic performance in services: a firm-level analysis. *Camb. J. Econ.* 30, 435–458.
- Chai, Bobby Boon-Hui, Pek See Tan, Thian Shong Go. (2016). Banking Services that Influence the Bank Performance. *Procedia - Social and Behavioral Sciences*, 224, 401 – 407. Elsevier. www.sciencedirect.com
- Chandy, R. and G. Tellis. (2000), the incumbent's curse? Incumbency, size and radical product innovation. *Journal of Marketing*, 64, 1-17.
- Charitou, C. and C. Markides (2003), Responses to disruptive strategic innovation, *MIT Sloan Management Review*, 44(2), 55-64.
- Christensen, C., and M. Overdorf. (2003). Meeting the challenger of disruptive change. *Harvard Business Review*, 78, 66-76.
- Christensen, C. (1997). The Innovator's Dilemma: When New Technologies Cause Great Firms to Fail, *Harvard Business School Press*.
- Cirera, Xavier; Silvia Muzi. (2016). Measuring Firm-Level Innovation Using Short Questionnaires. *Policy Research Working Paper 7696*. World Bank Group.
- Coulter, A., Roberts, S., Dixon, A. (2013). Delivering Better Services for People with Long-term Conditions: Building the House of Care. *The King's Fund 2013*. Available at: <http://zelfzorgondersteund.nl/wp-content/uploads/2014/11/>
- Christensen, C. (2006). The Ongoing Process of Building a Theory of Disruption, *Journal of Product Innovation Management*, 23(1), 39-55.
- Corrado, Carol, Charles R. Hulten and Daniel E. Sichel. (2005). “Measuring Capital and Technology: An Expanded Framework”, in C. Corrado, J. Haltiwanger and D. Sichel (eds.) *Measuring Capital in the New Economy*, NBER Press.
- Corrado, Carol A., Charles R. Hulten, Daniel E. Sichel. (2006). “Intangible Capital and Economic Growth,” NBER Working Papers 11948, *National*

Bureau of Economic Research.

33. Corrado, Carol, Jonathan Haskel, Cecilia Jona-Lasinio and Massimiliano Iommi. (2011). "Intangible Capital and Growth in Advanced Economies: Measurement Methods and Comparative Results", *INTANInvest*.
34. David, Paul A. (1990). The dynamo and the computer: a historical perspective on the modern productivity paradox. *Am. Econ. Rev.* 80 (2), 35–61.
35. Dantsoho, Mohammed Aliyu; Hanmaikyur Tyoapine John. (2017). *MAYFEB Journal of Business and Management*, Vol 1 (2017) - Pages 6-15.
36. Dewan, Sanjeev, Kraemer, Kenneth L., 2000. Information technology and productivity: evidence from country-level data. *Manage. Sci.* 46 (4), 548–562.
37. Eccles, R.G and Serafeim, G. (2013). Sustainability in Financial Services is not about Being Green. *Harvard Business Review*, May 13, 2013.
38. Edgeman, R., Eskildsen, J. (2013). Socio-ecological innovation: strategic integration of innovation for sustainability and sustainable innovation. In: *Proceedings of the International Conference on Intellectual Capital, Knowledge Management & Organizational Learning*, Bogota, Colombia, pp. 114e,122.
39. Ernst & Young. (2013). Building a better working world together: EMEIA Financial Services Sustainability Report 2013. Available from: [http://www.ey.com/Publication/vwLUAssets/EY-EMEIA-Financial-Services-Sustainability-Report-2013/\\$FILE/EY-EMEIA-Financial-Services-Sustainability-Report-2013.pdf](http://www.ey.com/Publication/vwLUAssets/EY-EMEIA-Financial-Services-Sustainability-Report-2013/$FILE/EY-EMEIA-Financial-Services-Sustainability-Report-2013.pdf)
40. Evangelista, R., (2000). Sectoral patterns of technological change in services. *Econ.Innov. New Technol.* 9, 183–221.
41. Gelder, J.W.V. (2006). The do's and don'ts of Sustainable Banking: A BankTrack Manual. BankTrack. Available from: http://www.banktrack.org/download/the_dos_and_donts_of_sustainable_banking/061129_the_dos_and_donts_of_sustainable_banking_bt_m_anual.pdf
42. Grandon, Elizabeth E., Pearson, J. Michael. (2004). Electronic commerce adoption: an empirical study of small and medium US businesses. *Inf. Manage.* 42 (1),197–216.
43. Günsel, Ayşe, Ayça Tükel. (2011). Does Information Technology Capability Improve Bank Performance? Evidence From Turkey. *International Journal of eBusiness and eGovernment Studies* Vol 3, No 1, (2011). ISSN: 2146-0744
44. Goyal, Praveen.- Rahman, Zillur.- Kazmi, A. A. (2013), "Corporate Sustainability Performance and Firm Performance Research: Literature Review and Future Research Agenda". *Management Decision*, Volume 51, Issue 2, p. 361-379.
45. Girotra, K., Netessine, S. (2013). OM forum-business model innovation for sustainability. *Manuf. Serv. Oper. Manag.* 15 (4), 537e544.
46. Hair, Joseph F.; William C. Black; Barry J. Babin; Rolph E. Anderson. 2014. *Multivariate Data Analysis*. 7th Edition. Person New International Edition.
47. Hulten, Charles R. and Janet X. Hao. (2012), "The Role of Intangible Capital in the Transformation and Growth of the Chinese Economy". NBER Working Papers, No.18405, September
48. Jaworski, Bernard J. and Ajay K. Kohli. (1993). "Market Orientation: Antecedents and Consequences." *Journal of Marketing*, 57 (July), 53–70
49. Kane, G., D. Palmer, A. Phillips, D. Kiron and N. Buckley. (2015). Strategy, not Technology, Drives Digital Transformation, *MIT Sloan Management Review* - Research Report
50. Karkowska, Renata. (2020). Business Model as a Concept of Sustainability in the Banking Sector. *Sustainability* 2020, 12, 111; doi:10.3390/su12010111.
51. Korzeb, Zbigniew and Reyes Samaniego-Medina. (2019). Sustainability Performance. A Comparative Analysis in the Polish Banking Sector. *Sustainability* 2019, 11, 653; doi:10.3390/su11030653. www.mdpi.com/journal/sustainability
52. Kmiecik, Roman, Anna Michna, Anna Meczynska. (2012). "Innovativeness, empowerment and IT capability: evidence from SMEs". *Industrial Management & Data Systems*, Vol. 112 Issue: 5, pp.707-728, <https://doi.org/10.1108/02635571211232280>
53. Kuan, K., Chau, P. (2001). A perception-based model of EDI adoption in small businesses using technology–organization–environment framework. *Inf. Manage.* 38 (8), 507–521.
54. Laukkanen, M., Patala, S., (2014). Analyzing barriers to sustainable business model innovations: innovation systems approach. *Int. J. Innov. Manag.* 18 (06), 1440010.
55. Lin, B. W. (2007). Information technology capability and value creation: Evidence from the US banking industry. *Technology in Society*, 29, 93–106.
56. Lüdeke-Freund, F., Massa, L., Bocken, N., Brent, A., Musango, J., 2016. Business models for shared value. *Netw. Bus. Sustain.* S. Afr. 29.
57. Markides, C., Charitou, C. D. (2004). Competing with dual business models: A contingency approach. *Academy of Management Executive*, 18, 22-36.
58. Mazidi, Ahmad Reza Karimi; Alireza Amini; Meisam Latifi. The impact of information technology capability on firm performance; a focus on employee-customer profit chain. *Iranian Journal of Management Studies (IJMS)* Vol. 7, No. 1, January 2014 pp. 95-120
59. Nosratabadi, Saeed; Gergo Pinter; Amir Mosavi; and Sandor Semperger. 2020. Sustainable Banking; Evaluation of the European Business Models. *Sustainability* 2020, 12, 2314; doi:10.3390/su12062314
60. Olson, Eric M.; Stanley F. Slater & G. Tomas M. Hult. (2005). "The Performance Implications of Fit Among Business Strategy, Marketing Organization Structure, and Strategic Behavior." *Journal of Marketing*, Vol. 69 (July 2005), 49–65.
61. Ozcelik, Funda; Burcu Avcı Ozcuk. (2014). Evaluation of Banks' Sustainability Performance in Turkey with Grey Relational Analysis. *The Journal of Accounting and Finance*, July/2014.
62. Peric, M., Djurkin, J. (2014). Systems thinking and alternative business model for responsible tourist destination. *Kybernetes* 43 (3/4), 480e496.
63. Parnell, John A. (2010) "Strategic clarity, business strategy and performance". *Journal of Strategy and Management*, Vol. 3 Issue: 4, pp.304-324, <https://doi.org/10.1108/17554251011092683>
64. Parimo, Daleep. (2017). Human Capital Management in Banking Sector-A Conceptual Framework. *International Journal of Management (IJM)*, Volume 8, Issue 6, Nov–Dec 2017, pp. 44–55.
65. Ramnarain, Taruna Devi, Mahdevi Tiagarassa Pillay. 2016. Designing Sustainable Banking Services: The Case of Mauritian Banks. *Procedia - Social and Behavioral Sciences* 224 (2016) 483–490. Elsevier. <https://www.sciencedirect.com/science/article/pii/S1877042816305080>
66. Rad, Masoud Gholampour. (2017). Disruptive innovation in media industry ecosystem and need for improving managerial cognitive capabilities in polymediation era. *Cogent Business & Management* (2017), 4: 1352183. <https://doi.org/10.1080/23311975.2017.1352183>
67. Rajapathirana, R.P. Jayani & Yan Hui. (2018). Relationship between innovation capability, innovation type, and firm performance. *Journal of Innovation & Knowledge* 3 (2018) 44–55. <https://www.journals.elsevier.com/journal-of-innovation-and-knowledge>
68. Revell, T. (2013). Triodos Bank. The Guide to Sustainable Banking 2013. *Blue and Green Tomorrow*. Available from: <http://blueandgreentomorrow.com/wp-content/uploads/2013/10/guide-to-banking-2013-10MB.pdf>
69. Rebai, Sonia; Mohamed Naceur Azaieza, Dhafer Saidaneb. (2012). Sustainable performance evaluation of banks using a multi-attribute utility model: an application to French banks. *Procedia Economics and Finance* 2 (2012) 363 – 372. Elsevier; www.sciencedirect.com.
70. Rogers, J. (2013). How sustainability metrics help build trust in the

- financial sector. *Greenbiz*. Available from: <http://www.greenbiz.com/blog/2013/04/26/how-sustainability-metrics-helps-build-trust-financial-sector>
71. Romer, Paul M., (1990). Endogenous technological change. *J. Polit. Econ.* 98 (5),71–102.
 72. Scott, Susan V., John Van Reenen, Markos Zachariadis. 2017. The long-term effect of digital innovation on bank performance: An empirical study of SWIFT adoption in financial services. *Research Policy* 46 (2017) 984–1004. <http://dx.doi.org/10.1016/j.respol.2017.03.010>. www.elsevier.com/locate/respol.
 73. Stankeviciene, Jelena; Marta Nikonorova. (2014). Sustainable Value Creation in Commercial Banks during Financial Crisis. *Procedia - Social and Behavioral Sciences* 110 (2014) 1197 – 1208. Elsevier, www.sciencedirect.com.
 74. Straw, R. (2013). Sustainable Banking. Fokus Financial Services. *Audit Committee News – KPMG*. Ausgabe 40 / Q1 2013. <http://www.kpmg.com/CH/Documents/ACNews/pub-20121220-06-sustainable-banking-de.pdf>
 75. Stephens, B., Caplain, J., Montes, D., Siegel, M., (2012). Transformation of Banking: Forces, Implications and Actions. *Financial Services*. Available at: <https://www.kpmg.com/US/en/IssuesAndInsights/ArticlesPublications/Documents/transformation-of-banking-forces.pdf>. (Accessed 16 April 2019).
 76. Thong, J.Y.L., Yap, C.S., Raman, K.S. (1996). Top management support, external expertise and information systems implementation in small businesses. *Inf.Syst. Res.* 7 (2), 248–267.
 77. Turulja, Lejla; Nijaz Bajgorić. 2016. Innovation and Information Technology Capability As Antecedents of Firms Success. *Interdisciplinary Description of Complex Systems* 14(2), 148-156, 2016. DOI: 10.7906/indecs.14.2.4
 78. Ursachi, George; Ioana Alexandra Horodnic; Adriana Zait. 2015. How reliable are measurement scales? External factors with indirect influence on reliability estimators. *Procedia Economics and Finance*, 20 (2015) 679 – 686. www.elsevier.com/locate/procedia.
 79. Visconti, Roberto Moro, Maria Cristina Quirici. (2014). The Impact of Innovation and technology on Microfinance Sustainable Governance. *International conference: "Corporate Governance: a Search for Advanced Standards in the Wake of Crisis"* Milan, Italy, May 8. <https://www.researchgate.net/publication/263009671>
 80. Westerman, G., D. Bonnet and A. McAfee. (2014). Leading digital: Turning technology into business transformation. *Harvard Business Press*.
 81. World Economic Forum. August 2017. Beyond Fintech: A Pragmatic Assessment Of Disruptive Potential In Financial Services.
 82. Yip, Angus W.H., Nancy M.P. Bocken. (2018). Sustainable business model archetypes for the banking industry. *Journal of Cleaner Production*, 174 (2018) 150e169. : www.elsevier.com/locate/jclepro.
 83. Zyadat, Ali Abdelfattah Zyadat. (2017). The Impact of Sustainability on the Financial Performance of Jordanian Islamic Banks. *International Journal of Economics and Finance*, Vol. 9, No. 1; 2017. Canadian Center of Science and Education.
 84. <https://www.cnnindonesia.com/ekonomi/20181115211807-78-346962/tiga-bank-raksasa-siapkan-dana-rp11-triliun-untuk-teknologi>. Diakses 1 April 2019

Citation: Amirul Wicaksono, Itjang D. Gunawan, Zulkifli Husin, "ANALYSIS THE EFFECT OF INFORMATION TECHNOLOGY CAPABILITY, BUSINESS INNOVATION, DIGITAL DISRUPTION AND DIGITAL DISRUPTION REACTIONS ON SUSTAINABLE BANKING PERFORMANCE ". *American Research Journal of Business and Management*, vol 6, no. 1, 2020, pp. 1-16.

Copyright © 2020 Amirul Wicaksono , et al. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.