The Role of Sustainability Innovations and E- Bussiness, in Achieving Firm Performance with A Sustainable Competitive Advantage as Mediation

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Abstract

This research aims to analyze the roles of Sustainability Innovations and E-Business to achieve a superior Firm Performance with Sustainable Competitive Advantage as mediating variable. The data in this study were obtained through a survey, and thenan integrative research model was created to analyze the relationship using structural equation modeling with partial least squares (PLS).The empirical results indicate that sustainability innovation have a significant effect, either directly or indirectlythrough sustainable competitive advantage on company performance. Meanwhile, E-business only has a significant relationship with firm performance while mediating by a sustainable competitive advantage. Continuous innovation and shifting of company operations to E-business will affect the company's activities and have the potential to create competitive advantages among its competitors, which in turn will affect in achieving better performance. This research implication is to make the management as a policymaker in the organization aware of the urgency to create a sustainability innovation and switch to e-business, to be in a position to compete and also achieve a better firmperformance.

Keyword:Sustainability Innovations, E-business, Firm Performance, Sustainable Competitive Advantage, Triple Bottom Line,Technology-Organization-Environment

I. Introductions

Business nowadays are increasingly aware of the environmental issues, as decision-makers face external pressures in the form of increased public sensitivity to environmentally friendly products and shareholder pressure to preserve the natural environment.Aside from external pressure to become even more sustainable, businesses are facing increased competition as a result of globalization and technological innovations (Cherrafi et al., 2018). These pressures increased the firm's focus on creating sustainable value and sustainable innovations to simultaneously improve competitiveness and financial performance (Chu et al., 2018).

The Indonesian government has been implementing a monitoring and control system of the ecological impact to minimize environmental damage. Those systems will influence the innovation that creates by the business. Regulation No. 47/2012 of the Indonesian Government on the Social and Environmental Responsibility, used as the regulatory foundation for companies operating in Indonesia to always being responsible for the environment in carrying out their operations.

Research that explained the relationship of sustainability innovation to firm performance had done before, but the results are still mixed. Many companies view sustainability innovation as cost drivers because the implementations required a high initial investment, have longpayback periods, and produce only minor benefit for the environmental(Cai & Li, 2018; Dey et al., 2020). Several other studies, on the other hand, believe that thereisapositiveand significantrelationshipamong SI onFP.(Qiu et al., 2020; Soto-acosta et al., 2015). It happens becausehigher profitability, efficiency, andcompetitiveness are associated with sustainability. These unclear and often contradictoryfindings imply that more research is required to determine how or under what circumstances relationships are still positive.

Theaccelerations of technological changes, globalization, and the intensity of competition have place pressure on management.In today's modern business environment, a company's website is no longer dominated by large corporations or highlyinnovative firms. That was support by the high level of internet usage among companies. Ahmad M. Ramly, as the Director of Post and Information Administration of the Indonesian Ministry of Communication and Information, said that Internet users in 2020 amounted to 175.5 million, an increase of 25 million or 17 percent compared to the previous year in 2019 (*Kominfo*, 2020).

Digital transactions increase rapidly, especially with the government policy to maintain social distancing until large-scale social restrictions because of pandemic Covid-19. Conventional activities such as going to banks and shopping at the malls are reduced significantly. Digital banking transactions drop massively. For example, PT Bank Rakyat Indonesia Tbk (BBRI) noted that throughout May 2020, BRImo mobile banking transaction services increased by 100% compared to early March 2020 before the Government announced Covid-19 as a pandemic. Bukalapak, as one of the famous E-commerce in Indonesia, also reported increase transactions. The number of transactions by Bukalapak Partners in June 2020 also increased by about three times from the same month last year(Astutik, 2020). This data indicates that to be able to compete, the company must change towards e-business. Changes in company operations with e-business are not related to company size (Soto-acosta et al., 2015).Therefore, all organizations, to win the competition in this digitalization era must inevitably switch to e-business.

The Covid -19 pandemic has caused a very significant change in consumer behavior, forcing companies to make various innovations and change to e-business platforms to improve company performance.This article is divided into six sections, which are organized as follows. The following section includes a literature reviewand hypotheses. Following that, the methodology for sample selection and data collection was discussed, followed by data analysis and results.And then, the paper concludes with an examination of the research findings, limitations, and conclusions.

II. Conceptual background and hypotheses development

A. Triple Bottom Line and Sustainability Innovations

(Elkington, 1998) wasintroduced the TripleBottomLine(TBL)concept forthe first time. At that time, he focused on three dimensions to measure company performance, including theeconomic, environmental, and socialconsiderations. Environmentalrefers tothesustainableand efficient useof energyand other naturalresources by decreasing adverse effects along with environmental damage due to inefficient resource use (Chavez et al., 2020). But 25 years later, (Elkington, 2018)emphasizes that most of these goals have been forgotten, and "TripleBottomLine" thinking has been reduced to accounting tools.. Elkington points out that TBL cannot achieve without a breakthrough change in the sustainable sector. Hence, innovation is essential to achieve TBL performance. Continuous innovation is accomplished through the creation of brand-new products, processes,services, and technologies which contribute to the organization's growth and well-being while conserving natural resources. (Hermundsdottir & Aspelund, 2020; Tello & Yoon, 2008).

B.Technology Organization Environment (TOE) And E-Business

(Tornatzky & Fleischer, 1990)created a framework for TechnologyOrganization Environment (TOE).To comprehend the context of technological innovation adoption and implementation, which consists of three factors Specifically, thetechnologicalcontext refers tocharacteristicsoftechnologicalinnovation, whereastheorganizationalcontextdescribes the characteristicsoforganizations. The final one is the environmental context, whichdescribes the setting in which the adopting organization operates. The TOE framework hasbeen widely usedas a theoretical reference framework for analyzing the determinant that influence the adoption including the use of e-business technologies such as cloudcomputing (Ali et al., 2020); integration of technologies (Soto-acosta et al., 2015), and enterpriseresourceplanning (Bradford et al., 2014). TOE framework examines how organizations employ e-business to benefit product and market development. Modern businesses must then identify and manage customer requirements, create the goods and/or services requested by these customers, dedicated on delivering product value to customers, and eventually, develop and maintain market share.

C. Hypothesis Development

Competition in the business world is getting tighter, caused by the increasingly critical consumer in choosing a product. This necessitates more innovative product development by businesses. Critical consumers will consider whether a product has differences and competitiveness compared to other products. (Battisti et al., 2019; Kuncoro & Suriani, 2018) argue that the better innovation made by the company, the more they gained a sustainable competitive advantage. By introducing new products and/or services, an innovation strategy can provide value to consumers, especially if competitors cannot be in the similar product or service scope (Chatzoglou & Chatzoudes, 2018). Sustainability innovation can increase company value as well as costs (Hermundsdottir & Aspelund, 2020). We propose the following hypothesis basedon the aboveexplanation.

H1:Sustainability Innovation haspositive effecton a SustainableCompetitiveAdvantage

With the development of the digital economy, electronic transactions have penetrated all sectors. E-business is not limited to buying and selling but includes various elements.Advertising and marketing, customer services, corporate resource planning, skills development, and human capital management are just a few examples(Moriset, 2020). E-business software applications

allow companies to access a variety of information and help decision-makers to make decisions efficiently. E-business solutions can analyse as company resources, which affect the company's activities and have the potential to give its competitors a competitiveadvantage (Pilinkienė et al., 2013; Sokiyna & Aqel, 2020).

H2: E-Business has positive effect on a SustainableCompetitiveAdvantage

If rival companies are unable to replicate or duplicate the company's business model, we can reach the conclusion that they have a sustainable competitiveadvantage (Liu & Mantecon, 2017). Businesses with a sustainable competitiveadvantage can increase their opportunities to outperform their competitors. It gives them the ability to maximize shareholder value.(Millicent, 2018) revealed in his research that SCA is positively and significantly related to FirmPerformance. SCA will lead to superior performance. That's happened because companies are focusing their competitive strategy on increasing their resources. According to the above explanation, the third hypothesis is:

H3: A Sustainable CompetitiveAdvantage has positiveeffecton FirmPerformance

Invest in sustainable innovation (process, product, management) and R&D related to environmental issues are drivers of cost savings. Those things require reducing the cost of production and lower the emissions costs to improve economic performance (Hojnik & Ruzzier, 2016; Saunila et al., 2018). Moreover, the goal of investing in sustainable innovation is to continue increasing productivity by reducing industrial waste and to generate positive economic growth (Canh et al., 2019).

Thereisasignificantandpositive relationshipbetweenorganizationalprofitability and sustainabilityinnovation, according to some research.(Przychodzen & Przychodzen, 2015)demonstrates that eco-innovationis frequentlycharacterizedbyhigherasset as well as equity returns and lower revenue retention. Firms are also much larger and more likely to have higher free cash flow than traditional businesses. The fourth hypothesis is then proposedas:

H4: Sustainability Innovation has positive effecton FinancialPerformance

E-business applications have the potential to create income derived from e-commerce apps, but its major contribution may be its ability to reduce costs, as well as fixedcosts and variable costs. Utilizing digital technologies, office automation system, and ERP, for example, might also help decrease fixed costs and overheads.Electronic data interchange(EDI),business-to-business (B2B), and business-to-consumer (B2C) applications, on the other hand, can reduce product variable costs in the manufacturing and distribution processes (Cerdan& Acosta, 2005).These advantages include elevated productivity and efficiency. The advantages of using e-business, such as efficient information exchange and business data analysis. Working without distance restrictions, as well as working without time constraints, are related positively to performanceofthecompany (Soto-Acosta et al., 2015). Through shifts in the inter and intra organizational combination approach, E-business implementations can create organizational efficiency and external coordination (Cerdan& Acosta, 2005). From the above explanation, the fifth hypothesis is:

H5: E-business has positive effect on FirmPerformance

Sustainable innovation that environmentally friendly is the main driver for companies to meet their operational performance (Xue et al., 2019). It helps organizations to solve environmental problems. Additionally, the concept boosts productivity, corporate image, as well as competitiveness.Companies' adoption of the innovation concept tends to leadthem to carveoutmarketsegmentsandgain the advantagethroughtechnologiesand market knowledge.It has

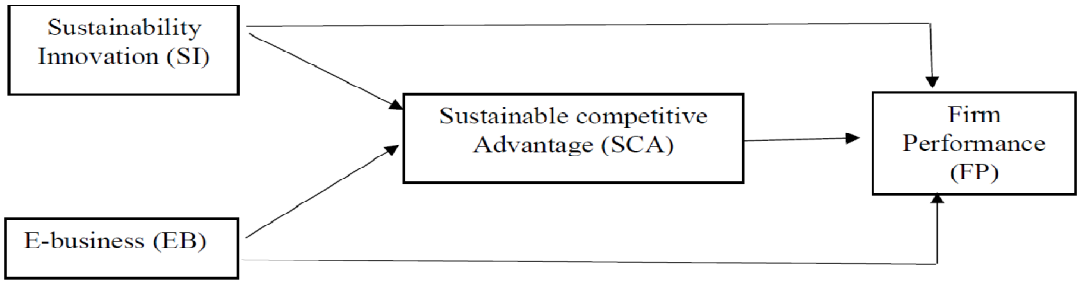
the potential to lead to their success (Leonidou et al., 2015). The hypothesis is as follows, derived from the literature presentation:

H6:Sustainable CompetitiveAdvantage mediates the relationship of Sustainability InnovationonFirm Performance

(Hadi Putra & Santoso, 2020) argue that e-business will impact financial and non-financial performance in the operational, managerial, and strategic. Technology implementation has a positive role in sustainable competitive advantage. Therefore, companies must ensure skilled mastery of technology (Haseeb et al., 2019). By having a competitive advantage, the firm expected its performance will always be superior to its competitors. For that, we propose hypothesis seven.

H7: SustainableCompetitive advantage mediates the relationship of e-business onFirm performance

Figure1. Conceptual Framework



III. RESEARCH METHODOLOGY

A.Sample and data collection

This research studied the manufacturing and financial sector in Jakarta, Indonesia, since those sectors face tremendous pressure during the Covid-19 pandemic. This study uses primary data by distributing questioner to targeted respondents. The unit analysis is individuals in the companies who has a position as the middle and top management. We choose a survey-based studyregardingtheabsenceofacomprehensivedatabasecoveringsustainability innovations and e-business. Since the research conducting in a pandemic situation, we use a Snowball sampling method to reach more respondents. We hope they are willing to participate based on references from their colleagues. The questionnaire is distributed by email and presented in English. From one hundred and forty-one questionnaires, we cannot use two of them due to incomplete data. So, a total of one hundred and thirty-nine (139) questionnaires were usable.

The demographicc characteristics of the respondents are xsummarized in Table 1. The majority of them hold high-level managerial positions, with 49 percent holding middle-level management positions and 35 percent holding top-level management positions. As a result, it is reasonabletoexpectinformantsto have sufficientknowledgeto complete the questionnaire.

Table1
Demographic Characteristics of Respondents. n=139

	PERCENT (%)		PERCENT (%)
GENDER		***INDUSTRIES***	
MEN	76%	manufacture	66%
WOMEN	24%	financial	34%
AGE		***JOB TITLE***	
25 - 35 years	15%	Front-line manager	16%
36 - 45 years	22%	Middle-level manager	49%
above 45 years	63%	Top-level management	35%
EDUCATION			
s1	26%		
s2	70%		
s3	4%		

B. Variable Measurement

In this research, the questionnaire was setting in closed questions. Each question provides five alternative answers in a weighted score. The score level was calculated using a 5-point Likert scale, with one (1) representing strongly disagree and five (5) representing strongly agree. The measurement of sustainability innovation variable adopts (Calik & Bardudeen, 2016) from economic, social, and environmental aspects using six (6) question items. Meanwhile, E-business measured adopting (Shehata & Montash, 2019; Soto-acosta et al., 2015), with four-question items included the use of e-business technology in product design to product distribution and marketing activities. For variable sustainable competitive advantage, the measurement adopts (Haseeb et al., 2019; Ramadan et al., 2020)using eighteen question items. And finally, the firm performance measurement was adopted (Haseeb et al., 2019; Soto-acosta et al., 2015) using five-question items.

IV. RESULTS

To validate the measurements and evaluate the structural models, we employ Structural Equation Modeling (SEM). We have chosen SEMbased on the PartialLeast Squares (PLS) method since it ispreferable tocovariancebased whenthe sample sizeissmall andthereforecancombine formative andreflective measurements (Chin, Wynne et al., 2003). In this study, we used Smarts PLS version 3.0

Before putting the proposed model to the test, it isessentialto verify the measurement model'sreliabilityandvalidity (Barclay et al., 2015). The scales' convergent validity is determined by the fulfillment of three parameters. First all indicator loads must be greater than 0.65; Second, theComposite Reliability(CR) mustbegreaterthan 0.8; andthe thirdisthe mean of variance extracted (AVE) for each construction must be greater than 0.5.

As per Table 2, all indicator loads are all above threshold value, the CR values range from 0.873 to 0.96, and the AVE values range from 0.538 to 0.842. As a result, all three convergent validity conditions are met.Moreover, all indicators' Cronbach alpha values must greater than the permissible value of 0.65, and all of our measuring items presented in Table 2 are greater than 0.65.

Table 2
Reliability and validity

	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
E-Business	0.937	0.938	0.955	0.842
Firm Performance	0.841	0.849	0.887	0.61
Sustainable Competiti	0.955	0.957	0.96	0.572
sustainability innovati	0.827	0.843	0.873	0.538

Following an examination of thequality ofstructuralequations, and nextstepis to investigatethe relationships amongxconstructs. Structural model evaluation is to see the connection between constructs. That evaluation uses the determination coefficient (*R - square*). The determination coefficient indicates with the *R-square* (R^2) value, which functions to measure the degree of variance of change caused by independent variables to dependent variables. The greater the *R-square* value, the better the proposed research model's predictive model. For this case, the higher the *R-square* or the closer it is to one, the better the model.

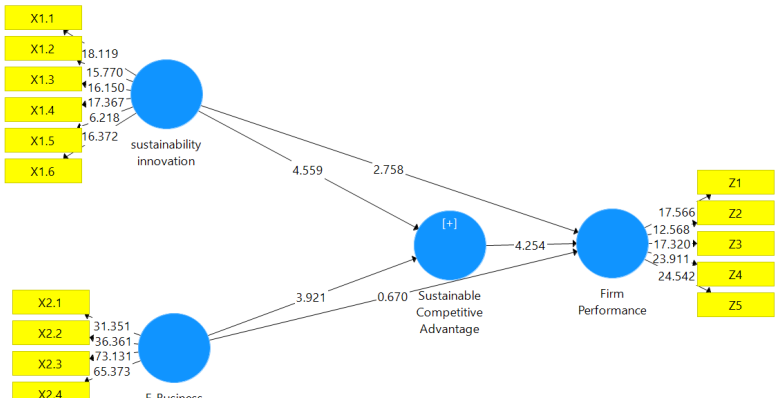
The results obtained an R^2value of 0.352 and an adjusted R^2 valueof 0.337, as shown in table 3. The indication is the contribution of the influence of the variable sustainability innovations, E-business, and Sustainable Competitive Advantage to Firm Performance is 33.7%, and 66.3% is the contribution of the variables not examined.

Table 3 Determination coeffisient

	R Square	R Square Adjusted
Firm Performance	0.352	0.337

The outcome of hypotheses H1 to H5, which described the path coefficient and its level of significance, are shown in Figure 2 and Table 4. The statistical analysis findings supported hypotheses H1, H2, H3, and H4 but do not support H5.Based on the output of the Hypothesis Test results in table 4, it shows that Hypothesis 1 is accepted where the associations among SI and SCA is significant with a T-statistic of 4.559 (> 1.96). The original sample estimate value is positive (0.361), indicating a positive heading of the relationship among SI and SCA.

Figure 2. Results model



The second hypothesis is also accepted. There is a positive influence between EB on SCA as indicated by the original sample estimate value of 0.403 and the T-statistic of 3.921 (> 1.96). The T-statistic value of 4.254 (> 1.96) with a positive direction of 0.399 indicates a significant positive relationship between SCA and FP, implying that the third hypothesis is accepted.

Table 4 path coefficient

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
E-Business -> Firm Performance	-0.068	-0.074	0.101	0.67	0.5030
E-Business -> Sustainable Competitive Advantage	0.403	0.406	0.103	3.921	0.0000
Sustainable Competitive Advantage -> Firm Performance	0.399	0.407	0.094	4.254	0.0000
sustainability innovation -> Firm Performance	0.299	0.306	0.108	2.758	0.0060
sustainability innovation -> Sustainable Competitive Advantage	0.361	0.37	0.079	4.559	0.0000

Furthermore, with a T-statistic value of 2.758 (>1.96), it is demonstrated that there is a significant positiverelationship (0.299) among SI and FP. Finally, H5 is rejected because the p-value shows 0.5030 (> 0.05), and the T-statistic value is 0.67 (<1.96) in a negative direction.Then, we use the variable sustainable competitive advantage as the mediating variable. Our outcomesespouse the full mediating impact of SCA to the relationship between EB use and FP. And the partial mediation impact of SCA to the application of SI on FP. Thus, the findings provide partial support for hypothesis H6 and complete support for hypothesis H7.Table 5 describes the indirect relationship model among the predictor variable and the input variable via the mediation variable.

Table 5. Indirect relationship model

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
E-Business -> Sustainable Competitive Advantage -> Firm Performance	0.161	0.167	0.061	2.64	0.009
sustainability innovation -> Sustainable Competitive Advantage -> Firm Performance	0.144	0.15	0.047	3.064	0.002

V. CONCLUSION

A. Conclusion

Thegoalof thisresearch wasto explorethe impactof sustainability innovations (SI) and E-business (EB) on Firm Performance (FP) throughthe mediationof sustainable Competitive Advantage (SCA). The empirical findings show that both directly and indirectly, sustainability innovation (SI) hasasignificantpositiveeffect on Firm Performance (FP). Meanwhile, only through the use of Sustainable Competitive Advantage (SCA) as a mediator does E-business (EB) have a positive and significant relationship with firm performance.

A possible explanation for that situation is because performance is a broad term that covers various aspects (Lucia-Palacios et al., 2014; Ravichandran & Lertwongsatien, 2005). According to the statistical findings, the indicator of sustained competitive advantage (SCA) was successful in fully mediating the association between EB on FP and partially mediating the association among SI on FP.

The results of this study make several contributions to academics and the development of science. This study is expected to aid in the advancement of accounting science, especially management accounting, which expands the study of the role of sustainability innovation and e-business to increase company competitiveness and simultaneously improve company performance. As for the contribution to regulators, we hoped that this research could be used as a reference in producing new regulations that support the company's sustainability innovation climate.

B. Limitations and Future Research Directions

Our research paper, like most other research, has several limitations that could be addressed in future studies. First, the sample used is still limited to local companies, and most of them not yet listed in the Indonesian capital market. For further research, it can be developed by researching listed companies or multinational companies. Then the outcome will be much more generalized and have a much more global perspective on the issue. Second, the quantity of respondents who participate is still low. We recommend that future research consider research designs that allow data collection from various types of organizations. Second, quantity of the respondents who participate is still low. We recommend that future research considerresearch designs which enable data gatheringfrom various types of organizations.

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