



THE ROLE OF DIGITAL INNOVATION IN MEDIATING DIGITAL CAPABILITY ON BUSINESS PERFORMANCE

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Abstract:

The purpose of this study is to elucidate the role of digital innovation in mediating digital capabilities on business performance. The sampling method used is purposive sampling. The number of samples is 75 respondents. Data collection is carried out by distributing questionnaire to SME managers in IT sector in Denpasar City. The data analysis technique used is the Path Analysis and Sobel Test technique. The results of the study show that the digital capability variable has a positive and significant effect on business performance. Likewise, digital innovation has a positive and significant effect on business performance, and digital innovation is able to mediate the effect of digital capabilities on business performance. Therefore, in the future, SMEs in IT sector must always improve their digital capabilities in order to develop digital innovations that have an impact on improving business performance.

Keywords: digital capability, digital innovation, business performance

1. Introduction

Rapid technological developments have created significant changes to the business world. One important stage in the development of this technology is the emergence of the 4th wave of industrial revolution, or what referred to as *the industrial revolution 4.0* (Bertola and Teinissen, 2018). Currently, Indonesia, including Bali and Denpasar City has entered into the era of industry 4.0, thus, every business actor in various sectors has to be prepared, especially the Small and Medium Enterprises (SMEs). Industry era 4.0 is a challenge that cannot be avoided by SMEs. Business actors, especially SMEs must adapt to industrial developments that are closely related to technological change (Chauhan *et al.*, 2018).

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One of phenomenon that occurs is the digitization of business enterprises across industries that are made possible by the existence of new digital technologies (El Sawy and Pereira, 2013; Eric and Richard, 2019). Companies must succeed in embracing transformation through digital technology to improve business performance, such as increasing experience and involvement, streamlining operations and creating new business models or that company will be crushed by the competing companies that implement such strategies (Chorng *et al.*, 2013 and Fitzgerald *et al.*, 2014)

Every company needs to optimize its business performance (Wang and Kim, 2017). Business performance is the outcome of implementing a job both physical (material) and non-physical (immaterial) with indicators of achievement of work results compared to predetermined targets. Today, business performance issues are still the main concern of researchers, especially issues related to SMEs (Brouthers, *et al.*, 2015). The business performance issues in the digital creative industry, which is largely dominated by SMEs, has drawn the attention of researchers to comprehend it thoroughly (Renko *et al.*, 2009; Ussahawanitchakit, 2012; Chae *et al.*, 2014; Ong and Chen, 2015; Motoiu *et al.*, 2016; and Saunila, 2016). Many variations of the approach used in previous research to comprehend the creative industry, and most of them used the approach of Information Technology (IT) application (Sung, 2015). One of the creative industries is SMEs in the growing IT sector in Bali, especially in the City of Denpasar. SMEs in IT sector in Denpasar City face increasingly fierce competition and thus, this condition has an impact on relatively declining business performance.

Business performance on the other hand is also determined by the company's capabilities (Aron, 2015). Company capability is the responsiveness or combination of components that is very closely related to the ability of organizations to adjust and or adapt to the changing environment. Hence, the concept of company capability shows the flexibility and dynamic capabilities in the organization. The capability of a company in the technological context is in its digital capability (Liu *et al.*, 2017). Digital capability is a group of routine strategies that utilize digital assets to create differential value. Digital assets refer to available IT resources, knowledge of IT design, and competencies to implement IT effectively (Sandberg *et al.*, 2014), however, a substantial relationship between digital technology and performance factors has not been widely examined empirically, especially in the context of digital technology. For instance, a study on Swedish companies by Wroblewski (2018) shows that weak digital maturity has a negative effect on company performance. This phenomenon occurs to SMEs in the IT sector in Denpasar City. Based on interviews with five business people in the IT sector, SMEs must develop their digital capabilities in order to improve business performance and it is inevitable. If digital capabilities can be developed, it can increase the opportunities for innovation and it will have an impact on improving business performance.

Khin and Ho (2018) assert that if a company is able to improve digital capabilities in managing its digital technology, it has a higher possibility to develop innovative digital solutions that will later improve the company's business performance. Previously, Al-Ansari *et al.* (2013) also suggest management to consider innovation to

achieve better business performance. In this research, it can be seen that digital innovation can increase the effect of digital capabilities on business performance. In this case, digital innovation can be conceptualized as an innovative IT solution that integrates digital technology that appears to support business digitalization (Yoo *et al.*, 2009; Yoo *et al.*, 2012; Asa, 2012; Nambisan, 2017). Business digitalization can also be applied to SME in IT sectors. Based on the background of the existing problems, the aim of this study is to elucidate the effect of digital capabilities on digital innovation and their impact on improving the performance of SME businesses in the IT sector in Denpasar.

2. Conceptual Framework and Research Hypothesis

In dynamic capability theory, digital capability can be considered as dynamic capability, described as the ability of organizations to create new products and processes and to respond to changing market conditions (Khin and Ho, 2018). Digital capability is a set of routine strategies that utilize digital assets to create differential value (Grover and Kohli, 2012). Digital assets refer to available IT resources, knowledge of IT design, and competencies to implement IT effectively (Sandberg *et al.*, 2014).

Digital capability determines business performance achievements. The higher the digital capabilities, the better the business performance (Levallet and Chan, 2018). Business performance is a certain standard used by entities to measure success in generating profits. Business performance is the ability of a company or business to explicate its operational activities. According to Febryani and Zulfadin (2003), business performance is an important factor that must be achieved by every company because performance is a reflection of a company's ability to manage and allocate its resources. It can be concluded that the company's performance is something that is produced by a company in a certain period with reference to predetermined standards. Khin and Ho (2018) suggest indicators of business performance, namely the development of sales turnover, the development of net profit, the development of market share, and customer satisfaction. The influence of digital capabilities on business performance can fluctuate but in order to achieve a better business performance, digital capabilities need to create digital innovations and eventually, digital innovation can improve business performance (Lyytinen *et al.*, 2016)

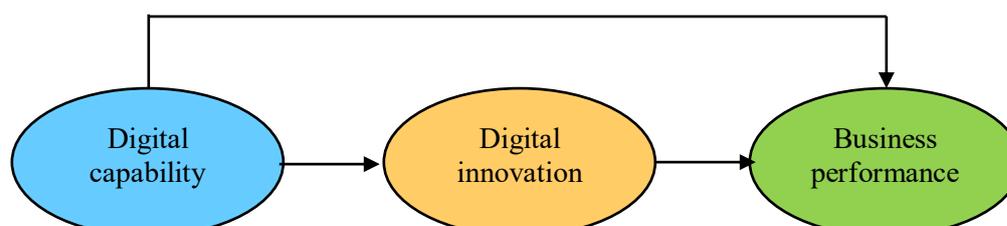


Figure 1: Conceptual Framework

3. Research Hypothesis

The results of the study by Rai and Tang (2010), shows that the digital capability variable has a positive and significant effect on business performance. Furthermore, Mithas *et al.* (2011); Zhou *et al.* (2017); and Ferraris *et al.* (2018), also examined the effect of digital capabilities on business performance which shows the results that digital capabilities can improve business performance. Increasing digital capabilities of SMEs in IT sector are able to improve business performance (Khin dan Ho, 2018). This statement is also supported by several other researchers, such as: Kulkarni *et al.* (2018); and Park *et al.* (2018). Based on the results of empirical studies, the hypothesis can be constructed as follow:

H1: Digital capability has a positive and significant effect on business performance.

The greater digital capability a business has can increase its digital innovation (Del Giudice *et al.*, 2017). The same statement also stated by Zawislak and Alves (2013) and Fernandez-Mesa *et al.* (2014), which revealed that the greater the digital capabilities possessed, the more digital innovations that can be carried out. Based on the results of empirical studies, the hypothesis can be constructed as follow:

H2: Digital capability has a positive and significant effect on digital innovation.

Research conducted by Al-Ansari *et al.* (2013), states that digital innovations can improve business performance. Furthermore, the results of the study by Fransesco *et al.* (2019), also show similar results, namely digital innovation has a positive and significant effect on business performance. Likewise, there are several other researchers who assert the same statement such as: Bellantuono *et al.*, 2013; and Saviano *et al.*, 2018, which state that innovation can accelerate the introduction of new products that have an impact on improving performance. Based on the results of empirical studies, the hypothesis can be constructed as follow:

H3: Digital innovation has a positive and significant effect on business performance.

Based on research Khin dan Ho (2018), stated the results of research conducted shows that digital innovation is able to significantly mediate digital capabilities on business performance. This statement is supported by a combination of research Liu *et al.* (2017), which show the results that digital capabilities affect digital innovation, and researchers Jahanmir dan Cavadas (2018), state that digital innovation can improve business performance. Therefore, the position of digital innovation can be used as a mediating variable between digital capabilities and business performance. Based on the results of empirical studies, the hypothesis can be constructed as follow:

H4: Digital innovation is able to significantly mediate digital capabilities of business performance.

4. Research Method

This research is conducted towards Small and Medium Enterprises (SMEs) engaged in IT sector in Denpasar City. The subjects in this study are SMEs in the IT sector in Denpasar. The object of this research is business performance which is influenced by digital innovation and digital capabilities. In this study, there are three types of variable data to be examined, these variables are 1) Independent Variables: Digital Capability (X); 2) Mediation Variable: Digital Innovation (Y1); 3) Dependent Variables: Business Performance (Y2)

The population of this research is all SMEs engaged in IT sector in Denpasar City. The sample size of this study is 75 SMEs in the IT sector. Determination of sample size in this study uses the Slovin formula. In this way, it is expected that all representative samples to represent SMEs in the IT sector in each of the existing sub-districts (East Denpasar, South Denpasar, West Denpasar, and North Denpasar) and eventually be able to represent the entire area of Denpasar City.

Indicator variables of digital capability, digital innovation, and business performance variables are measured by the perception of SME owners or managers in IT sector, as a digital innovation strategy maker, using a five-level Likert scale, namely from definitely disagree = 1, disagree = 2, quite agree = 3, agree = 4, and definitely agree = 5. Data collection is conducted through distributing questionnaires to SME owners or managers in the IT sector. The instruments used are tested for validity and reliability in order to check what they can measure and to know the consistency of the responses given by respondents. The validity test of the instruments used is the Pearson Product Moment correlation technique with a minimum limit of $r = 0.3$. The reliability test of the instruments is conducted by calculating the reliability coefficient of Cronbach's Alpha with a minimum limit of Alpha coefficients > 0.6 . Both tests use the SPSS computer program.

The data analysis technique used in this study is the Path Analysis technique. Path Analysis is used to analyze the pattern of relationships between variables with the aim to determine the direct or indirect influence of exogenous/ independent variables on endogenous/ dependent variables.

5. Results and Discussion

5.1 Descriptive Statistical Analysis

A description of the descriptive statistical analysis of each variable, as follows:

5.2.1 Digital Capability (X)

Digital capability variable is one of the variables related to business performance variable of SMEs in IT sector in Denpasar City. This research variable measures digital capabilities possessed by SMEs in IT sector in Denpasar City with a quantitative approach, which is based on the responses of respondents (managers/ SME owners) towards digital capability indicators owned by SMEs, namely indicators of application

of digital technology (X1), identifying digital opportunities (X2), responding to digital transformation (X3), creating development pattern of digital technology (X4), and developing innovative products (X5). Respondents' perceptions concerning digital capability variable can be seen in Table 3.

Table 3: The Results of Descriptive Statistical Analysis of Digital Capability Variable (X)

Indicator	Answer Score					Mean
	1	2	3	4	5	
Application of digital technology (X1)	0	1	32	27	15	3,75
Identifying digital opportunities (X2)	0	1	32	29	13	3,72
Responding to digital transformation (X3)	0	1	24	35	15	3,85
Creating development pattern of digital technology (X4)	0	5	42	23	5	3,37
Developing innovative product (X5)	0	4	35	26	10	3,56
Digital capability						

Based on Table 3, it can be seen that out of the 75 respondents surveyed, it turns out that in general the perception of managers/ SME owners in IT sector in Denpasar City towards digital capability variable indicator is in a positive area with an average score of 3.65 and it is considered to be good. This illustrates a condition that the respondent understands the digital capabilities shown by responding to digital transformation.

Of the five digital capabilities performed, it turns out that responding to digital transformation shows the highest mean value, which is 3.85, while the lowest is the indicator of creating development pattern of digital technology with a mean value of 3.37. This illustrates that the indicator of creating development pattern of digital technology need to be improved.

5.2.2 Digital Innovation (Y1)

The mensuration of SME digital innovation in IT sector refers to Khin and Ho's research (2018), which consists of: the Quality of superior enterprise digital solutions (Y1.1), Features of superior enterprise digital solutions (Y1.2), Applications of different digital enterprise solutions (Y1.3), Enterprise digital solutions differ in product platforms (Y1.4), Enterprise digital solutions are improvements from previous products (Y1.5), and some enterprise digital solutions are always new (Y16).

Digital innovation carried out by SMEs in IT sector in Denpasar City is shown by the indicators of the Quality of superior enterprise digital solutions (Y1.1), Features of superior enterprise digital solutions (Y1.2), Applications of different digital enterprise solutions (Y1.3), Enterprise digital solutions differ in product platforms (Y1.4), Enterprise digital solutions are improvements from previous products (Y1.5), and some enterprise digital solutions are always new (Y16). Based on Table 4, it can be seen that out of the 75 respondents surveyed, it turns out that in general the perception of SME managers in IT sector in Denpasar City towards the indicators of digital innovation variable is in the positive area with an average score of 3.69 and it is considered to be good. This illustrates a condition that respondents understand the digital innovation of SMEs in IT sector shown by the indicator of the difference in product platforms.

Table 4: The Results of Descriptive Statistical Analysis of Digital Innovation Variable (Y1)

Indicator	Answer Score					Mean
	1	2	3	4	5	
Quality of superior enterprise digital solutions (Y1.1)	0	1	25	42	7	3,73
Features of superior enterprise digital solutions (Y1.2)	0	0	41	29	5	3,52
Applications of different solutions (Y1.3)	0	0	31	37	7	3,68
Differ in product platforms (Y1.4)	0	3	20	39	13	3,83
Improvements from previous products (Y1.5)	0	1	29	30	15	3,79
Always new for the existing market (Y1.6)	0	2	34	31	8	3,60
Digital innovation						3,69

Of the six types of digital innovations carried out by SMEs in IT sector in Denpasar, it turns out that the indicator of differ in product platforms shows the highest mean value, which is 3.87, while the lowest is the indicator of superior digital solution feature, which is equal to 3.52. This illustrates that differences in product platforms can be considered to be good, while the value of superior digital solution features needs to be improved.

5.2.3 Business Performance (Y2)

In this study, the Business Performance variable measures the business performance achieved by SMEs in IT sector in Denpasar City with a quantitative approach, based on the responses of respondents (managers/ SME owners) towards the company performance indicators achieved by SMEs in IT sector, namely indicators of sales turnover development (Y2.1), market share development (Y2.2), operating profit development (Y2.3), and customer satisfaction development (Y2.4). Respondents' perceptions about business performance variable can be seen in Table 5.

Table 5: The Results of Descriptive Statistical Analysis of Business Performance Variable (Y2)

Indicator	Score Answer					Mean
	1	2	3	4	5	
Sales turnover development (Y2.1)	0	6	26	23	20	3,76
Market share development (Y2.2)	0	5	45	19	6	3,33
Operating profit development (Y2.3)	0	7	23	37	8	3,64
Customer satisfaction development	0	9	36	24	6	3,37
Business performance						3,54

Business performance achieved by SMEs in IT sector in Denpasar City is shown by indicators of sales turnover development (Y2.1), market share development (Y2.2), and operating profit development (Y2.3), and customer satisfaction development (Y2.4). Based on Table 5, it can be seen that out of the 75 respondents surveyed, it turns out that in general the perception of SME managers in IT sector in Denpasar on business performance variable is in the positive area with an average score of 3.54 and it is considered to be good. This illustrates a condition that respondents understand business performance as indicated by the development of sales turnover.

Of the four types of business performance standard available, it turns out that the development of sales turnover shows the highest mean value, which is 3.76, while

the lowest is the development of market share with a mean value of 3.33. This illustrates that the development of sales turnover is good, while the development of market share needs to be improved.

5.3 Discussion of the Research Results

5.3.1 The Effect of Digital Capability on Digital Innovation

The test of equation 1 is conducted to find out the effect of digital capability on digital innovation by using the SPSS program. Based on the results of data processing, the regression test results are presented in Table 6.

Table 6: Regression Test Results of Digital Capability on Digital Innovation

Model	Unstandardized Coefficients		Standardized Coefficients	
	B	Std. Error	Beta	t Sig.
1 (Constant)	1,836	0,329		5,585 0,000
1 Digital Capability	0,508	0,089	0,556	5,710 0,000
R ²			0,309	
F Statistic			32,605	
Sig F			0,000	

Table 6 shows the results of regression tests of the effect of digital capabilities on digital innovation with Sig. 0,000 < 0.05 which shows that digital capability has a positive and significant effect on digital innovation.

5.3.2 The Effect of Digital Capability and Digital Innovation on Business Performance

The test of equation 2 is conducted to find out the effect of digital capability and digital innovation on business performance by using the SPSS program. Based on the results of data processing, the regression test results can be presented in Table 7.

Table 7: Regression Test Results of Digital Capability and Digital Innovations on Business Performance

Model	Unstandardized Coefficients		Standardized Coefficients	
	B	Std. Error	Beta	t Sig.
1 (Constant)	-0,649	0,353		-1,840 0,070
Digital Capability	0,326	0,096	0,277	3,391 0,001
Digital Innovation	0,812	0,105	0,631	7,723 0,000
R ²			0,668	
F Statistic			13,691	
Sig F			0,000	

Table 7 shows the results of regression tests of the effect of digital capabilities and digital innovations on business performance of digital capabilities with Sig. 0.001 < 0.05 which shows that digital capability has a positive and significant effect on business

performance. Digital innovation with Sig. 0,000 <0.05 shows that digital innovation has a positive and significant effect on business performance.

5.3.3 The Results of Path Analysis Test

Based on the results of data processing in Appendix 8 shown in Table 6 and Table 7, the relationships between research variables which are path coefficients in this study can be formulated as follow. The path coefficient can be formulated in the form of a path diagram. The model is also presented in the following structural equations.

1) Structural Equation 1

$$Y1 = 0,556 B_1 X$$

2) Structural Equation 2

$$Y2 = 0,277 B_2 Y1 + 0,631 B_3 X$$

5.3.4 Evaluation of Model Validity

Based on the results of data processing presented in Table 6 and Table 7, a path coefficient summary is formulated as shown in Table 8.

Table 8 illustrates that digital capability variable (X) significantly affects digital innovation (Y1), digital innovation variable (Y1) has a significant effect on business performance (Y2), and digital capability variable (X) has a significant effect on Business Performance (Y2).

Table 8: Path Coefficient Summary

Regression	Standard Regression Coef.	Error Standard	t calculation	p value	Note
X → Y1	0,556	0,062	5,71-0	0,000	Significant
X → Y2	0,277	0,096	3,391	0,001	Significant
Y1 → Y2	0,631	0,105	7,723	0,000	Significant

Note: X = Digital capability; Y1 = Digital innovation; Y2 = Business performance.

Based on the data in Appendix 8 which is a summary of the path coefficients in Table 8, the path diagram can be presented as shown in Figure 2. In Figure 2, it can be seen that the digital capability variable has the greatest effect with the path coefficient value of 0.556 to the digital capability variable and the digital innovation variable also affects the business performance variable with a path coefficient value of 0.277 and there is an indirect effect through the digital innovation variable with a coefficient value of 0.351 on business performance variable. Based on Figure 2, the direct effect, indirect effect and the total effect between variables can be calculated as presented in Table 9.

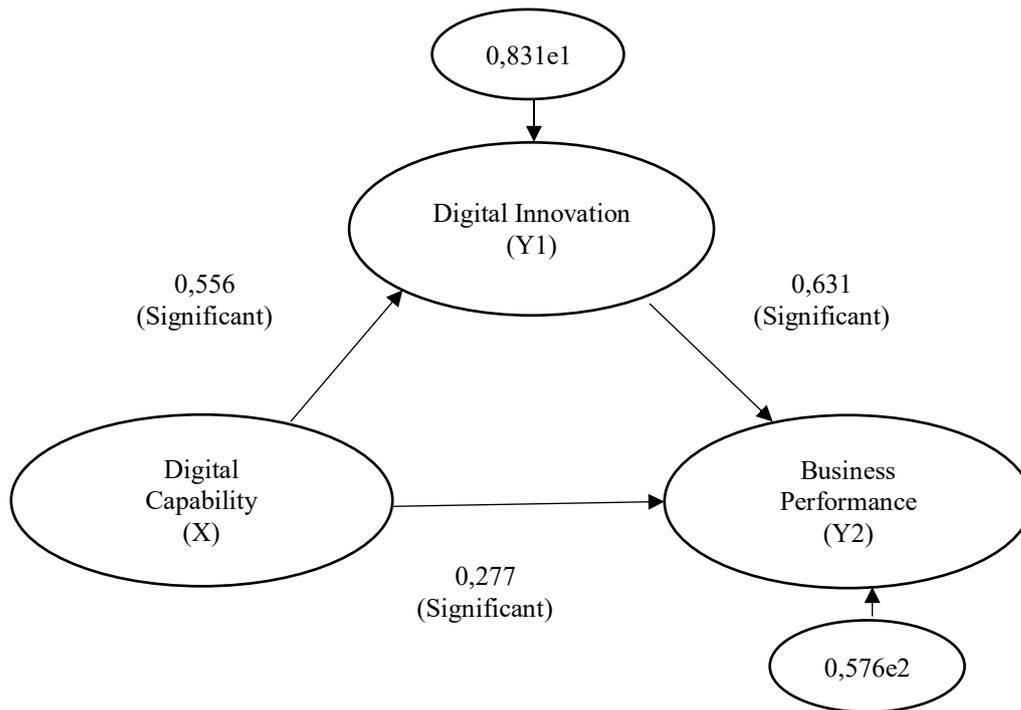


Figure 2: Path Analysis Diagram of the Research

Table 9: Summary of Direct Effects, Indirect Effects and Total Effects between Research Variables

Variable X	DE	IE	TE
Y1	0,556		0,556
Y2	0,277	0,351	0,628

Note: DE = Direct Effect; IE = Indirect Effect; TE = Total Effect; X = Digital capability; Y1= Digital innovation; Y2 = Business performance.

Based on Table 9, the direct effect of X on Y1 is 0.556; there is no indirect effect thus the total effect is 0.556. The direct effect of X on Y2 is 0.277. The indirect effect of X on Y2 through Y1 is obtained from $0.556 \times 0.631 = 0.351$. Therefore, the total effect of X on Y2 through Y1 is $0.277 + 0.351 = 0.628$. This means that there are indirect effects of digital capability variable on business performance through digital innovation.

5.3.5 Standard Estimated Error Value

The value of e_i which shows the number of variance digital innovation variable that is not explained by the digital capability variable is calculated by using the following formula.

$$\begin{aligned}
 e_i &= \sqrt{1 - R^2} \\
 &= \sqrt{1 - 0,309} \\
 &= 0,831
 \end{aligned}$$

The value of e_2 which shows the variance of business performance variable that is not explained by digital capability and digital innovation variables is calculated by using the following formula.

$$\begin{aligned} e_2 &= \sqrt{1 - R^2} \\ &= \sqrt{1 - 0,668} \\ &= 0,576 \end{aligned}$$

5.3.6 Model Validity Test

To test the validity of the model, there are indicators to carry out the examination, namely the coefficient of total determination results as presented follows.

$$\begin{aligned} R^2_m &= 1 - (Pe_1)^2 - (Pe_2)^2 \\ R^2_m &= 1 - (0,831)^2 - (0,576)^2 \\ R^2_m &= 0,771 \end{aligned}$$

Note:

R^2_m : The coefficient of total determination

e_1, e_2 : Standard estimated error value

Based on the calculation of the total determination coefficient, it is found that the diversity of data that can be explained by the model is 77.1% or in other words the information contained in the data is 77.1% can be explained by the model while the remaining 26.9% is explained by the others variables that are not included in the model.

5.3.7 The Discussion on Direct Effect

A. The direct effect of digital capabilities on digital innovation

i) Hypothesis Formulation

H_0 : Digital capability does not have a positive and significant effect on digital innovation.

H_1 : Digital capability has a positive and significant effect on digital innovation.

ii) Actual level 5% trust rate 95% ($\alpha = 0,05$)

iii) Testing criteria

If the probability value is greater than the value of $\alpha = 0,05$ ($p > 0,05$) hence, H_0 is accepted and H_1 is rejected. If the probability value is smaller than or equal with the value of $\alpha = 0,05$ ($p < 0,05$), hence, H_0 is rejected and H_1 is accepted.

iv) The Calculation

Based on calculations using the SPSS program, the value of *Standardized coefficient beta* obtained is 0,556 and the probability value is 0,000.

v) Conclusion

The probability value is $0,000 < 0,05$. Hence, H_0 is rejected and H_1 is accepted. Thus, digital capability has a positive and significant effect on digital innovation.

A positive and significant relationship between digital capability variable and digital innovation variable shows that digital capability has a positive and significant effect on digital innovation. If SMEs in IT sector have digital capability, digital innovations from these SMEs will always increase over time.

B. The direct effect of digital capabilities on Business Performance

i) Hypothesis Formulation

H₀: Digital capability does not have a positive and significant effect on Business Performance

H₁: Digital capability has a positive and significant effect on Business Performance

ii) Actual level 5% trust rate 95% ($\alpha = 0,05$)

iii) Testing criteria

If the probability value is greater than the value of $\alpha = 0,05$ ($p > 0,05$) hence, H₀ is accepted and H₁ is rejected. If the probability value is smaller than or equal with the value of $\alpha = 0,05$ ($p < 0,05$), hence, H₀ is rejected and H₁ is accepted.

iv) The Calculation

Based on calculations using the SPSS program, the value of *Standardized coefficient beta* obtained is 0,277 and the probability value is 0,014.

v) Conclusion

The probability value is $0,001 < 0,05$. Hence, H₀ is rejected and H₁ is accepted. Thus, digital capability has a positive and significant effect on business performance.

A positive and significant relationship between digital capability variable and business performance variable shows that the higher the digital capability of SMEs in IT sector, the better the business performance of SMEs in IT sector over time.

C. The effect of Digital Innovation on Business Performance

i) Hypothesis Formulation

H₀: Digital innovation does not have a positive and significant effect on Business Performance.

H₁: Digital innovation has a positive and significant effect on Business Performance.

ii) Actual level 5% trust rate 95% ($\alpha = 0,05$)

iii) Testing criteria

If the probability value is greater than the value of $\alpha = 0,05$ ($p > 0,05$) hence, H₀ is accepted and H₁ is rejected. If the probability value is smaller than or equal with the value of $\alpha = 0,05$ ($p < 0,05$), hence, H₀ is rejected and H₁ is accepted.

iv) The Calculation

Based on calculations using the SPSS program, the value of *Standardized coefficient beta* obtained is 0,631 and the probability value is 0,000.

v) Conclusion

The probability value is $0,000 < 0,05$. Hence, H₀ is rejected and H₁ is accepted. Thus, digital innovation has a positive and significant effect on business performance.

There is a positive and significant relationship between digital innovation variable on business performance. It means that digital innovation can contribute in

forming dominant business performance. The higher the digital innovation, the easier to improve business performance. The effect of digital innovation is very impactful for companies, it can be assumed that increasingly high digital innovations can improve business performance. It can be concluded that digital innovation has a positive and significant effect on business performance, it means that the higher the digital innovation carried out by SMEs in IT sector, the better the business performance.

5.3.8 The Discussion on Indirect Effect

Mediation test of digital innovation variable (Y1) on relationship between digital capability (X) and business performance (Y2).

i) Hypothesis Formulation

H₀: Digital innovation is not a mediating variable on relationship between digital capability and business performance.

H₁: Digital innovation is a mediating variable on relationship between digital capability and business performance

ii) Testing criteria

- a) If the Z calculation $\leq 1,96$, H₀ is accepted, and thus, digital innovation is not a mediating variable.
- b) If the Z calculation $> 1,96$, H₀ is rejected, and thus, digital innovation is a mediating variable.

iii) The Calculation

In order to check if the mediating variable can mediate relationship between the dependent variable and the independent variable, the following steps are conducted.

- 1) Sobel test on the effect of digital capability on business performance through digital innovation as follow:

(1) Calculating the value

$$Sab_1 = \sqrt{b_1^2 sa_1^2 + a_1^2 sb_1^2 + sa_1^2 sb_1^2}$$
$$Sab_1 = \sqrt{0,812^2 0,089^2 + 0,508^2 0,105^2 + 0,089^2 0,105^2}$$
$$Sab_1 = 0,099$$

(2) Calculating the value of $a_1 b_1$

$$a_1 b_1 = 0,508 \times 0,812$$

$$a_1 b_1 = 0,412$$

(3) Calculating the value of Z_1

$$Z_1 = \frac{a_1 b_1}{Sab_1}$$
$$Z_1 = 4,18$$

Note:

b_1 = Effect coefficient of variable X on Y1

b_3 = Effect coefficient of variable Y1 on Y2

iv) Conclusion

Because the Z calculation is $4.18 > 1.96$, it means that digital innovation (Y1) is a mediating variable of the indirect effect of digital capability (X) on business performance (Y2).

Digital innovation variable as a mediating variable significantly influences the relationship between digital capabilities and business performance through digital innovation variables. Therefore, with digital innovations being carried out, digital capabilities have a stronger influence on the achievement of business performance.

6. Research Implication

As has been stated in the analysis and discussion that this research could theoretically find a relationship between latent variables of digital capabilities on digital innovation, as well as business performance. This research can contribute idea for SMEs in IT sector. The idea in question is that SMEs must constantly developing digital capabilities in order to provide digital innovation for businesses and eventually to improve the business performance of SMEs in IT sector.

7. Research Limitation

Various limitations are also found in this study mainly due to the following factors. 1) This study only involves SMEs managers or business actors in IT sector and therefore, the research results cannot be generalized as a whole. 2) The mediating variable examined is a digital innovation variable which in fact has a significant effect on Business Performance, thus, in the future, it is necessary to consider other mediating variables, such as business value.

Bibliography

- Aron O'Cass Liem Viet Ngo Vida Siahtiri (2015). Marketing resource-capability complementarity and firm performance in B2B firms, *Journal of Business & Industrial Marketing*, Vol. 30 Iss 2 pp. 194-207.
- Åsa Rönnbäck Henrik Eriksson (2012). A case study on quality management and digital innovation, *International Journal of Quality and Service Sciences*, Vol. 4 Iss 4 pp. 408 – 422.
- Al-Ansari, Y., Altalib, M. and Sardoh, M. (2013). Technology orientation, innovation and business performance: a study of Dubai SMEs, *The International Technology Management Review*, Vol.3 No.1, pp.1-11.
- Bellantuono, N., Pontrandolfo, P. and Scozzi, B. (2013). Different practices for open innovation: a context-based approach, *Journal of Knowledge Management*, Vol. 17 No. 4, pp. 558-568.
- Bertola Paola and Teunissen Jose (2018). Fashion 4.0. Innovating fashion industry through digital transformation, *Research Journal of Textile and Apparel*

- Brouthers, K. D., Nakos, G., & Dimitratos, P. (2015). SME entrepreneurial orientation, international performance, and the moderating role of strategic alliances. *Entrepreneurship Theory and Practice*, Vol. 39, No. 5, pp. 1161-1187.
- Chae, H. C., Kohl, C. E. and Prybutok, V. R. (2014). Information technology capability and firm performance: contradictory findings and their possible causes, *MIS Quarterly*, Vol. 38 No. 1, pp.305-326.
- Chauhan, S., Gupta, P. and Jaiswal, M. (2018). Factors inhibiting the internet adoption by base of the pyramid in India, *Digital Policy, Regulation and Governance*, Vol. 20 No. 4, pp. 323-336.
- Chorng Shyong Ong, Poyen Chen, (2013). Information technology capability enabled performance, future performance, and value, *Industrial Management & Data Systems*, Vol. 113 Issue: 5, pp.669-682,
- Del Giudice, M. Della Peruta, M. R., Tarba (2017). The impact of IT-based knowledge management systems on internal venturing and innovation: a structural equation modeling approach to corporate performance, *Journal of Knowledge Management*, Vol. 20 No. 3, pp. 484-498.
- El Sawy, O. A. and Pereira, F. (2013). Business Modelling in the Dynamic Digital Space: An Ecosystem Approach, *Springer Briefs in Digital Spaces*, Springer, Berlin.
- Eric Ansong, Richard Boateng (2019). Surviving in the digital era – business models of digital enterprises in a developing economy, *Digital Policy, Regulation and Governance*.
- Fitzgerald, M., Kruschwitz, N, Bonnet, D. and Welch, M. (2014). Embracing digital technology–anew strategic imperative, *MIT Sloan Management Review*, Vol.55, No.2, pp.1-12.
- Febryani, A., & Zulfadin, R. (2003). Analisis kinerja bank devisa dan bank non devisa di Indonesia, *Kajian Ekonomi dan Keuangan*, Vol. 7, No. 4, pp. 31- 47.
- Fernandez-Mesa, A., Ferreras-Mendez, J. L., Alegre, J. and Chiva, R. (2014). IT competency and the commercial success of innovation, *Industrial Management & Data Systems*, Vol. 114, No. 4, pp. 550-567.
- Ferraris Alberto, Alberto Mazzoleni, Alain Devalle, Jerome Couturier (2018). Big data analytics capabilities and knowledge management: impact on firm performance, *Management Decision*,
- Francesco Caputo, Valentina Cillo, Elena Candelo, Yipeng Liu (2019). Innovating through digital revolution: The role of soft skills and Big Data in increasing firm performance, *Management Decision*.
- Grover, V., and Kohli, R. (2012). Cocreating IT value: New capabilities and metrics for multiform environments. *MIS Quarterly*, Vol. 36, No. 1.
- Jahanmir, S. F., and Cavadas, J. (2018). Factors affecting late adoption of digital innovations. *Journal of Business Research*, Vol. 88, 337-343.
- Khin, S., and Ho, T. C. (2018). Digital technology, digital capability and organizational performance: A mediating role of digital innovation. *International Journal of Innovation Science*.

- Kulkarni Sourabh, Verma Priyanka, R. Mukundan (2018). Performance landscape modeling in digital manufacturing firm, *Business Process Management Journal*
- Murray, J. Y.; Gao, G. Y. and Kotabe, M. (2011). Market orientation and performance of export ventures: the process through marketing capabilities and competitive advantages, *Journal of the Academy of Marketing Science*, Vol. 38 No. 2, pp. 252-269.
- Liu, X. Y., Huang, Q. H., Dou, J. S. and Zhao, X. D. (2017). The impact of informal social interaction on innovation capability in the context of buyer-supplier dyads, *Journal of Business Research*.
- Levallet, N., and Chan, Y. E. (2018). Role of Digital Capabilities in Unleashing the Power of Managerial Improvisation. *MIS Quarterly Executive*, Vol. 17, No. 1.
- Lyytinen, K., Yoo, Y. R. and Boland, J. B. Jr, (2016). Digital product innovation within four classes of innovation networks, *Information Systems Journal*, Vol.26, No.1, pp.47-75.
- Mithas, S., Ramasubbu, N., and Sambamurthy, V. (2011). How Information Management Capability Influences Firm Performance, *MIS Quarterly*, Vol. 35 No. 1, pp. 237-256.
- Motoiu, E., Pavel, O. A., and Lakatos, E. S. (2016). A brief quantitative analysis of clusters from the creative industry in Romania. *Review of Applied Socio-Economic Research*, Vol. 11, No. 2, pp. 57-66.
- Nambisan, S., Lyytinen, K., Majchrzak, A., & Song, M. (2017). Digital Innovation Management: Reinventing innovation management research in a digital world. *Mis Quarterly*, Vol. 41, No. 1.
- Ong, C. S., dan Chen, P. (2013). Information technology capability-enabled performance, future performance, and value. *Industrial Management & Data Systems*, Vol. 113, No. 5, pp. 669-682.
- Park Hong Y., Misra Kaustav, Reddy Surender, Jabe Kylier (2018). Family firms' innovation drivers and performance: a dynamic capabilities approach, *Journal of Family Business Management*.
- Rai, A. and Tang, X. L. (2010). Leveraging IT Capabilities and Competitive Process Capabilities for the Management of Interorganizational Relationship Portfolios, *Information Systems Research*, Vol. 21 No. 3, pp. 516-542.
- Renko, M., Carsrud, A. and Brannback, M. (2009). The effect of a market orientation, entrepreneurial orientation, and technological capability on innovativeness: a study of young biotechnology ventures in the United States and in Scandinavia, *Journal of Small Business Management*, Vol.47 No.3, pp.331-369
- Saviano, M., Caputo, F., Mueller, J. and Belyaeva, Z. (2018). Competing through consonance: a stakeholder engagement view of corporate relational environment, *Sinergie, Italian Journal of Management*, Vol. 105, pp. 63-82.
- Sandberg, J., Mathiassen, L., and Napier, N. (2014). Digital options theory for IT capability investment. *Journal of the Association for Information Systems*, Vol. 15, No. 7, 422.

- Saunila, M. (2016). Performance measurement approach for innovation capability in SMEs. *International Journal of Productivity and Performance Management*, Vol. 65, No. 2, 162-176.
- Sung, T. K. (2015). Application of information technology in creative economy: Manufacturing vs. creative industries. *Technological Forecasting and Social Change*, 96, 111-120.
- Ussahawanitchakit, P. (2012). Administrative innovation, technical innovation, competitive advantage, competitive environment, and firm performance of electronics businesses in Thailand, *Review of Business Research*, Vol.12 No.1, pp.1-10.
- Wang, Z., and Kim, H. G. (2017). Can social media marketing improve customer relationship capabilities and firm performance? Dynamic capability perspective. *Journal of Interactive Marketing*, Vol. 39, pp. 15-26.
- Wroblewski, J. (2018). Digitalization and firm performance: are digitally mature firms outperforming their peers? Masters, Lund University.
- Yoo, Y., Boland, R. J., Jr., Lyytinen, K., & Majchrzak, A. (2012). Organizing for innovation in the digitized world. *Organization Science*, Vol. 23, No. 5, pp. 1398–1408.
- Yoo, Y., Lyytinen, K. and Boland, R. J. (2009). Innovation in the digital era: digitization and four classes of innovation networks, *working paper*, Temple University, Philadelphia, PA.
- Zawislak, P. A. and Alves, A. C. (2013). Influences of the internal capabilities of firms on their innovation performance: a case study investigation in Brazil, *International Journal of Management*, Vol.30, No.2, pp.329-348.

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