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Strategic role of digital capability on business agility during COVID-19 era

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Abstract

COVID-19 is a real experience of volatile-uncertain-complex-ambiguous (VUCA) world. It has brought fundamental changes in leading people and managing business organizations. This article aims to elaborate business agility of public companies and to examine the impacts of digital capability and ambidextrous leadership - as the hypothesized influential factors on business agility. This article is based on a cross sectional study with involved participation of 103 CEOs, directors, and senior management. This result revealed that digital capability plays a strategic role in supporting top management to apply ambidextrous leadership in leading organization during turbulence times. From three aspects of business agility, Supply chain agility is most influential factors on firm performance rather than operation or marketing agility. This article has contributed for clarifying the indirect impact of digital capability on firm performance and proving the mediating role of business agility and ambidextrous leadership on the relationship between digital capability and firm performance at public companies.

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Keywords: Digital capability; ambidextrous leadership; business agility

1. Introduction

COVID-19 is a concise experience of how VUCA World happened. This has brought about a fundamental change in leading people and managing business organizations. The term VUCA World was first used in the US Army War College in the 1990s in a book entitled *Leaders Make the Future* [1]. VUCA stands for volatile, uncertain, complex,

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and ambiguous [2]. The term is associated with fog of war which describes the chaotic conditions of the modern battlefield. The Covid-19 pandemic exposes us to a fragile world. All matters have changed because of an outbreak of a kind of flue (volatility), full of uncertainty in the prevailing regulations (uncertainty), causing new and interconnected problems (complexity) and steps to overcome ambiguity. Therefore, leading a company in the normal world is, of course, far different from leading a company in the VUCA world. Companies as business organizations are required to have dynamic capability in dealing with business turbulence [3]. This dynamic capability can be in the form of organizational flexibility, agility, or resilience, if the organizations need to be mastering the turbulence [4]. Organizational agility is the ability of the organization to be fast and flexible in the face of continuous change [5]. Meanwhile, business resilience is an organization's ability to survive and bounce back when faced with disruptive changes that threaten its survival [6]. This article is interested in elaborating the relationship between organizational agility and company performance during turbulence such as in the current COVID-19 pandemic. In addition, he also wants to see the influence of leadership from top leaders [7] and the digital capabilities of the organization [8] in supporting the development of organizational agility.

There are many leadership concepts that can be applied [9], but this article chooses to use ambidextrous leadership as a top leadership approach in dealing with business turbulence [10]. The literature study of previous research on ambidexterity [11] concluded three important things: (a). ambidexterity has a significant influence on sales growth, company performance, innovation, market valuation and company survival. (b) ambidexterity is more relevant for companies that are in an environment full of uncertainty. (c) ambidexterity is more relevant in large companies that have adequate resources than in small companies that are limited in resources. Based on those thoughts, this article attempts to elaborate the influence of ambidextrous leadership for public companies in dealing with COVID-19 pandemic as an experienced VUCA world. Does ambidextrous leadership - either exploration or exploitation approach could impact on business agility and firm performance? Does digital capability support ambidextrous leadership and business agility for maintaining firm performance in public companies during COVID-19 pandemic?

2. Literature reviews

2.1. Firm performance

Firm performance is the achievement of a business organization both in financial and non-financial terms such as market control, internal business processes, or learning for growth [12]. This article focuses more on financial achievements and market share in the form of four indicators: (a) market share, (b) ROI growth, (c) operating income, and (d) the position of the company's products in the market. An empirical study in the United States involving 193 manufacturing companies proves that information technology affects supply chain agility and firm performance (e.g., sales, market share, profitability, speed of market response, and customer satisfaction) [13].

2.2. Business agility

In facing the continuous and disruptive turbulence of the business environment, companies are required to be more agile and resilient [4]. Business agility is the company's ability to change business processes and direction quickly and easily when faced with turbulence [5][14]. Business agility is not just flexibility in running a business, more than that [14]. Business agility is a combination of flexibility and speed in dealing with turbulence [4].

Business agility when viewed as organizational agility is a company's capability that has certain dimensions (agility dimensions), which are supported by agility enablers and triggered by agility drivers [15]. In this article, business agility is broken down into three separate dimensions, namely: supply chain agility, operational agility, and marketing agility. For measuring supply chain agility, this article adapts the instruments used previous study [16]. Meanwhile, for measuring operational and marketing agility, this article adapts organizational agility scale [17]. Empirical studies involving 141 garment manufacturers prove that strategic and manufacturing flexibility affects supply chain agility and then affects firm performance [18]. Based on these empirical studies [13][18], this article hypothesizes that business agility – either supply chain, operational, or marketing agility have a positive and significant effect on firm performance.

H1: *Supply chain agility has significant impact on firm performance.*

H2: *Operational agility has significant impact on firm performance.*

H3: *Marketing has significant impact on firm performance.*

2.3. *Ambidextrous leadership*

Ambidextrous leadership is seen as the ability to encourage exploration and exploitation (behaviors in individuals who are team members [19]. Bosses encourage and stimulate the creativity of the work team while constantly ensuring that they remain efficient in running the business [20]. Therefore, bosses are encouraged to combine flexible, situational, and versatile leadership styles [21] in guiding the work team to achieve goals. The ambidextrous leadership in this article is described in two main behaviors, namely: (1) EXPLR, an opening behavior that encourages innovation. This behavior allows tasks to be carried out in different ways through experiments. (2) EXPLT, a closing behavior that encourages efficiency. This behavior ensures compliance with objectives, supervision, corrective action, and the establishment of specific guidelines [22]. Conceptually other scholar [23] argues that leadership agility plays a role in developing organizational agility. This shows that leadership is an important factor that affects business agility. In line with these arguments, an empirical study proves that entrepreneurial leadership and corporate culture have a positive and significant effect on organizational agility [24]. Referring to the two thoughts above, this article develops a hypothesis that ambidextrous leadership - whether related to exploration or exploitation which affects firm performance and business agility in supply chain, operational, or marketing agility.

H4: *Exploration has significant impact on firm performance.*

H5: *Exploration has significant impact on supply chain agility.*

H6: *Exploration has significant impact on operational agility.*

H7: *Exploration has significant impact on marketing agility.*

H8: *Exploitation has significant impact on firm performance.*

H9: *Exploitation has significant impact on supply chain agility.*

H10: *Exploitation has significant impact on operational agility.*

H11: *Exploitation has significant impact on marketing agility.*

2.4. *Digital capability*

To deal with the dynamics of the business environment, companies need dynamic capability to adapt. Dynamic capabilities are described as the subsection of capabilities or competence, which accept the firm to generate new processes and products, to react to dynamic market situations [25]. Digital capability as a part of dynamic capability is an imperative requirement to achieve business success. In digital economy, business success is highly determined on how good a firm could explore and exploit digital technologies [8]. Technological based capability is viewed as organizational capacity to create and build new products and related processes [26]. It becomes an important and essential building block for reconfiguring business models, operational processes, and customer experience [27]. No matter how perfectly technology has been utilized within an organisation, it still needs to be handled effectively and efficiently [17]. Digital capability is defined as organizational competence, expertise, and talent to operate digital technology for developing new products or services [8]. Although it is related to digital technology, digital capability is not about technological capability only. It also related to capability of human resources to develop collaboration and innovation by utilizing digital technology [28]. Previous studies found that digital capability have positive effect indirectly on financial and non-financial performance, digital innovation mediates the effect of digital capability on firm performance [17]. Digital related capability impact indirectly on firm performance, performance management system plays as mediator on the relationship [28]. An open-ended online survey with 49 recognized digitalization experts found that changes in work-life and health, the use of information and communication technology (ICT), performance and talent management, and organizational hierarchies have impacted on work design and leadership development [29].

H12: *Digital capability has significant impact on exploration.*

H13: *Digital capability has significant impact on exploitation.*

3. Research methodology

3.1. Methods and materials

A cross-sectional study with causal analysis for hypothesis testing was conducted for this article. Collecting data used convenience approach as non-probabilistic sampling method. PLS based Structural Equation Modelling is used for constructing and testing the research model. Data was analyzed with SmartPLS version 3.3. At first step, the study focused to approach top management from Top 50 IDX. Most of them are from personal and professional network of the authors. Finally, the study completed to involve 103 top leaders from 55 public companies in Indonesia stock exchange which represented to 51.4% market capitulation. It is about 25 companies from Top-50 list. The respondents are directors or chiefs (38%), vice presidents (25%), and division heads (37%). Most of them are men (76%) with age less than 51 years (79%), have a bachelor and master education background (93%) and have worked in the company for more than five years (74%). More detailed respondent profiles are showed in Table 1.

Table 1. Profile of respondents.

Profile of respondents				
Gender	Male	78	76%	76%
	Female	25	24%	100%
Age	Below 36 years old	17	17%	17%
	36 - 40 years old	13	13%	29%
	41 - 45 years old	19	18%	48%
	46 - 50 years old	32	31%	79%
	Above 50 years old	22	21%	100%
Education	Bachelor's degree (S1) equivalent	61	59%	59%
	Master's degree (S2) equivalent	35	34%	93%
	Doctoral degree (S3) equivalent	6	6%	99%
	Other	1	1%	100%
Industry	Basic Industry and Chemicals	7	7%	107%
	Consumer Goods Industry	4	4%	111%
	Finance	17	17%	127%
	Infrastructures, Utilities and Transportation	9	9%	136%
	Mining	6	6%	142%
	Property, Real Estate and Building Construction	37	36%	178%
	Trade, Services and Investment	21	20%	198%
Position	Director or Chief	34	33%	33%
	Director or Chief at Subsidiary	5	5%	38%
	Vice President or Others	26	25%	63%
	Division Head or Equivalent	38	37%	100%
How long have you been with this COMPANY	Below 5 years	27	26%	26%
	5 - 10 years	41	40%	66%
	11 - 15 years	14	14%	80%
	More than 15 years	21	20%	100%
The age of your CEO?	36 - 40 years old	10	10%	10%
	46 - 50 years old	15	15%	24%
	More than 50 years old	78	76%	100%
How long your Current CEO occupy his/her position?	Below 5 years	31	30%	30%
	5 - 10 years	29	28%	58%
	11 - 15 years	15	15%	73%
	More than 15 years	28	27%	100%

3.2. Instruments for measurement

Digital capability was measured by instrument which developed in previous study [30] which is reflected into five items or indicators (DC01, DC02, DC03, DC04, and DC05). Two dimensions of ambidextrous leadership was treated as separated variables in this article. They are exploration (EXPLR) and exploitation (XPLT). Ambidextrous

leadership was measured with two dimensions and 14 indicators [20]. There are each seven indicators for measuring XPLT and XPLR. Business agility was treated as three variables. SAGI was measured by five indicators [16]. MAGI dan OAGI was measured by organizational agility scale [17]. Meanwhile firm performance is indicated by six items. The proposed research model is illustrated in Fig. 1.

Validity and reliability analysis is conducted for assuring the research model is constructed by valid and reliability variables and indicators. Table 2 and Table 3 provides the result of validity and reliability analysis. OL (outer loading) scores was used for validating the indicators. Only indicator with OL score more than 0.6 is valid. Invalid indicators id excluded from the research model and is not presented in Table 2. All proposed indicators are valid, except AL06 is invalid and then excluded from the model. AVE (average variance extracted) was used for validating variables. All variables are valid because all variables have AVE scores more than 0.5. For assuring validity of variable, Table 3 provides result of discriminant validity analysis. All diagonally bold scores (square root of AVE) are more than 0.70 and all of them are the highest score in each column. It means that all variables are discriminant valid. All variables are reliable too. Because all of them have Cronbach Alpha (CA) or Composite Reliability (CR) score more than 0.7. According to validity and reliability analysis, it could be confirmed that all indicators and variables in the research model are valid and reliable.

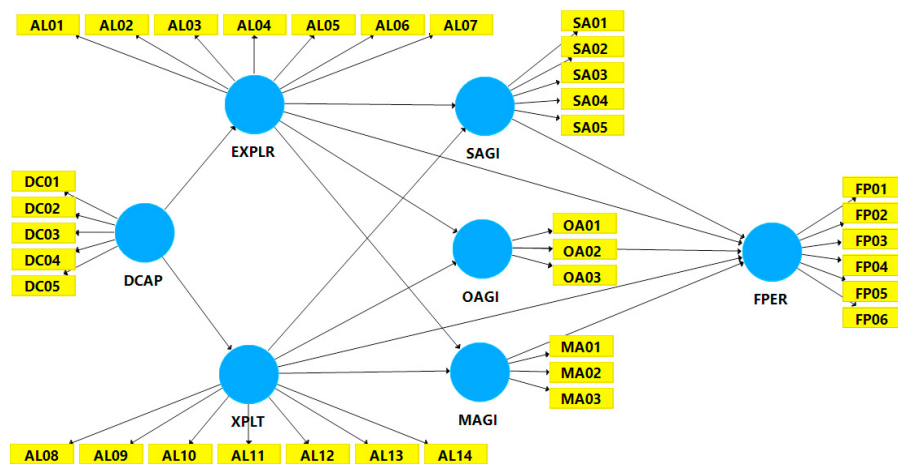


Fig. 1. Proposed research model.

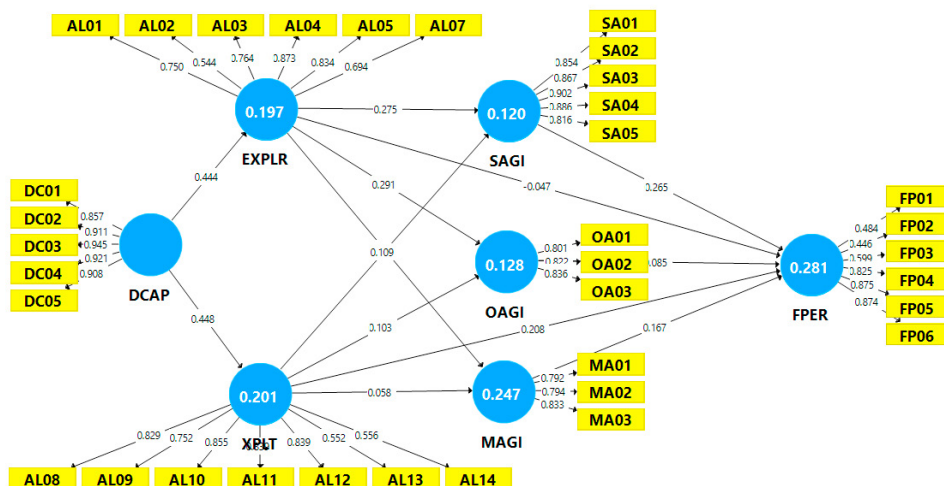


Fig. 2. Result of PLS algorithm analysis.

Table 2. Validity and reliability analysis.

Variables and indicators			OL	AVE	CA	CR
Firm Performance (FPER)	Your company MARKET CAPITALIZATION (price per share x outstanding shares)?	FP01	0,61	0,51	0,79	0,85
	Your company GROWTH IN REVENUE for six months ended 30 Jun 2020 compared to similar period last year?	FP02	0,62			
	Your company NET INCOME for six months ended 30 Jun 2020 compared to similar period last year?	FP03	0,62			
	Your company MARKET SHARE as of 30 June 2020 is better than competitors:	FP04	0,83			
	Your company Growth in RETURN ON INVESTMENT (ROI) as of 30 June 2020 is better than competitors	FP05	0,87			
	Your company OPERATING INCOME as of 30 June 2020 is better than competitors:	FP06	0,87			
Digital Capability (DICAP)	Acquiring important digital technologies	DC01	0,86	0,83	0,95	0,96
	Identifying new digital opportunities	DC02	0,91			
	Responding to digital transformation	DC03	0,94			
	Mastering the state-of-the-art digital technologies	DC04	0,92			
	Developing innovative products/service/process using digital technology	DC05	0,91			
Exploration (XPLR)	Our CEO allows different ways of accomplishing tasks	AL01	0,75	0,56	0,84	0,88
	Our CEO encourages experimentation with different ideas	AL02	0,64			
	Our CEO has motives to take risk	AL03	0,76			
	Our CEO gives possibilities for independent thinking and acting	AL04	0,87			
	Our CEO gives room for own ideas	AL05	0,83			
	Our CEO encourages error learning	AL07	0,69			
	Our CEO monitors and controls goal attainment	AL08	0,83			
Exploitation (XPLT)	Our CEO establish routines	AL09	0,75	0,57	0,87	0,90
	Our CEO takes corrective action	AL10	0,85			
	Our CEO controls adherence to rules	AL11	0,84			
	Our CEO pays attention to uniform task accomplishment	AL12	0,84			
	Our CEO sanctions mistakes	AL13	0,65			
	Our CEO sticks to plans	AL14	0,66			
	Our CEO sticks to plans	AL14	0,66			
Supply Chain Agility (SAGI)	We are able to ADAPT our services and/or products FASTER to new customer requirements	SA01	0,85	0,75	0,92	0,94
	We are able to REACT FASTER to new market developments	SA02	0,87			
	We are able to react FASTER to significant changes IN DEMAND AS required by the market	SA03	0,90			
	We are always able to ADJUST OUR PRODUCT PORTFOLIO faster as required by the market	SA04	0,89			
	We are able to react faster to SUPPLY-SIDE changes (e.g., compensate for spontaneous supplier outages)	SA05	0,82			
Operational Agility (OAGI)	We fulfil demands FASTER for special requests whenever such demands arise	OA01	0,79	0,67	0,76	0,86
	We are more responsive to SCALE UP or SCALE DOWN service levels to SUPPORT FLUCTUATIONS in the market	OA02	0,79			
	Whenever there is a DISRUPTION in SUPPLY from our suppliers, we can QUICKLY make necessary alternative arrangements	OA03	0,83			
Marketing Agility (MAGI)	We are more responsive to make and IMPLEMENT appropriate DECISIONS in the face of market/customer-changes	MA01	0,80	0,65	0,73	0,85
	We CONSTANTLY LOOK FOR ways to reinvent/RE-ENGINEER our organization to better serve our marketplace	MA02	0,82			
	We TREAT market related changes and apparent CHAOS AS OPPORTUNITIES to capitalize faster	MA03	0,84			

Table 3. Discriminant validity.

	[1]	[2]	[3]	[4]	[5]	[6]	[7]
[1] Digital Capability (DCAP)	0,909						
[2] Exploration (XPLR)	0,444	0,751					
[3] Firm Performance (FPER)	0,463	0,267	0,707				
[4] Marketing Agility (MAGI)	0,512	0,495	0,433	0,807			
[5] Operational Agility (OAGI)	0,278	0,347	0,390	0,739	0,820		
[6] Supply Chain Agility (SAGI)	0,445	0,334	0,451	0,610	0,541	0,865	
[7] Exploitation (XPT)	0,448	0,542	0,325	0,309	0,261	0,258	0,756

4. Results and discussion

Fig. 2 displays the result of PLS algorithm calculation. Firm performance (FPER) is influenced about 28.1% by SAGI, OAGI, and MAGI. It is about 71.9 % impact of other influential factors which does no discussed in this research. Ambidextrous leadership – exploration (EXPLR) or exploitation (XPLT) has impact on SAGI (12%), OAGI (12.8%) and MAGI (24.7%). Ambidextrous leadership has higher impact on marketing (MAGI) rather than on operation (OAGI) or supply chain agility (SAGI). Meanwhile, digital capability (DCAP) has impact equally on exploration (EXPLR) about 19.7% and exploitation (XPLT) about 20.1%.

Table 4 and Fig. 3(a) explains the result of bootstrapping analysis. The result is used as consideration for hypothesis testing. A hypothesis is accepted when path coefficient or beta has t-statistics more than 1.96 or p-value less than 0.05. From 12 hypothesizes of proposed research, six hypothesizes have path coefficients with t-statistics less 1.96 or p-values more than 0.05. Those hypothesizes - H2, H3, H4, H9, H10, and H11 are rejected. and rest of them are accepted. The seven hypothesizes (H1, H5, H6, H7, H8, H2, and H13) are accepted.

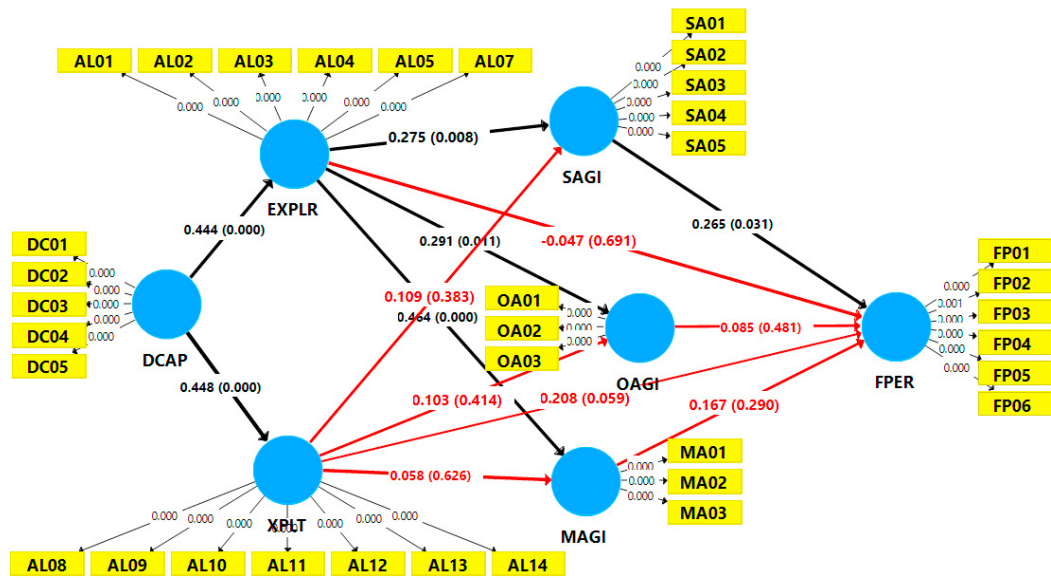
Firm performance (FPER) is influenced significantly by supply SAGI (H1) but is not influenced significantly by OAGI (H2) or MAGI (H3). FPER is not influenced directly and significantly, either by EXPLR (H4) or XPLT (H8). Exploration impacts positively and significantly on SAGI (H5), OAGI (H6), and MAGI (H7). But exploitation (XPLT) does not impact significantly on SAGI (H9), OAGI (H10) and MAGI (H11). Digital capability (DCAP) impact positively and significantly, either on EXPLR (H12) or XPLT (H13).

Based on those hypothesizes testing, the research model is extended for scrutinizing the direct impact of digital capability on business agility (SAGI, OAGI, and MAGI). Fig. 3(b) shows the extended research model. Based on bootstrapping result, digital capability has direct and significant impact on SAGI (H14) and MAGI (H16) but not on OAGI (H15). It indicates that digital capability really impacts on organizational agility with external relationship (such supply chain and marketing activities) rather the internal coordination (such as operational activities).

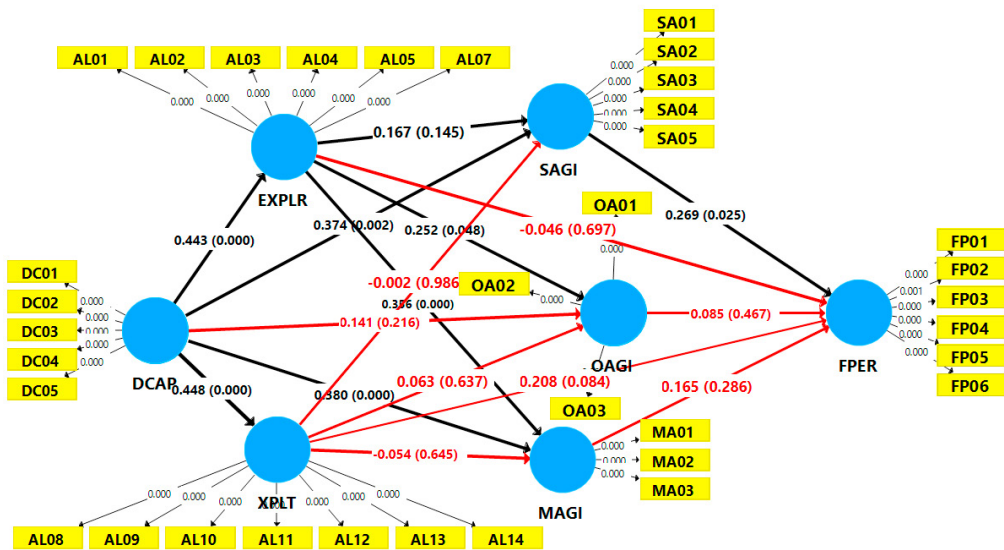
The result does support that the previous study [13] which found that information technology uses as element of digital capability have positive but indirectly effect on firm performance. Supply chain agility mediates the effect of information technology use on firm performance. This study found that digital capability impact on firm performance indirectly too. Supply chain agility mediates the impact of digital capability on firm performance. The result also supports the previous studies [29] which found that the use of ICT has a direct effect on leadership development. This study confirmed that ambidextrous leadership of top management is influenced by digital capability, either in opening behavior (exploration) or closing behavior (exploitation).

Table 4. Hypothesis testing.

Hypothesizes	Path Coeff.	t-Statistics	p-Values	Conclusion
Structural model				
H1: Supply Chain Agility ==> Firm Performance	0,25	2,16	0,03	Accepted
H2: Operational Agility ==> Firm Performance	0,09	0,71	0,48	Rejected
H3: Marketing Agility ==> Firm Performance	0,17	1,06	0,29	Rejected
H4: Exploration ==> Firm Performance	-0,04	0,40	0,69	Rejected
H5: Exploration ==> Supply Chain Agility	0,28	2,66	0,01	Accepted
H6: Exploration ==> Operational Agility	0,30	2,54	0,01	Accepted
H7: Exploration ==> Marketing Agility	0,47	5,23	0,00	Accepted
H8: Exploitation ==> Firm Performance	0,23	1,89	0,06	Accepted
H9: Exploitation ==> Supply Chain Agility	0,13	0,87	0,38	Rejected
H10: Exploitation ==> Operational Agility	0,11	0,82	0,41	Rejected
H11: Exploitation ==> Marketing Agility	0,06	0,49	0,63	Rejected
H12: Digital Capability ==> Exploration	0,45	5,28	0,00	Accepted
H13: Digital Capability ==> Exploitation	0,47	5,21	0,00	Accepted
Extended model				
H14: Digital Capability ==> Supply Chain Agility	0,37	3,04	0,00	Accepted
H15: Digital Capability ==> Operational Agility	0,14	1,24	0,216	Rejected
H16: Digital Capability ==> Marketing Agility	0,38	4,70	0,00	Accepted



(a)



(b)

Fig. 3. (a) tested research model; (b) extended research model.

This article has several limitations and suggestion for further study. First, the sample size is small. It suggested to find out more respondents with probabilistic sampling method to make more representative conclusion on Indonesia public companies (IDX). Second, the research method should be combined with qualitative approach to get more insightful understanding about strategic role of digital capability on top management leadership approach during COVID-19 era. Third, the research model should be advanced by adding several exogeneous variables on firm performance (e.g., business resilience, corporate culture, and collaborative capability). Forth, multi groups analysis by considering the industry type should be delivered. COVID-19 has brought different impacts on different industries. During the pandemic, some industries (e.g., tourism, transportation, property) experienced difficulties and shrank drastically. Some other industries (e.g., pharmaceuticals, health care, telecommunications, delivery services) experienced high growth.

5. Conclusions

COVID-19 is a VUCA world experience for business organizations. For maintaining firm performance, this article recommends public companies in Indonesia to develop business agility – especially focused on supply chain agility. Supply change agility has positive, significant, and direct impact on firm performance – either in market, growth, and revenues. For developing business agility, top management is recommended to be more explorative with strengthening opening behaviors rather than exploitative which tends to be closing behaviors in leading the business. Digital capability can be utilized for supporting implementation of ambidextrous leadership and development of business agility. Digital capability impacts directly and indirectly on business agility, especially on activities or processes which are related to the external partnership – such as marketing and supply chain.

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