



## **Intervening Role of Innovation Management on Relationship between Digital Leadership and Dynamic Capability Accelerated by Collaboration**

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Digital technology has driven changes in markets and consumers. The market has become more dynamic due to new business model innovations offered by new entries in the industry. Incumbent firms require a digital transformation in order to have a more dynamic capability in shaping their existing business to fit the new paradigm. The fastest way of developing capabilities to align with the new paradigm is through collaboration with partners. Developing capabilities for innovation management and dynamic capabilities requires strong digital leadership to optimize the use of digital technology. The need for collaboration is urgent to accelerate the development process of innovation in the digital era, therefore, this study uses collaboration as its moderating variable. Most published research focusing on digital transformation examines digital leadership, innovation dynamic capabilities based on construct, applicability and benefit, and the role of collaboration. However, the role of digital leadership in driving innovation management and dynamic capability has not been intensively explored nor specifically the influence of collaboration. This study was conducted through a survey of 88 senior leader respondents from Indonesian telecommunication firms using a purposive sampling method. The statistical data was processed using Smart-PLS application for analyses. Findings demonstrate that innovation management moderated by collaboration had a significant influence in accelerating the relationship between digital leadership and dynamic capabilities. It is also found that digital leadership had a direct and indirect impact on the development of dynamic capability. This indicates that digital leadership actually had a strong role in driving the transformation. These findings have practical implications to support the theory that collaboration is a critical factor in the digital era. It supports the role of firm management in strengthening digital leadership capabilities in conjunction with the development of innovation management with a



focus on co-creation values in developing dynamic capabilities. Recommendation for further research is also discussed in this paper.

**Keywords:** *Digital leadership, Innovation management, Dynamic capability, collaboration*

## Introduction

Digital technology plays a significant role in driving changes in various industries, from which ensue two most notable impacts; a wider exploration of opportunities and the effectiveness and efficiency in terms of cost spending (Raivio and Luukkainen, 2011; Yoon, 2007). Digital technology also shapes a new paradigm in the business process and supply chain, which creates turbulence in the market. Changes in the paradigm also lead to uncertainty in the market, mostly known as its Volatility, Uncertainty, Complexity, and Ambiguity (VUCA) (Pandit, Joshi, Sahay, and Gupta, 2018). This leads to a new business model that integrates the value chains across industries through an integration of knowledge. Moreover, digital technology encourages innovation to converge the industry due to a wider range of digital technology capabilities. Those activities spawn changes within the market and shorten product life cycle.

Market changes also happen in the ICT industry, making it a lot more dynamic due to new players from OTT (Over the Top) firms such as a start-up companies that are able to provide more attractive and new business models based on customer requirements. Hence, ICT carrier firms would have to create new values for consumers. All these changes lead to the question “what kind of capabilities are required to develop existing business and generate new business models using digital technology”, and further “what kind of leadership and management is required to accelerate the development of the required capabilities”?

Carrier firms are required to adapt capabilities to integrate innovation based on the influence of digital technology on the knowledge of existing assets through dynamic capabilities (Sandberg, 2014; Teece, 2014; Bhattarai, & Carter, 2018). However, asset integration and orchestration are not simple, since the knowledge is different across different organizations. Carrier firms are actually beneficial compared to the new entries in terms of network connectivity, which accelerate the orchestration of superior assets and knowledge integration that is dispersed through strategic collaborations with partners across boundaries within and outside the firm (Kodama, 2018a; Swanson, Jin, Fawcett, and Fawcett, 2017). Collaboration itself leads the firms to co-creation in order to perform innovation management, especially for business model innovations (Berman, 2012; Kodama, 2018b).



The process of innovation management requires cognitive capabilities of the management, particularly the leaders, to respond to the dynamic environment and to form dynamic capabilities. The cognition of leader capabilities is heterogeneous (Helfat and Peteraf, 2014), the leader must have capabilities to sense, seize and transform to seek out and to filter opportunities. Since the cognition of each leader is different, leadership is perceived as a dynamic system having continuous learning capabilities (Cockburn and Smith, 2016; Lopez-Cabrales, Bornay-Barrachina, and Diaz-Fernandez, 2017). In the digital era, the leadership type should optimize the use of digital technology by combining culture and competence, also known as digital leadership (Creusen, Gall, and Hackl, 2017; Mihardjo, Sasmoko, Alamsjah, and Elidjen, 2019).

Past studies have mostly assessed the way an organization manages change by adapting to the change and collaborating with partners, however, there are still very limited studies on the impact of digital leadership in developing dynamic capabilities and innovation management, as well as the role of collaboration in accelerating the development of dynamic capabilities and innovation management. Hence, this study aims at assessing the impact of digital leadership and the role of collaboration in accelerating the development of dynamic capabilities and innovation management. This development would drive towards a new paradigm to support creativity and break out of the routine activities.

The research framework of this study is depicted in Figure 1 below.

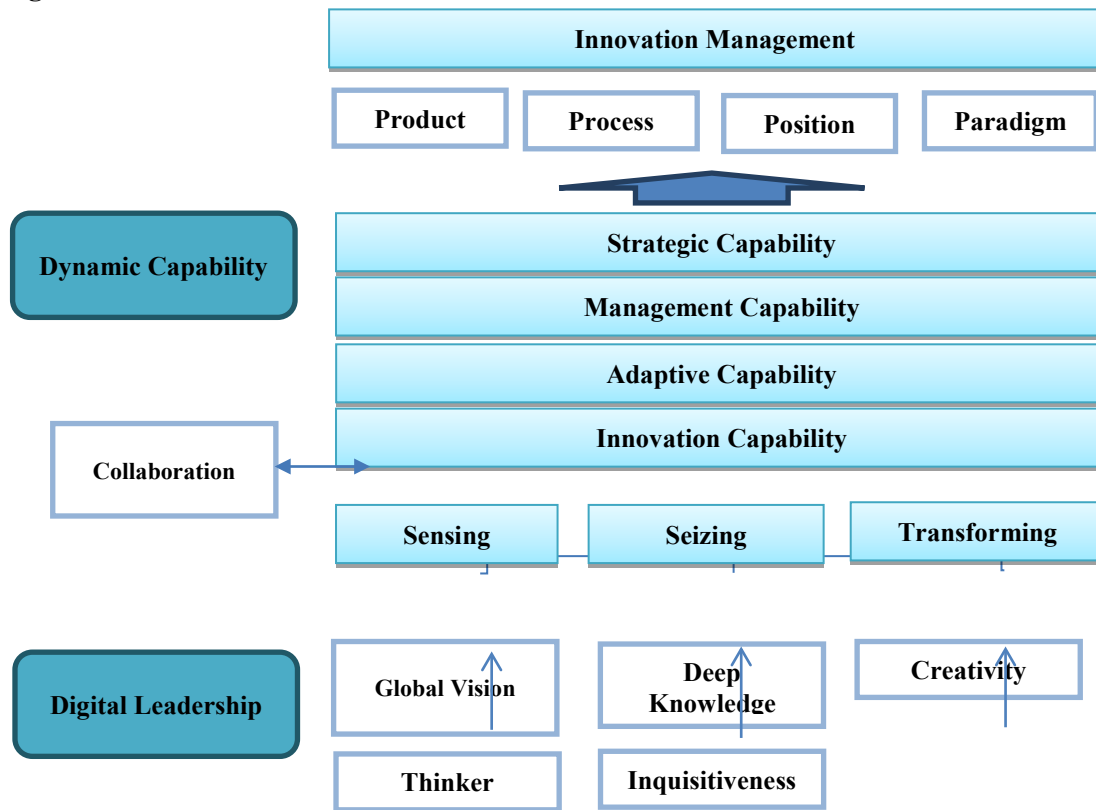
## **Literature Review and hypothesis development.**

### ***Digital Leadership***

Helfat and Peteraf (2014) have identified the heterogeneous nature of cognition, particularly amongst the top level managerial position holders, which supports the study conducted by Tripsas and Gavetti (2000) in which leadership takes an important role in providing dynamic capabilities (Rosenbloom, 2000). In the digital era, digital leadership plays an important part in driving innovation and providing a good relationship with stakeholders (customer and partners) (Doz and De Roover, 2017; Mihardjo *et al.*, 2019). Past studies have also shown that digital leadership refers to the core competence of the leaders in the digital field to contribute knowledge to society (Goethals, Sorenson, and Burns, 2002). Digital leadership is a combination of culture and competence to optimise the opportunities and advantages of digital technology (Mihardjo *et al.*, 2019). The 5 characteristics of digital leadership, according to Zhu (2015) are: (1) leaders shall have the creativity capability, (2) always investigate comparative difference with other firms, (3) have a global vision to drive change, (4) have inquisitive capabilities for continuous learning and adapt with change, and (5) have in-depth knowledge. However, Doz and De Roover (2017) and Sandell (2013) found that

digital leaders do not only need to have creative and innovative capabilities, but also need to be able to collaborate to seize opportunities.

**Figure 1.** The Literature Review Framework



**Dynamic Capability (DC)**

The base of the theoretical model of dynamic capability began with a resource-based view theory (RBV) (Barney, 1991; Wernerfelt, 1984). The combination between RBV and competition strategy theory encourages a company to have strategic positioning. Digital technology leads to the creation of a new paradigm in market and strategic positioning, therefore, firms have developed DC to support innovation management (Bessant and Phillips, 2013; Mihardjo *et al.*, 2019; Schoemaker, Heaton, and Teece, 2018; Weerawardena and Mavondo, 2011). DC is defined as the organizational capability of the firm to integrate, build, and reconfigure their competencies to rapidly adapt to changing environments in order to create new market positions (Desyllas and Sako, 2013; Bhuia *et al.*, 2016). Teece (2014) also suggests that the DC is related to an entrepreneurial leader’s ability to build and renew resources, which consists of three primary clusters: (1) the ability to sense opportunities related to the identification, development, and assessment of technological opportunities based on customer needs, (2) the ability to seize and organize the resources based on potential



opportunities, and (3) the ability to transform in order to have a more firm ability in continuous renewal and learning. DC plays an important role in the digital era to drive sustainable competitive advantage to adapt with high-velocity markets (Wasono, Furinto, and Rukmana, 2018). DC is recommended to include collaboration to accelerate the process of transformation and mitigate potential risks (Kodama, 2018a; Swanson *et al.*, 2017). The scope of DC shall focus on the development of adaptive capability (Swanson *et al.*, 2017), building innovation as a continuous learning process (Bessant and Phillips, 2013; Schoemaker *et al.*, 2018), and building capabilities to strengthen the firm through aligning management capabilities with strategic capability (Kodama, 2017; Mihardjo and Rukmana, 2019).

### ***Innovation Management and collaboration***

In the digital era, the concept of innovation plays a significant role in a company's sustainability, particularly in relation to business model innovation (Carayannis, Sindakis, and Walter, 2015; Mihardjo, Sasmoko, Alamsjah, and Elidjen, 2018). Collaboration becomes the main driver of innovation due to the unlimited capabilities required to develop innovation capability in adapting to the dynamic global business environment (Chesbrough, 2012; Ramírez-Montoya and García-Peñalvo, 2018). Collaboration could accelerate the innovation process by combining the non-competence value chain with the core competence of firms (Al-Debei, 2010). Collaboration on innovation can be implemented when the leader of a company is able to coordinate and take action in the implementation as a members of an innovation community (Kodama, 2018b). In the disruptive era, business model innovation should become the main focus of the leader, just as such enterprises as Amazon, Apple, Google, or Facebook create values and achieve higher capital value by developing the business ecosystem (Walton and Lecturer, 2011). Innovation can be categorized into four different capabilities: product innovation, process innovation, position innovation and paradigm innovation (Tidd, 2015). Product innovation is part of the core competence of the firm to have distinct capability. Process innovation means having a good relationship in optimizing the digital technology to digitize the process, in accelerating decision-making, product development, and the marketing process. Position innovation refers to the firm's market positioning and the capability to adapt to changes in relation to the product and service segmentation, targeting, and positioning. Lastly, paradigm innovation is an incorporation with business model innovations.

### ***Hypothesis Development***

Previous studies have found that digital leadership had a significant impact on dynamic capability and innovation management (Mihardjo and Rukmana, 2019; Mihardjo *et al.*, 2019;

Schoemaker *et al.*, 2018), with dynamic capabilities appearing to have an influence on innovation management (Mihardjo *et al.*, 2019; Salunke, Weerawardena, and McColl-Kennedy, 2011; Teece, 2017). Therefore, the following hypotheses were formulated:

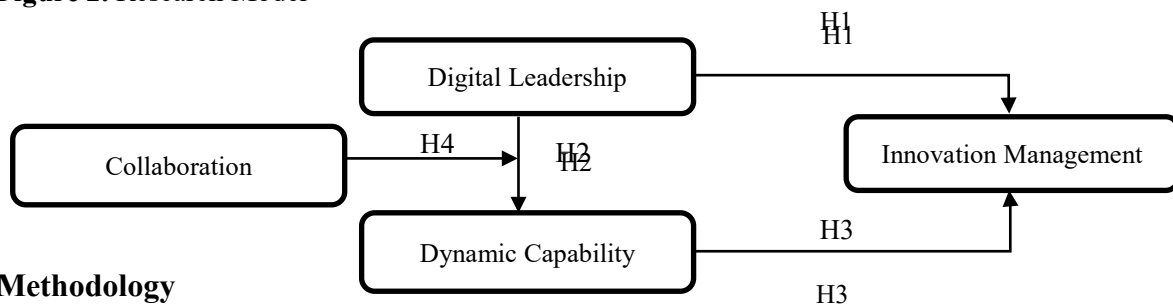
- H1: Digital leadership has a significant influence on Dynamic Capability
- H2: Digital leadership has significant influence on Innovation management
- H3: Dynamic capability has significant influence on Innovation management

Since the value chain of the market has become complex and there is a need to accelerate the transformation, collaboration plays a more important role than ever to accelerate the development of dynamic capability in relation to digital leadership based on previous studies (Kodama, 2018a; 2018b), hence, the developed hypothesis is:

- H4: Collaboration accelerates the relationship between digital leadership and dynamic capability

The research model could be shown as in Figure 2 below.

**Figure 2.** Research Model



## Methodology

This quantitative study was conducted using purposive sampling. The unit of analysis was telecommunication firms with its senior leaders starting from manager level position holders as subjects. Data was collected through a questionnaire and observations that were conducted between November 2017 and January 2018. The minimum required sample size is 52 respondents for a structural model, with a maximum of two arrows pointed at an endogenous construct with 5% significance level and 80% statistical power to detect a minimum R2 value of 0.25. Thus, the actual sample size in this study of 88 respondents is larger than the minimum required sample size. The sample was made up of 75% general manager or managers, 25% vice president (VP) or presidents of the board, with 88% men and 12% women, and 83% working for network and 17% for service providers. Data was collected

through a self-administered online questionnaire, which was distributed through Messenger, WhatsApp, LINE, Telegram, and e-mail. Due to limitations of the sample, SmartPLS was used to conduct the statistical analysis.

## Result

The measurement model assessment and structural model assessment have been demonstrated in this study.

### *Measurement model assessment*

The measurement model assessment consists of the following parameters (Hair, Risher, Sarstedt, and Ringle, 2018):

- Cronbach alpha to assess the internal consistency reliability with a minimum threshold of 0.7
- Convergence Validity with Average Variance Extracted (AVE) to be more than 0.5
- Composite Reliability and Rho A with a minimum threshold of 0.7
- Discriminant validity to compare the intended constructs that is higher than any other construct.

The result of the evaluation measurement is demonstrated as following in Table 1 below:

**Table 1:** Construct's Reliability Test

	<b>Cronbach's Alpha</b>	<b>rho_A</b>	<b>Composite Reliability</b>	<b>AVE</b>	<b>Conclusion</b>
Adaptive Capabilities	0.917	0.918	0.948	0.858	Reliable
Collaboration	0.909	0.910	0.936	0.785	Reliable
Deep Knowledge	0.913	0.916	0.939	0.794	Reliable
Digital leadership	0.972	0.974	0.975	0.675	Reliable
Dynamic Capabilities	0.959	0.962	0.964	0.657	Reliable
Global Vision	0.931	0.933	0.951	0.830	Reliable
Innovation Capability	0.817	0.826	0.892	0.734	Reliable
Innovation Management	0.963	0.963	0.971	0.872	Reliable
Inquisitively	0.945	0.946	0.960	0.858	Reliable
Management Capabilities	0.915	0.922	0.940	0.797	Reliable
Moderating Effect	0.997	1.000	0.997	0.824	Reliable
Paradigm Innovation	0.855	0.866	0.932	0.873	Reliable
Position Innovation	0.906	0.906	0.955	0.914	Reliable
Process Innovation	0.941	0.941	0.971	0.944	Reliable
Product Innovation	0.837	0.863	0.924	0.859	Reliable

Strategic Capability	0.851	0.865	0.900	0.694	Reliable
Thinker	0.915	0.915	0.946	0.854	Reliable
Creativity	0.872	0.874	0.912	0.723	Reliable

All dimensions of the latent variable were valid since the all dimensions had a value higher than the threshold.

The result of discriminant validity testing is presented in Table 2 below.

**Table 2:** Discriminant Validity

No	Variable	1	2	3	Remarks
1	Digital leadership	0.822			Valid
2	Dynamic Capabilities	0.800	0.811		Valid
3	Innovation Management	0.668	0.795	0.934	Valid

Values of the intended constructs (on the diagonal) were higher than the figure to the left, indicating good discriminant validity for each latent variable.

### ***Structural Model***

The structural model test consists of testing of the R-square value indicating a moderate fit if the R-square values are 0.25, 0.50, and 0.75 and over fit if the R-square value was higher than 0.90. The result of structural model is presented in Table 3 below.

**Table 3:** The R2 Test Result

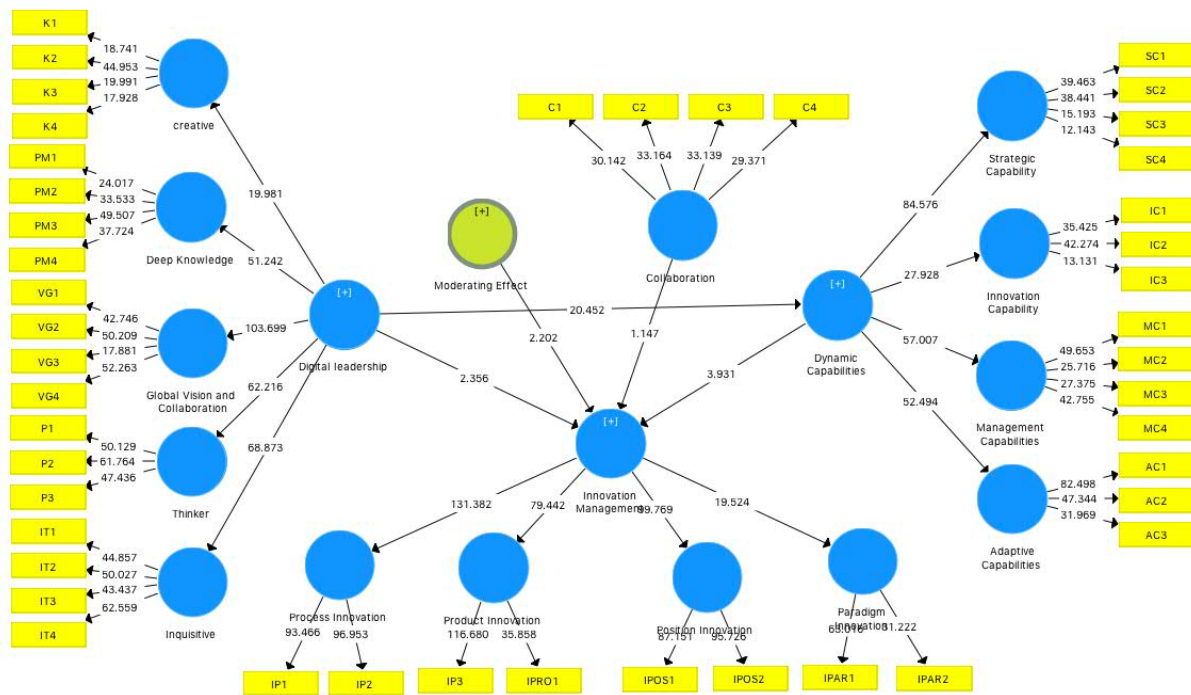
Dimensions	R Square	Conclusion
Adaptive Capabilities	0.845	Fit
Deep Knowledge	0.865	Fit
Dynamic Capabilities	0.640	Fit
Global Vision	0.922	Over Fit
Innovation Capability	0.807	Fit
Innovation Management	0.713	Fit
Inquisitively	0.869	Fit
Management Capabilities	0.865	Fit
Paradigm Innovation	0.620	Fit
Position Innovation	0.916	Over Fit
Process Innovation	0.939	Over Fit
Product Innovation	0.886	Fit
Strategic Capability	0.903	Over Fit
Thinker	0.875	Fit



Creativity	0.639	Fit
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Table 3 presents the adequate predictive relevance of the study since R2 indicated the dimensions that were fit and over-fit on global vision, position innovation, process innovation and strategic capability innovation. The overall research model results are depicted in Figure 2 below.

**Figure 2.** The Complete Research Model



**Hypothesis Testing**

Partial testing of the hypotheses was conducted to measure the significance of the direct relationship between variables. Results of the partial testing are presented in Table 4 below.

**Table 4:** Partial Hypothesis Testing

	<b>SD</b>	<b>T Statistics</b>	<b>P Values</b>	<b>Conclusion</b>
Digital leadership -> Dynamic Capabilities	0.039	20.452	0.000	Significant
Digital leadership -> Innovation Management	0.345	2.356	0.019	Significant
Dynamic Capabilities -> Innovation Capability	0.032	27.928	0.000	Significant
Moderating Effect -> Innovation Management	0.085	2.202	0.028	Significant

The simultaneous test was conducted to assess the indirect effects of the independent variable on the dependent variable. The results are presented in Table 5 below.

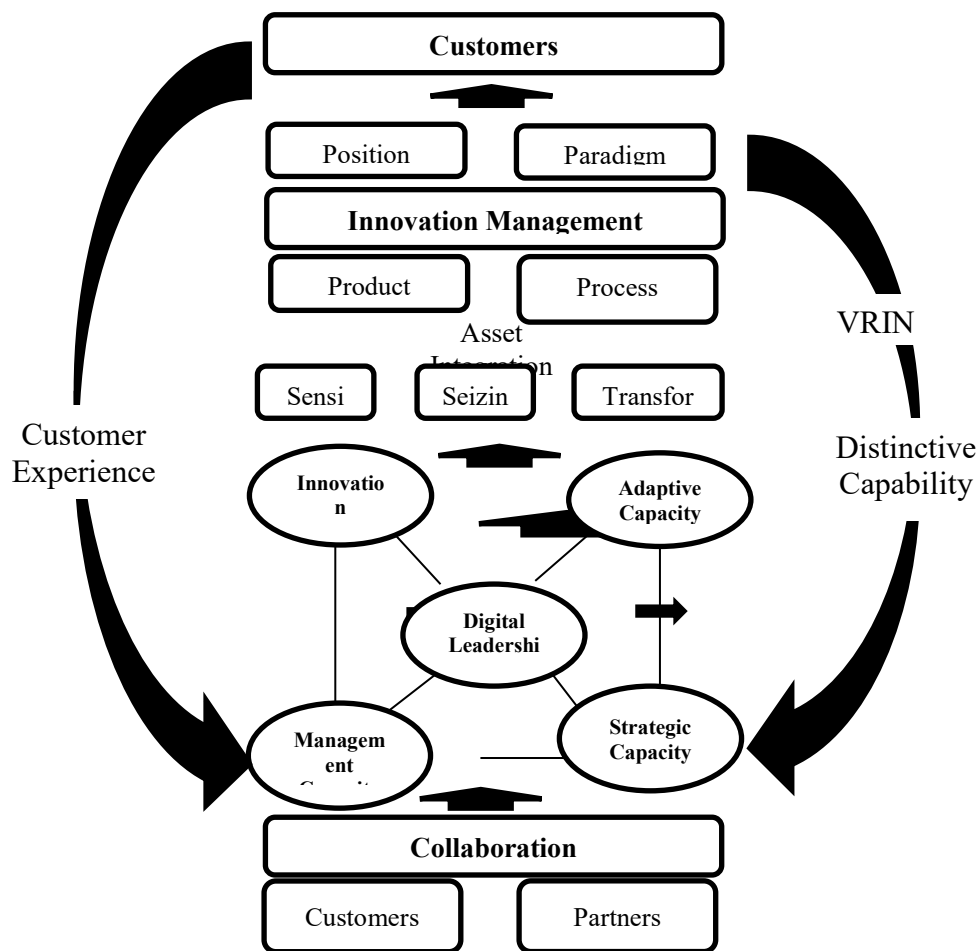
**Table 5:** Simultaneous Hypothesis Testing Result

	<b>SD</b>	<b>T Statistics</b>	<b>P Values</b>	<b>Conclusion</b>
Digital leadership -> Dynamic Capabilities -> Innovation Management	0.101	3.767	0.000	Significant

## Discussion and Implication

This study reveals that collaboration strategy played a more significant role compared to competitive strategy in the development of innovation management and dynamic capabilities. Process and product innovation took a bigger part in influencing the output as a result of the development of collaborative dynamic capabilities of the incumbent firm. This demonstrates the need of digitalization to seize opportunities for the product and the development of digitization as part of the innovation process. Both areas are considered as the weakness of the incumbent compared to the new entries (Loucks, Bradley, Macaulay, Noronha, and Wade, 2015). It can be concluded that currently, Indonesian incumbent firms are at an early stage of the digital transformation since it has focused more on the physical appearance in terms of the diversification of their products and digitization of business processes. Before entering the new paradigm of innovation in business model, it is important to drive positioning innovation.

**Figure 3.** The implication of Collaborative Dynamic Capability



This finding is aligned with the previous studies on digital opportunities in Indonesia (Das, Gryseels, Sudhir, and Tan, 2016; Vu, 2017). Hence, it reveals that the development of dynamic capability required strong strategic and management capability, which implies that firms should form strong changes in their management team to integrate and orchestrate the



new digital capabilities into the existing skillset in order to have adaptive capability by implementing a proper measurement system (Bourne and Neely, 2003). The measurement tool used to enable organizations to innovate should firstly detect the weakest signals to sense changes in the market and seize the opportunities to develop the scenarios and mitigate risks. It also enables transformation of organization capability to thrive and achieve higher to navigate the direction in adapting to volatility and market turbulence in the future (Pisano, 2015; Teece, 2014).

Strategic capabilities and management capabilities as part of a major influence on innovation-based dynamic capabilities require strong leadership vision to optimize the digital opportunities and ensure a sustainable and profitable organization. This study found that in the digital era, strong global vision with good knowledge and learning capabilities (inquisitively, thinker, and depth knowledge) take a major role in leadership innovation success. Leaders must develop their individual capacities and competence to provide better understanding of the change in dynamic environments through a strong global vision. Thinking and inquisitiveness were related to leaders interpreting, and challenging their interpretation of, situations. In other words, possessing the curiosity and ability to sense market changes, seize opportunities, and mitigate threats are considered important. In-depth knowledge is related to decision-making supported by digital technology and is part of the leaders' continuous learning. Since the innovation of paradigm and positioning has not been strong yet in the Indonesian ICT market, creativity becomes less critical in suggesting numerous innovations of business models.

Since the emergence of digital technology, such as the Internet of things (IoT), computing, big data, and cloud, allow all parties in an industrial sector to be connected and collaborate virtually and consequently, collaboration has become more significant in accelerating the whole process. This study also found that the drive for collaboration to fulfil the value chain of a firm by orchestrating it with digital leadership has an impact in accelerating the process. The overall implication of this study is depicted in Figure 3 above. Feedback from customers and internal processes for management to utilize in shaping capabilities is thus based on the inputs from customer experience to develop distinctive capabilities as a core competence based on VRIN (valuable, rare, inimitable, no substitutable; Barney, 1991). Therefore, it is recommended that future studies to incorporate innovation management and dynamic capability with customer experience input and distinctive capabilities be conducted.

### **Conclusion, limitation and further development**

Digital leadership takes an important role in driving the development of innovation management based on dynamic capabilities through direct and indirect effects. In addition,



this collaboration could accelerate the process of innovation based on dynamic capabilities. This study has limitation in terms of its sample, model and methodology, therefore, a larger sample, improvement in research model, and more advanced statistical analysis tools should be used to expand the study by also incorporating customer experience input and development of distinctive capability.

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