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Dynamic Capabilities: Responsiveness of Broadband Service Providers in Facing The Digital Business Era

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Abstract: *The broadband service providers in the digital business era are currently in a high turbulence business environment situation. The response of companies to the changing business environment is by changing their capabilities. The fast response of companies to implement fast and precise changes determines the level of dynamic capabilities of companies. The study aimed to analyse the factors influencing the dynamic capabilities of broadband service providers focusing on 4 telecommunication companies in Indonesia. The method used on this study was the structural equation modelling (SEM). The research results have shown that dynamic capabilities affect company performance. Dynamic capabilities are built by sensing data analytics, seizing, and transforming variables. The factors affecting dynamic capabilities are environmental turbulence and management capability profile. Environmental turbulence is built by technology turbulence and market turbulence indicators. Management capability profile is built by manager, management climate, management competency, and management capacity indicators. The managerial implications of broadband service providers in facing the digital business era are obtaining new revenue from the application and content business, utilizing data analytics on the management decision making of companies, and routinely diagnosing a gap between management capability profile and environmental turbulence.*

Keywords: *dynamic capabilities, sensing data analytics, seizing, transforming, SEM*

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I. Introduction

The growth of information and communication technology (ICT) industry is increasing, which is marked by the developing number of internet users in Indonesia. Based on the results of a survey conducted in October 2016 by the Association of Indonesian Internet Service Providers (APJII, 2016), there were 132.7 million internet users in Indonesia in 2016 with the highest one in Java at 86.3 million (65%). Based on the contents frequented, the behaviour of Indonesian users tends towards the commercial content at 62% through online shops and the social media content at 54% through Facebook. The behaviour of internet users who frequently visit the over-the-top (OTT) providers, like Facebook and online shops, has caused the bandwidth of the broadband service providers to drain. With the rising number of internet users in Indonesia, the data traffic coming to the infrastructure of broadband service providers increases; the demand for broadband services increases rapidly which in turn requires increased bandwidth. To ensure the good quality of internet services, an improvement on infrastructure capacity is necessary to accommodate the surge in data traffic due to the increase number of internet users. Extra capacity can be done by expanding the coverage area of services by adding the infrastructure on core network and value added services. The addition of capacity to accommodate the surge in data traffic is costly and takes time and good planning. Broadband service providers are required to follow these changes by trying to maintain a good service quality, but they should take into account any investment made in the addition of the infrastructure capacity.The increase in data traffic due to increasing internet users cannot be separated from changes in the business environment of broadband services. The business environment experiences changes with shorter time period and faster changes, causing the business environment to face turbulence situation. Turbulent business environment is marked by the increasing competition between companies, whether it is among their peers or with companies from other fields. Companies in an environment full of uncertainty require the ability to align the changing business environment dynamics; therefore, it is necessary to have adaptive internal capability as well as the ability to adjust to the external environment in real-time (Ansoff, 1990). The ability of companies to make changes quickly and appropriately to renew resources and capabilities is an effort of companies' dynamic capabilities to adjust to environmental changes.

The dynamic capabilities concept is the development of the capability concept on the resource-based view (RBV). According to Sampurno (2010), RBV emphasizes on resource efficiency where companies

produce better to give satisfaction to the customers' needs. The concept of dynamic capabilities is defined as a process of companies in utilizing the use of resources, especially the process to integrate, reconfigure, and adjust or even create market changes. Dynamic capabilities, in addition to the ability of companies to adapt to technology and market dynamics, are also the ability of companies to influence technology and market dynamics. According to Teece (2007), dynamic capabilities are differentiated into the capacities of (1) sensing opportunities and threats, (2) capturing opportunities, and (3) maintaining competitiveness through improvement, integration, protection and, if necessary, business reconfiguration on tangible and intangible assets. The intangible assets of a company are more difficult to manage (Teece, 2007). Intangible assets are difficult to imitate by competitors and become a source of competitive advantage (Barney, 1991). The success of a company to maintain a competitive advantage cannot be guaranteed simply because the company is always actively reconfiguring the right and structured process, but it must be done effectively and skilfully (Jantunen et al, 2005). According to Augier and Teece (2006), the dynamic capabilities framework includes three stages, namely sensing, seizing, and transforming. Sensing is the activity to sense technology and market opportunities. Seizing is the activity to select strategic decision-making dynamically. Transforming is the activity that combines, reconfigures and protects the assets in the organizational process of a company.The study aimed to analyse the factors influencing the dynamic capabilities of broadband service providers. In this study, the dynamic capabilities of companies in facing turbulent business environment in the broadband service provider industry were discussed. The novelty of this study is on the development of research model referring to the dynamic capabilities framework of Teece (2007) and the adaptation of the concept of capability adjustment to the changing environment of Ansoff (1990). The next novelty is the addition of data analytics on the dimensions of dynamic capabilities. The model and research hypothesis development is shown in Figure 1.

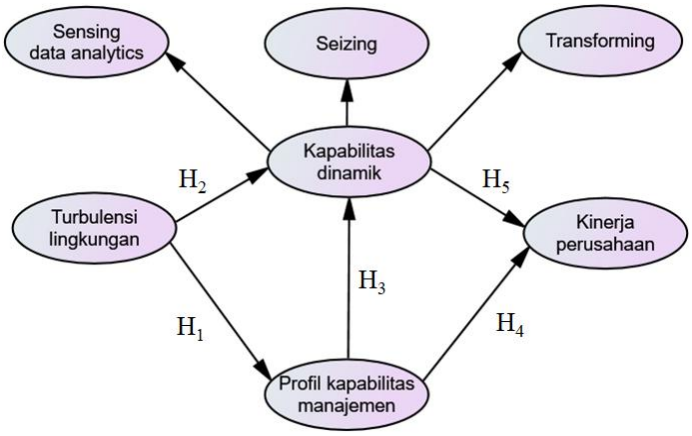

Figure 1. Research conceptual model

II. Research Methodology

Field research was conducted in the information and communication technology (ICT) companies in Indonesia from May to August 2017. The data used consisted of primary and secondary data. The primary data was obtained directly from the Indonesian telecommunication companies' employees as respondents through questionnaires and interviews. Secondary data was obtained from literature studies and other data related to the study. The sampling was done by the random sampling method, which was spreading the questionnaires randomly to the employees of 4 (four) broadband service providers through an online survey. Other sampling was carried out by the snowball sampling method, where the respondents who had filled in the questionnaires could participate in distributing the questionnaires to potential respondents.The method used was the structural equation modelling (SEM) in order to examine the factors influencing dynamic capabilities. SEM method is a confirmatory factor analysis (CFA) based analysis, which is a method that combines correlation analysis, regression analysis, traffic analysis and factor analysis (Suharjo, 2007). Another method was the Delphi method which was used when creating the model construction. The Delphi method was used to obtain consensus by digging opinions from some expert respondents.The study was done in several stages. First, it was to identify and select the factors influencing dynamic capabilities. Identification was obtained from the results of literature studies and interviews of experts for model structure material. Second, the questionnaires were made and pre-test questionnaires to limited respondents were conducted in order to test and receive suggestions for improvement. Third, the questionnaires that had been tested were sent to the respondents. Fourth, the result data from the questionnaires was processed and after that the reliability and validity tests for each construct were implemented. Finally, the model suitability test was conducted by referring to the model suitability criteria from Ghozali (2013).

III. Results And Discussions

3.1 Characteristics of Respondents

The research data was obtained from the answers of 462 respondents, consisting of broadband service providers' employees and employees of other companies related to the information and communication field. The distribution of respondents was based on the locations when filling the questionnaires; 85.36% of respondents came from Indonesia and the rest was from Japan, United States, United Kingdom, Netherlands, Singapore, Timor Leste, Hong Kong and Myanmar. The profile of respondents by unit origin or work field consisted of marketing (43.51%), network and operations (23.16%) and others, such as human capital management, corporate, planning, digital services, finance, information technology, sales, and others.

3.2 Analysis of influential factors

Broadband service providers in the digital business era are currently in a high turbulence business environment situation. The competitors of broadband service providers come not only from similar industry, but also from over-the-top (OTT) providers. Companies respond to the changing business environment by changing their capabilities. The fast response of a company in doing fast and precise changes determines the level of dynamic capabilities of the company. The factors identified were those related to environmental turbulence, management capability profile and dynamic capabilities. Factor identification was obtained from the results of literature studies and interviews of expert respondents with the understanding of ICT business for modelling material. The respondents' answers to each indicator have generated the mean values between 4.86-5.27 and the standard deviation (SD) values between 0.53- 0.82 (Table 1). The assessment categories for the questionnaires' answers were scaled 1 to 6.

Table 1. The structural model coefficients

Variabel latent		Var	Indicator variables	Mean	SD	λ	t-value	CR	VE
2nd order	1st order								
	Environmental turbulence	TTr	Technology turbulence	5,24	0,53	0,53	13,50	0,81	0,69
		TPr	Market turbulence	5,11	0,71	0,82	30,74		
	management capabilities profile	PKMr1	Manager	5,27	0,60	0,92	50,18	0,98	0,91
		PKMr2	Management Climate	4,86	0,82	0,93	54,52		
		PKMr3	Management Competencies	5,24	0,59	0,93	52,84		
		PKMr4	Management capacity	5,05	0,66	0,94	57,34		
Dynamic capability	Sensing data analytics	ADIr	Analytical data infrastructure	5,21	0,60	0,57	14,68	0,90	0,70
		ADAr	Advanced data analytics	4,92	0,73	0,73	23,10		
		ADSr	Analytic of strategic data	4,94	0,80	0,66	18,68		
		EBr	Business ecosystem	4,97	0,68	0,91	47,53		
	Seizing	MBr	Business models	5,04	0,69	0,86	35,24	0,93	0,81
		PKr	Pengelolaan dan kontrol	4,91	0,78	0,85	35,09		
		MLKr	Membangun loyalitas dan komitmen	4,89	0,78	0,80	28,60		
	Transforming	MPr	Knowledge management	5,20	0,67	0,85	33,92	0,95	0,83
		KIr	Integration capability	4,96	0,78	0,82	30,74		
		KKr	Coordination capability	4,91	0,74	0,86	36,03		
		KRr	Reconfiguration capability	4,87	0,76	0,87	37,72		
	Company performance	KKUGr	Financial performance	4,90	0,76	0,88	39,02	0,89	0,81
		KPr	Marketing performance	4,90	0,77	0,80	28,90		

Source: data processing

The analysis results of the influential factors (Table 1) show that, first, market turbulence has a greater influence than technology turbulence in building environmental turbulence variable. Ansoff (1990) and Pavlou and El Sawy (2011) have stated that the two indicators are used to measure the changes and prediction of the turbulence level of business environment. Second, the manager, management climate, management competency, and management capacity indicators have relatively equal influence in building the management capability profile and the results are aligned with those of Ansoff (1990). Third, dynamic capabilities are built from the sensing data analytics, seizing, and transforming variables. The business ecosystem indicator has a greater influence than the infrastructure data analytics, advanced data analytics, and strategic data analytics indicators in building the sensing data analytics variable. Business model indicator and management and control indicator have a greater influence than the building loyalty and commitment indicator in building the seizing

variable. Knowledge management, integration capability, coordination capability and reconfiguration capability indicators have relatively equal influence in building the transforming variable. This is in line with the results of Pavlou and El Sawy (2011), Szakaly (2012), and Teece (2009).The processing result in Table 1 give good reliability and validity values where all indicators/latent variables fulfil the requirement values of CR $\geq$ 0.7, VE> 0.5 (Hair, et al, 2009). The results of degrees of freedom (DF) 144 and referring to the statistical tables, the significant level on the alpha (α) 0.05 two tail is 1.9766, hence t-value of all the indicators is more than t-table. The results show that all indicators can explain the existence of their variables and t-value test results generate significant values.

3.3 Structural model testing and hypothesis discussion

The next analysis to determine the relationship of the influential factors according to the research hypothesis was conducted through the structural model test with the help of the AMOS program. Figure 2 is the output result of the structural model with the data number of 459 respondents, where the outlier data was eliminated as many as 3 responses. The suitability test of the structural model was carried out to ensure that the model developed was in accordance with the data obtained. The measurement test of the structural model produced the values meeting the model suitability criteria (Table 2); thus, the model can be considered appropriate and in accordance with the data obtained.

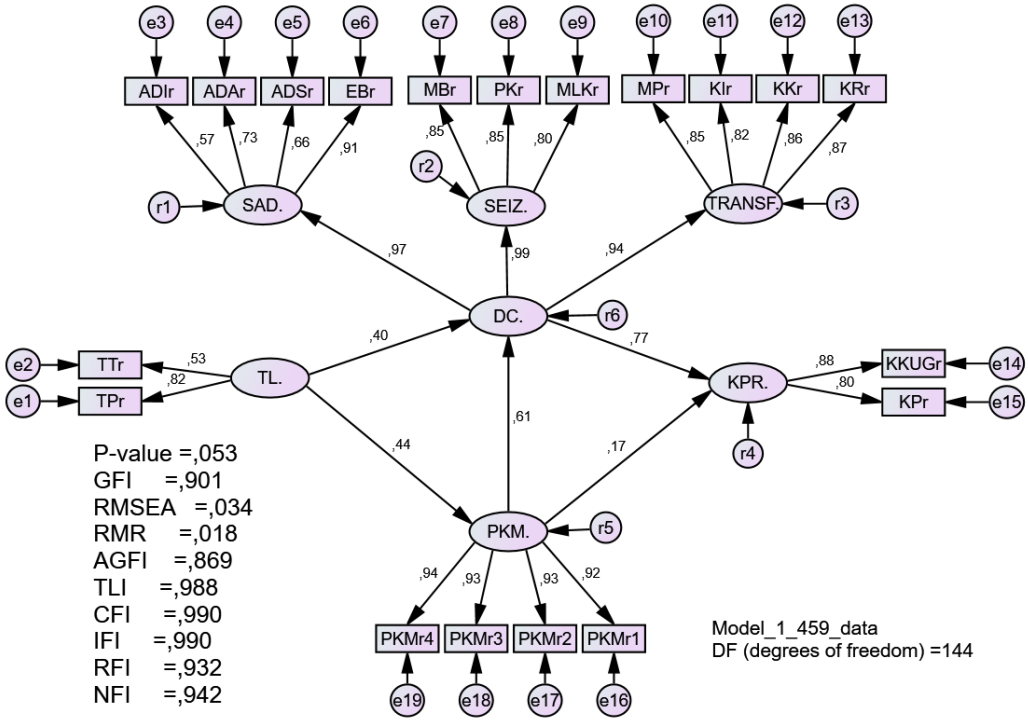

Figure 2. The structural model of dynamic capabilities (standardized estimates)

Table 2. The model suitability values of structural equation modelling

Measure	Goodness of fit	Cut off value	Result	Criteria
Absolut fit measure	*P-value* (*significance probability*)	≥ 0,050	0,053	good fit
	GFI (*goodness of fit*)	> 0,900	0,901	good fit
	RMSEA (*root mean square error of approximation*)	< 0,080	0,034	good fit
	RMR (*root mean square residual*)	< 0,050	0,018	good fit
Incremental fit measure	AGFI (*adjusted Goodness of fit index*)	> 0,900	0,869	marginal fit
	TLI (*tucker lewis index*)	> 0,900	0,988	good fit
	CFI (*comparative fit index*)	> 0,900	0,990	good fit
	IFI (*incremental fit index*)	> 0,900	0,990	good fit
	RFI (*relative fit index*)	≥ 0,900	0,932	good fit
	NFI (*normed fit index*)	≥ 0,900	0,942	good fit

Source: data processing

3.3.1 The effect of environmental turbulence on management capability profile (H_1) and dynamic capabilities (H_2)

The research results show that environmental turbulence has a significantly positive effect on management capability profile and dynamic capabilities. This indicates that any change in the environment affects management capability profile and dynamic capabilities. The results are in line with those of Ansoff (1990) where environmental turbulence affects company capability. Besides, Ansoff (1990) has also said that environmental turbulence and company capability can influence each other, where company capability can also affect environmental turbulence.Market turbulence indicator has greater contribution compared with technology turbulence indicator in building the environmental turbulence latent variable. The t-value of market turbulence indicator (30.74) was higher than that of technology turbulence (13.50), which means that market turbulence indicator can better explain the existence of the environmental turbulence latent variable. In association with market turbulence, companies have to be able to read marketing changes that can affect the business. Marketing changes in the broadband services need to be followed by the management capability profile dimension and dynamic capabilities dimension. The basis of service of the broadband service providers is connectivity. Marketing changes do not only focus on the basis of service, but also pay attention to the changes in the application and content business. Companies need to make creative efforts to obtain revenue not only by relying on the basis of service (connectivity), but also by making creative efforts to alter marketing patterns that lead to application and content business; companies need to be creative in capturing the business opportunities derived from connectivity. Product introduction becomes important for companies to focus at, where the introduction of a company's product can affect the business. Product introduction become the focus of companies, where a company must routinely introduce its products to the customers. Companies do not only introduce the benefits of a product in terms of the basis of service, but also require the introduction in terms of applications and contents. Companies must be able to convince the customers that the product introduced can provide benefits and is able to provide value for the customers.

Another indicator of the environmental turbulence latent variable is technology turbulence. Companies should be able to read technological changes that can affect the business. Technological changes in broadband service have to be followed by the management capability profile dimension and dynamic capabilities dimension. The basis of broadband service is connectivity service, but companies seek to follow the changes occurring in the application and content business. Improvement both in quality and quantity on application and content business should be anticipated by broadband service providers so that the management of connectivity infrastructure can accommodate the surge in data traffic.

Table 3. The structural model relation coefficients

Hypothesis	Relationship			Coefficient	t-value	Note
H_1	PKM.	<---	TL.	0,445	10,62	Accepted
H_2	DC.	<---	TL.	0,401	9,36	Accepted
H_3	DC.	<---	PKM.	0,607	16,33	Accepted
H_4	KPR.	<---	PKM.	0,172	3,73	Accepted
H_5	KPR.	<---	DC.	0,773	26,05	Accepted

Source: data processing

3.3.2 The effect of management capability profile on dynamic capabilities (H_3) and company performance (H_4)

The research results show that management capability profile has a significantly positive effect on dynamic capabilities and company performance (Table 3). The effect of management capability profile is greater on dynamic capabilities than on company performance. Four indicators that build the management capability profile, namely manager, management climate, management competency, and management capacity, significantly influence dynamic capabilities and affect company performance. The four indicators need to be updated in order to contribute positively in affecting dynamic capabilities and company performance. The three dimensions that build dynamic capabilities need to consider the four indicators of management capability profile. In companies' internal environment, it is necessary to routinely photograph the gap between management capability profile and environmental turbulence. Ansoff (1990) has stated that at a high level of environmental turbulence scale (scale 5) a flexible and creative management capability is required. A flexible

and creative management capability is one that is able to adapt and create something in a changing business environment with a high level of turbulence. In the ICT industry, where, along with the progress in the fields of connectivity, applications and contents, the ability of company management to be creative is needed to act as a subject to change, to be able to provide the effect that can undermine the market order. In order to capture the opportunity, companies need to capture company management capability profile on a regular basis so that companies can determine the selection of appropriate management capability profile to face the business environment dynamics currently and for the next few years.

3.3.3 The effect of dynamic capabilities on company performance (H_5)

The research results show that dynamic capabilities have a significantly positive effect on company performance. The results of previous hypothesis stated that environmental turbulence had an effect on company performance, but had a smaller influence value than the effect of dynamic capabilities. This shows that environmental turbulence has a greater influence value when it is through an intermediate variable, namely dynamic capabilities. The dynamic capabilities of a company can adjust to the business environment which is determined by sensing data analytics, seizing and transforming. Sensing data analytics are the sensing of internal and external environment. Seizing is capturing the opportunity from the sensing results in the form of management decision making. Transforming is the transformation on business process. The research results show that the indicators that should be considered in sensing data analytics is the infrastructure data analytics, advanced data analytics, strategic data analytics and business ecosystem. The activity of sensing data analytics is the sensing activity to read and feel the issues related with a company's business, both from the external environment and internal environment of the company. The results of sensing become input for companies, as reference input for the dynamic capabilities of companies. This activity has a very important role because reference input is the basis for companies to determine the appropriate strategy for their business continuity. The indicators building the seizing dimension that needs to be focused at are the business, management and control as well as building loyalty and commitment models. The business model applied by broadband service providers, for instance in an effort to get new revenue from OTT, becomes a reference for the process in the dynamic capabilities dimension. In the effort to obtain new revenue, broadband service providers need to renew the existing process in the transforming dimension. The indicators that build the transforming dimension become the indicators for the process changes in the transforming activity. Knowledge transfer is needed in the transformation effort; hence, innovations for product development are expected. Increased capabilities in the improvement effort of business process to be more effective can continue to be implemented.

3.4 Managerial implications

The managerial implications that can be done for broadband service providers in facing the digital business era from the research findings are, first, utilizing their core business (connectivity) advantage by also enjoying new revenue from the application and content business. The behaviour of internet users in Indonesia that frequently visit social media and commercial contents (APJII, 2016) is a challenge for broadband service providers to enjoy new revenue, for example by conducting a cooperation with OTT companies that provide applications and contents (social media/commercial). The benefits to be gained from such cooperation are: 1) for the broadband service providers, they get new revenue and can increase the market value, 2) for the OTT providers, the quality of the data traffic to OTT is guaranteed and the market share domination potential for OTT is opened with the potential number of users of broadband services. With this cooperation, connectivity companies gain new revenue and the users of OTT providers have guaranteed quality.

Second, the result recommendation of data analytics is suggested to become the basis of management decision making for business model creation/improvement as well as the framework of evaluation/control in the business process of companies. With the help of data analytics, the interaction pattern of any data traffic coming to the infrastructure of broadband services can be discovered, and after that the required management decision making can be recommended by considering the existing consequences and creating risk mitigation.

Third, the creation/improvement of business models in an effort to capture the opportunities in digital business both in the main business of companies and in the business derived from it (applications and contents) is implemented. For example, the business model in order to create a new start-up can continue to surge so that in the future it is expected to provide value added to companies. Resource power in connectivity field can be utilized by pursuing business model digitalization in the form of making applications that can simplify business process to be more effective. To make it happen, it can be done in the early stages through collaboration with relevant partners. Fourth, companies need to know the gap between management capability profile and environmental turbulence and further establish the appropriate management profile for the business currently and in the future. Management capability profile improvement is highly needed in order to gain new revenue in the current digital business era. In a high environmental turbulence situation in the broadband service

business, flexible and creative capabilities are needed (Ansoff, 1990). The selection of management decision making should take this into consideration because decision making mistake can result in considerable losses. Broadband service providers that have the ability of data analytics and are able to read new business opportunities need qualified management capability profile. If a company wants to take the cake in the business that is currently achieved by the OTT providers such as Google and Facebook, the investment to enter the business must be selective.

IV. Conclusion

The broadband service providers in the digital business era are currently in a high turbulence business environment situation. Competition comes not only from similar industries, but also from over-the-top (OTT) providers. The response of companies to the changing business environment is by changing their capabilities. The response of companies to implement fast and precise changes determines the level of dynamic capabilities of companies. Dynamic capabilities affect company performance. Dynamic capabilities are built by sensing data analytics, seizing, and transforming variables. The factors affecting dynamic capabilities are environmental turbulence and management capability profile. Environmental turbulence is built by technology turbulence and market turbulence indicators. Management capability profile is built by manager, management climate, management competency, and management capacity indicators.The managerial policies that can be recommended to broadband service providers facing the business digital era are, first, utilizing their core business advantage (connectivity) by also enjoying new revenue from application and content business. Second, the result recommendation of data analytics data is suggested to become the basis of management decision making for business model creation/improvement as well as the framework of evaluation/control in the business process of companies. Third, the creation/improvement of business models in an effort to capture the opportunities in digital business both in the main business of companies and in the business derived from it is expected to provide value added to companies. Fourth, companies need to know the gap between management capability profile and environmental turbulence and further establish the appropriate management profile for the business currently and future.

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