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Distinctive Competencies and Process of Innovation during Organizational Mergers: The Moderating Effect of Knowledge Vacuum

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ABSTRACT

The practice of organizational merger may face both contra and supportive conditions. Organizational changes due to merger often occur as a result of both process and knowledge inertia. In particular, this is widely encountered in a research and development (R&D) agency, which its core activity is innovation. Merger among R&D organizations is aimed to achieve legit images, but it also may delay innovation process. This study aims to measure the effect of knowledge vacuum as a moderating variable between distinctive competencies and process of innovation. A number of 90 targeted researchers and engineers from various former public research & development agencies were involved in a questionnaire survey. Data were analyzed using partial least square-structural equation modeling (PLS-SEM). The results show that distinctive competencies significantly affect process of innovation, meanwhile knowledge vacuum is not a significant moderating variable between distinctive competencies and process of innovation**.** The most important aspects of distinctive competencies are to define detailed process of innovation from start to end and to be able to commercialize innovation output. These aspects will boost the organizational changes to achieve new goals and maintain innovation process. In this case of insignificant knowledge vacuum, the possibility of open innovation is adequate.

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I. INTRODUCTION

In recent years, mergers and acquisitions were the main topics in several organizations and industries. Mergers were intended to fuse several organizations and establish new managerial formation. Meanwhile, acquisitions were more intended to acquire new parties to be managed, without the necessity to establish new managerial systems. Both merger and acquisition involved organizational change, which fully intersected with innovation performance, either organizational or individual. Lately, merger issues dominated the emerging sectors of organization, such as occurred in Bayer and DuPont. Many successful mergers phenomena depicted better monetary benefits. Based on previous researches, several high-tech mergers generated prominent impacts on markets through innovation (Allio, 2020; Berkhout et al., 2006). Many experts suggested that mergers could lead to raising price, but it worth the market competition. On the other hand, the function of innovation process was still debatable, especially when the innovations were not resulted from formal research and development (R&D) activity (Allio, 2020; Stipp et al., 2018). Colombo and Rabbiosi (2014) stated that commercial business mergers not only would lead to a sharp increase in sales, but also would boost R&D intensities. Previous studies discussed organizational change during mergers that occurred mostly in profit oriented companies or industries. On the other hand, studies that examine mergers in the scope of research-based organization were still rarely conducted.

Mergers-innovation literatures revealed that mergers not only might generate synergies and reduced rivalry, but also brought up organizational inertia, such as knowledge vacuum. Several past researches showed that the pro and contra actions due to organizational changes, which caused knowledge vacuum, had generated several distinctive competencies that affect company's performance (Calipa et al., 2010; Dandira, 2012; Palacios-Marqués et al., 2019; Symeonidou et al., 2022). Past research on innovation discussed about innovation process in the commercial business (Calipha et al., 2010), and another researches measured knowledge vacuum in the levels of strategy architect or decision makers, even though the corresponding actors did not really understand strategic management (Dandira, 2012; Manning et al., 2021). Moreover, distinctive competencies and innovation process were often being examined solely in the middle process of innovation rather than being integrated in the input, process, and output of innovation process (Symeonidou et al., 2022). According to several past researches, the relationship between distinctive competencies and innovation process, especially in public sectors, was still debatable (Bolívar-Ramos et al., 2012; Real et al., 2006). Palacios-Marqués et al. (2019) added that during organizational change due to mergers, it was important to reinforce distinctive competencies in order to smoothen organizational practice to meet its goals during the transition.

Thus, this study will discuss the impacts of distinctive competencies to process of innovation and knowledge vacuum as moderating variable between distinctive competencies and process of innovation. Public research organizations, which merged recently, were observed in this study. Previous related studies are highlighted in Table 1.

This study aims academically to contribute on both basic and applied sciences, especially to enrich the existing literature of policy studies. Methodologically, all latent variables were measured using Likert scale, then were analyzed using structural equation modelling. The research model that involved knowledge vacuum generates significant evidence among innovation process during organizational change due to merger. Overall, the structure of this article is arranged as follows: Section 1 presents theoritical backgrounds and hypotheses; Section 2 explains methodology of research, including data gathering and variables description; Section 3 describes data and empirical strategy; and finally section 4 concludes the overall research findings.

II. ANALYTICAL FRAMEWORK

Merger activities were prevalent tactics used by many firms and organizations to enhance their performances. The motive to conduct merger was often similar from one organization to anothers, one of the main reasons was to improve their human resource capacities. Distinctive

competencies was defined as the capability of human being to act in certain way that generated valuable impacts in an organization. Furthermore, merger activities was believed to enhance organizational value through adding more number of capable employees. They served important roles to improve the business's innovation process towards its desired goals. In line with research institution mergers, this merger activities was aimed to enhance innovation process through synergizing various talented personnel. Moreover, organization's global reputation was expected to be advanced through this. Heller-Schuh et al. (2020) described that a merger can lead to the creation of new organizational models and the upgrade of research and innovation capacity. These are expected to improve organizational's knowledge base and allows it to access new technologies that lead to a faster penetration to their target market. The more distinctive the competencies it acquired, the more advance the innovation process it can implement. Real et al. (2006) investigated several innovative Spanish companies and defined distinctive competencies from technological capabilities. He revealed that technological distinctive competencies had a significant relationship to business performance. Other findings found that marketing distinctive competencies could enhance company's revenues, which came from increased sellings and stock price (Palacios-Marqués et al., 2019; Olazo, 2022). Palacios-Marqués et al. (2019) explained a distinct capability as a trait that can generate value in a firm and is required to develop a competitive business advantage. The term was established with aim to strategically formulate the organizational core competencies. Companies that describe their business domain in terms of their distinctive competencies will perform better in volatile conditions, such as during merger and acquisition (Fernandez et al., 2018). Merged research organization is urged to well define its distinctive competencies, both in social and technological aspects. Distinctive competencies helped individual to think critically and to outline the problem solving concept. This characteristic is needed during the process of innovation as it impacts the success level of innovation (Olazo, 2022).

Therefore, this study is considered necessary with aim to examine distinctive competencies in merged public research organizations and its relationship to innovation process. From preceding arguments, the first hypothesis is formulated as follows:

H1: Distinctive competencies has a significant positive direct impact to innovation process

Merger is a part of strategic decision made by top management, even though the majority of top management did not realy aware what they supposed to do due to incomplete information. In addition, organizational change basically consists of crisis situation and supportive situation. Crisis situation may be worsened by unawareness about the fundamental knowledge of what should be achieved in a five year strategic plan. Meanwhile, supportive situation arised from cooperative interactions between employees to settle organizational transition. Such crisis situation could lead to knowledge inertia, or knowledge vacuum, since several capable personnel were being moved or changed before they had the chance to pass on the valuable knowledges or informations. Eventually, knowledge vacuum could hamper the innovation process.

According to Liao et al. (2008), knowledge inertia was defined as principle of thought that influenced individual's behavior to behave inversely with current situation or strategy. This knowledge inertia, also known as knowledge vacuum, was generally caused by missing information and misleading perception. The concept of knowledge vacuum emphasizes how the structural and behavioral components tend to interact negatively rather than positively (Choi & Chandler, 2020). Knowledge vacuum is a condition in which organizational learning is hindered by the interaction of two factors: the pushing force of innovation, such as political pressure and pro-innovation bias; and the pulling force of organizational inertia at the structural and behavioral levels, such as employees' unwillingness to innovate (Xie et al., 2016).

The pulling force is mostly related to organizational inertia that opposes change, whereas the pushing force is associated to heterogeneous and premature inventions with a pro-innovation

attitude and political pressures. Many scholars acknowledge that public organizations have contradictory internal reasons for innovation, as well as external political pressure, that sometimes forces them to innovate against their will, and with low motivation and high degrees of inertia. In other words, even while political pressure or the pro-innovation inclination of public manager's forces public organizations toward innovation, the employees may not be able to respond to it properly, mainly for motivational and cognitive reasons (Liao et al., 2008; Choi & Chandler, 2020).

In relation with the knowledge vacuum context in this study, structural changes impose a learning requirement that exceeds the capacity and motivation of the employees, leading to their frustration and resistance. As a result, the organizational capacity for learning is pulled back, but at the same time, additional changes are stimulated to break the deadlock. The idea draws attention to the potentially detrimental effects of promising developments. The conceptual model proposed in this study is displayed in Figure 1.

Overall, the preceding statements lead to the formulation of second hypothesis as follows:

H2: Knowledge vacuum has a negatively moderating effect on the relationship between distinctive competencies and innovation process.

Table 1. Main Previous Studies Related to Distinctive Competencies, Process of Innovation, and Knowledge Vacuum

Author	Year	Title	Method	Findings	Journal
Bolivar-Ramos et al.	2012	Technological distinctive competencies and organizational learning: Effects on organizational innovation to improve firm performance	SEM	Top management positively influences the formation of technological skills, technological distinctive competencies, and organizational learning. In general, technological distinctive competencies and organizational learning are impacting innovation process	*Journal of Engineering and Technology Management*
Palacios-Marques et al.	2019	Social entrepreneurship and organizational performance: A study of the mediating role of distinctive competencies in marketing	Structural Equations (EQS)	There is a positive relationship between how far the company introduces the concept of social entrepreneurship and company performance. Distinctive marketing competencies are able to mediate between the level of social entrepreneurship implementation and organizational performance	*Journal of Business Research*

Author	Year	Title	Method	Findings	Journal
Fernandez et al.	2018	Distinctive competencies and competency-based management in regulated sectors: A methodological proposal applied to the pharmaceutical retail sector in Spain	SEM	The performance of pharmaceutical companies and the acquisition of competitive advantage will positively affect the store image, managerial control, and knowledge management	*Journal of Retailing and Consumer Services*
Choi & Chandler	2020	Knowledge vacuum: An organizational learning dynamic of how e-government innovations fail	Literature Study	Training, political pressure, and employee resistance can cause a knowledge vacuum in the dynamics of the organization.	*Government Information Quarterly*
Dandira	2012	Strategy in crisis: knowledge vacuum in practitioners	Literature Study	Individual interest in job characteristics is a challenge in the dynamics of work. The higher the turn-over, the higher the potential knowledge vacuum that will occur	*Business Strategy Series*
Asplund et al.	2021	The genesis of public-private innovation ecosystems: Bias and challenges	Kruskall Wallis test	Knowledge exploitation activities will lead to objective bias in the recruitment system in companies that refers to public leadership. It is very important to know the main motivations of companies entering and leaving an innovation ecosystem so that a strategy can be designed in balancing the management of knowledge flows and the balance of company exploration-exploration.	*Technological Forecasting & Social Change*
Sucupira et al.	2018	Innovation in public administration	Bibliometric study	Research on public innovation is still dominated by qualitative methods, even though the mix-method will provide more insight in this regard. Further studies are still needed to review the innovation phase in public administration, especially in relation to socio-political- and economic aspects.	*Innovation & Management Review*

Author	Year	Title	Method	Findings	Journal
Stipp et al.	2018	Innovation and cross-functional teams	Case Study	Formal and temporary teams will produce high incremental innovations of the product. Meanwhile, the permanent and informal team will generate a higher capacity for innovation in internal processes and compliance with market standards.	*Team Performance Management:* *An International Journal*
Fouad et al.	2017	The innovation process impact on the new product performance: A case study	Literature Study & SEM-PLS	The crucial phase in a product development is the finalization of the concept idea to enter into prototype development. Many of the activities in this phase are characterized by a partial parallel structure that must be supported by strong innovative human resources.	*International Journal of Innovation*

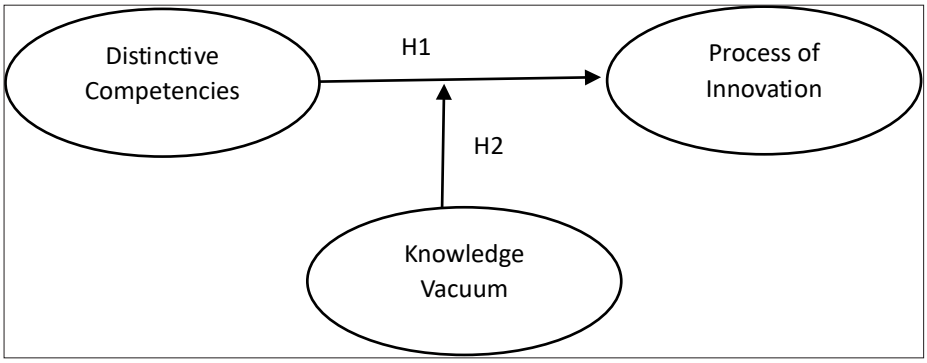


Figure 1. Conceptual model proposed in this study

III. METHODOLOGY

A. Measurement

This study measured all latent variables using four-point (4-point) Likert scale (from 1 = strongly disagree, to 4 = strongly agree). According to Hair et al. (2011), the implementation of 4-point Likert had several advantages, namely avoided ambiguity in answering questions and provided an uncomplicated scale for assessment. Moreover, questions to measure latent variables were adopted from previous studies, also were cross-checked with the corresponding experts during pre-survey of the study in order to meet the current study's objectives. The operational definitions and references of each latent variables is presented in Table 2., meanwhile Table 3. shows indicators of each latent variables.

Overall, each latent variable was measured using several specific indicators or questions. The latent variable of Distinctive Competencies was measured using 5 (five) indicators that consisted of four capabilities: writing scientific

articles, producing innovation outputs, performing joint researches, thinking critically about innovation, and updating technological and social knowledges. The latent variable of Knowledge Vacuum was measured using 4 (four) indicators that explained about personnel and/or business process flow, motivation change of innovation, knowledge and business process change, and the impact of organizational change on knowledge learning. Lastly, the latent variable of Process of Innovation was measured using 6 (six) indicators that linked to five capabilities: identifying problems, defining steps of innovations, building conceptual models of innovations, improving innovations, and publishing or commercializing innovations.

B. Data Collection

To observe organizational mergers, this research involve researchers and engineers from various government research institutions that have been merged recently into National Research and Innovation Agency of Indonesia. Those merged research institutions consist of National Institute of Aeronautics and Space, National Nuclear Energy Agency of Indonesia, Agency for The Assessment and Application of Technology, Indonesian Institutes of Sciences, and several research institutes from particular ministries. The phenomenon of merging public research institutions is quite different from merging public universities. Knowledge flow was considered more stable in the research institutes rather than in universities, since students—as innovation actors—would generally leave universities after graduation, meanwhile researchers would generally stay in the research institutes for their long term career paths (Aagaard et al., 2016; Cheah & Ho, 2021; Contreras & Lozano, 2022; Heller-Schuh et al., 2020). Previous studies only spotted merging universities or centralized coordination between research institutions, therefore current merging government research institution is needed to be investigated.

This reseach involved 90 targeted researchers and engineers. This number were selected after consider the respondent's willingness and their period of work. Scope of innovation activities that conducted by researches and engineers were linked to both non-technological and technological innovation. Non-technological innovation was described as social research, which mostly produced public policy. On the other hand, technological innovation was explained as basic and implementative researches, which involved laboratory activities or technological assembly (Bolívar-Ramos et al., 2012; Chi et al., 2021; Colombo & Rabbiosi, 2014). The questionnares were divided into two parts. The first part contained general questions about personal information, then the second part contained self perception questions to measure all latent variables in this study. This study was grouped in social sciences and not involving any human experiment, hence this study did not need ethical approval.

III. RESULTS

Partial least square-structural equation modeling (PLS-SEM) using SmartPLS 3 was utilized to test the hypotheses in a proposed model in this study. Compared to Lisrel, PLS-SEM is a more appropriate method for small samples (Khan et al., 2019). In this section, several data will be presented and interpreted. There are 3 (three) points that will be described: 1) sample characteristics; 2) measurement model; 3) structural model. Sample characteristics explain individual information, such as gender, status or type of working, and research & development activities continuity (R&D continuity). In addition, measurement model section will discuss about factor loadings, reliability, and validity. Finally, parts of structural model will imply about validity of the hypotheses.

Table 2. Operational Definitions and References of Each Latent Variables

Latent Variables	Operational Definition	References
Distinctive Competencies	Superior or unique capabilities of research and innovation actors that drive the improvement of research and innovation-based organizational performance itself	(Fernandez et al., 2018; Palacios-Marqués et al., 2019; Real et al., 2006)
Knowledge Vacuum	Organizational learning capabilities that are impaired by organizational inertia (e.g. reorganization or merger), either structurally or behaviorally	(Choi & Chandler, 2020; Dandira, 2012; Manning et al., 2021; Wensley & Navarro, 2015)
Process of Innovation	The process of searching for innovative ideas to convert conceptual innovation into disseminable innovation, where before reaching the dissemination stage, the idea will be converted into a concept model, which is then formed into output that has intellectual property value	(Agolla & van Lill, 2017; Berkhout et al., 2006; Fouad et al., 2018)

Table 3. Indicators of Each Latent Variable

Distinctive Competencies	
DC1.	During this organizational change, I am capable to write scientific articles with national and/or global reputation
DC2	During this organizational change, I am capable to produce prototype(s) and/or policy brief(s) from research and development activities
DC3	During this organizational change, I am capable to perform external joint researches, both nationally and/or internationally
DC4	During this organizational change, I am capable to think logically, as well as critically, during performing innovation process
DC5	During this organizational change, I continue updating both technological and social knowledge
Knowledge Vacuum	
KV1	I feel personnel and/or business process losses during this organizational change due to merger
KV2	I feel less motivated to innovate in this merged organization
KV3	In my opinion, there is a knowledge vacuum or loss due to personnel and/or business process change during organizational change
KV4	In my opinion, organizational change due to merger can cause unconducive new and advanced knowledge learning
Process of Innovation	
PI1	I am capable to identify problems and define fundamental concepts to generate proper innovation
PI2	I am able to define each steps of innovation and develop them into an integrated innovation
PI3	From the conceptual model that I built, I am competent to develop the model into product prototype(s) or/ and policy paper(s)
PI4	I open to accept critics and suggestions about innovation that I made
PI5	I revise prototype(s) and/or policy paper(s) based on critical suggestions
PI6	I publish or commercialize my innovation results (outputs)

A. Sample Characteristics

All 90 questionnaires received were complete and valid. Validity of responses was indicated from responses' consistency. The majority of respondents were researchers (70% over 30% engineers). Furthermore, gender percentages indicated that there were 53 males and 37 females, despite this gender type can not represent R&D continuity. Meanwhile, R&D continuity rates showed that the majority of their activities were discontinued after institutional mergers. This suggests that there were adjustment process during organizational changes due to mergers. Summary of the sample characteristics is shown in Table 4.

Table 4. Sample Characteristics

Category	Frequency	Percentage
Gender		
Male	53	58.9%
Female	37	41.1%
Type of Working		
Researcher	63	70%
Engineer	27	30%
R&D Continuity		
R&Ds continue after merging	39	43.3%
R&Ds discontinue after merging	51	56.7%

B. Measurement Model

Loadings of factor, reliability, and validity were being analyzed in this section. There were several standard values for model measurement. Factor loading values should be equal to or more than 0.70, while reliability is achieved when resulting values of Composite Reliability (CR) and Cronbach's Alpha (α) were 0.70. The first model running indicated that several indicators did not meet the standard value of CR. Those are DC2 (0.31), DC3 (0.33), PI4 (0.13), PI5 (0.22), and KV4 (0.33). These indicators should be excluded in order to re-run the model. Moreover, validity was assessed by calculating construct and discriminant validities. Construct validity was assessed using Average Variance Extracted (AVE), which means each construct should reach value of 0.50 or more (Khan et al., 2019). Then, discriminant validity was examined using the values of square root of AVE and heterotrait–monotrait (HTMT) ratio. The Fornell-Larcker criterion was confirmed by determining whether the square root of the AVE of each latent variable was greater than the correlations with other variables in the model. The correlations between the constructs are shown in Table 7. Finally, the HTMT ratio result confirmed that all HTMT indices were less than 0.85 or 0.90. (Hair et al., 2016; Khan et al., 2019)

Through several following tables (Table 5., Table 6., Table 7.), it can be seen that after excluding several mentioned indicators, all these criteria (e.g loadings, reliability, and validity) were met. Then, the next step is to measure the structural model.

C. Structural Model

The full model results show that the data fit the model properly. The structural model was first tested for its multicollinearity by calculating VIF values. Because all VIF values were less than the maximum threshold of 5, it can be inferred that there is minimal multicollinearity in each set of predictor associations in the structural model, as shown in Table 8.

In the second step, PLS Path Modeling was examined using blindfolding precedure. This step was performed to obtain the value of Q^2. Values of Q^2 predictive relevance greater than 0 (zero) indicates that the structural model has adequate predictive relevance. From Table 9., it can be depicted that in terms of out-of-sample prediction, the PLS Path Modeling has adequate predictive power or predictive relevance. Thus, knowledge vacuum has no significant value as a moderating effects. Coefficient of loading factor can be seen in Figure 2.

IV. DISCUSSION

Organizational mergers phenomenon that affected innovation process had been discussed among academicians in the last decade, but mostly focused on commercial industries (Ali, 2021; Fouad et al., 2018; van Lieshout et al., 2021). Organizational changes due to merger impacted both organizational and individual levels, especially core actors who possess distinctive competencies in innovation process (Aagaard et al., 2016; Heller-Schuh et al., 2020). This study focuses on public research institutional mergers, that hopefully can enrich the existing literature of organizational studies. Meanwhile, research on institutional merger apparently has never been conducted before. A similar case showed that research organizations in Korea had been centralized through governmental coordination (Park, 2022). In Singapore, there is A*Star—formerly known as National Science and Technology Board—that functions as research and development agency. A*Star was established by Ministry of Industries and Trading in Singapore, that focuses on Biomedical and Science Engineering (including social science and technology). This agency has a central coordination. There

are 3 (three) main focal points to be concerned: research & development, commercialization, and SMEs partnership that allow local government to conduct successful technological implementation. A*Star members are consisted of academicians and practitioners from various industries, and this agency plays role as a statutory boards of Singapore Government (https://www.a-star.edu.sg/, accessed March 7, 2023). Meanwhile in Poland, there is similar research and development agency, namely NCBR/*Narodowe Centrum Badań i Rozwoju* (The National Centre for Research and Development). Since August 1, 2022, the NCBR has been an executive agency under the terms of the Act of August 27, 2009 on Public Finances, and it is overseen by the Minister of Funds and Regional Policy. The provisions of the Act of April 30, 2010 on the National Centre for Research and Development and the statutory law annexed to the Regulation of the Minister of Science and Higher Education of September 9, 2010 on the act of the National Centre for Research and Development govern how the Centre operates. A number of executive acts and legal acts related to the implementation of programs funded by European funds also govern the operation of the National Centre for Research and Development. This agency was established to carry out tasks within the state policies on science, innovation, as well as science and technology (https://www.gov.pl/web/ncbr-en, accessed March 7, 2023). Similar to A*Star, this organization has a centralized coordination.

Previous studies about organizational changes took notice about employees' resistance, job dissatisfaction, and organizational disbelieve (Sucupira et al., 2019). In addition, organizational mergers could cause knowledge inertia or vacuum, which also including missing business process inside the merged organization.

This study confirms that distinctive competencies strongly affect (0.534) process of innovation during merger. The result also in line with previous study, which stated that actors with strong distinctive competency, especially in knowledge management, tend to generate prominent innovation ideas (Fernandez et al., 2018). In particular, it can be seen from the measurement model that if research actors can well define each step of innovation process (PI2) and able to commercialize the innovations (PI6), then these can lead to the emergence of solid competencies to smoothen the innovation process during organizational change due to merger. Several past studies revealed that to meet organizational goals during merger, main actors of R&D should be able to take agile actions, especially in knowledge spill-over and prompt commercialization (Bolívar-Ramos et al., 2012; Chen et al., 2022; Fernandez et al., 2018b; Real et al., 2006; Taghizadeh et al., 2020; van Lieshout et al., 2021).

On the other hand, knowledge vacuum seems do not produce any significant effect in terms as moderating variable between distinctive competencies and process of innovation. It can be shown by the T-Value that less than 1.96 (0.371), as presented in Table 10. R&D actors are urged to proceed the agile transformation during organizational change. This must be supported by researcher's and engineer's decree to maintain yearly standard research and development outputs. This standards are counted as minimum performance outputs, which affect performance allowance. Thus, the organizational changes, such as changes in personnel and business process that are not related to performance outputs and affect performance allowance, will unintentionally being neglected. This facts are supported by previous researches that stated when an organization acquires new parties from another organization, the acquired one may suffer a restructurisation, such as management teams' replacement, alignment of the existing routines, and eventually leads to faded prior expectations, increased frustration, and cause intentional unlearning, thus indicating knowledge loss. Nonetheless, knowledge loss is not necessarily a bad thing (Dandira, 2012; Choi & Chandler, 2020). For example, losing research and development personnel may encourage the organization to recruit new employees with fresh perspectives. This finding is significant because knowledge loss can prompt the development of new appropriate routines to support research and development personnel and teams (Choi & Chandler, 2020).

On the contrary, there were also previous researches that suggested a negative significant

relationship between knowledge vacuum and process of innovation. In government service tranformation, e-government made changes in daily workload and job skill requirements. Initially, government that implements new e-government systems will encounter slow business or work flow process in terms of technological work adjustment (Sucupira et al., 2019). New employees' recruitment may be possible if there is no capable existing workers. Nonetheless, changing of employees also may deal with unintentional and intentional knowledge loss (Allio, 2020). Innovation process during organizational change is also influenced by employees' perception of the change, as well as by the availability of existing skills (Allio, 2020; Ali, 2021).

Hence, organizations need to develop appropriate practices whereby organizational staff feel able to identify, codify, and share their experiences (including instances of previous system and product failure and the associated organizational knowledge that was acquired as a result). This is aimed to retain explicit and implicit knowledge. Another managerial implication derives from the fact that knowledge loss or degradation can highly possibly lead to both relearning and unlearning mentality, as well as an 'after-the-event' account of the change process. Managers and employees should cooperate accordingly to ensure that the firm's mission and objectives are well define the "What is our business and what will it be?" and "What to do now" in order to achieve the organization's goals. According to several past researches, strategic management to innovation process during organizational changes is not going to be simple since it consisted of planning, deploying, patterning, positioning, and making perspective, which needed to be evaluated and controlled (Agolla & van Lill., 2017; Choi & Chandler, 2020; Ali, 2021; Contreas & Lozano, 2022).

In a merged institutional agency, gathering experts and people with merger experience will smoothen the process and ensure the organization is still on the track to achieve its goals and objectives (Choi & Chandler, 2020). The other important thing that can help the organization to go through the transition is a leader with the following traits: sufficient substantial knowledge, standardized managerial expertise, and good work ethics (Allio, 2020). A top tier leader in a merged organization should keep partners and middle management informed about merger progress, value of merger, and company's future. This first layer leader, along with due diligence team, need to retain important information. In addition, due diligence team should get along with integration team to make sure all data and information are successfully transferred without redundancies. Human resources departments will communicate with employees and answer their questions regarding future job positions, benefits, duties, and expectations. Experts in change management can make the purchased company feel cared for, which in turn can boost employees' morale

Until nowadays, these suggestions is still debatable in the scope of merging public research agency. Therefore, this study needs further analysis to investigate how innovation processes are impacted and affected by specific individual and organizational aspects.

V. CONCLUSION

This research is the type of initial study of an innovation process that involves both individual and organizational aspects in a merged institution. Specifically, current model measurement reveals the relationship of knowledge vacuum as a moderator between distinctive competencies and process of innovation that has never been discussed before. The results of this study suggest that distinctive competencies, especially the ability to define each steps of innovation process in details and to commercialize innovation outputs, plays major role to ensure the success of innovation process during unstable situation (e.g merger organizations). While previous studies on merger and acquisition (M&A) analyzed its effects on institutional and more commercial scope, this study enrich M&A research field in scope of individual actors' innovation in governmental research and development agencies. However, managerial decisions have to pay attention to the possibility of both unintentional and intentional knowledge vacuum even though this aspect has no significant relationship to distinctive competencies and innovation process. Existing knowledge

has to be maintained by protecting documents and establishing well knowledge systems. New knowledge needs to be properly disseminated so as to diminish the discrepancies between the new and former actor's skills.

Several limitations were encountered in this study. First, as an initial research, this study only has narrow time frame to gather the data. Second, this study only used questionnaires data as the sole material to determine the distinctive competencies, the innovation process, and the knowledge vacuum. Hence, further studies should include the opinion or valuation from the corresponding experts using open questions since this method is effective for digging hidden insights to obtain more valuable data.

Forum group discussion and in-depth interview will also be appropriate methods to add validity and reliability of further studies. Also, it is necessary for further studies to examine the other factors that may impact the process of innovation, such as adaptibility and explorative skill. Considering aforementioned limitations, this study also propose potential directions for further studies. First, additional information about innovation performances might enrich the existing model construct and innovation management theory. Second, a case study comparison should be conducted to examine the merging private research agencies in various countries to broaden the study's perspective. Third, studies on innovation process needs longitudinal period as the benchmark to assess more detailed aspects of both individual and organizational level.

Table 5. Factor Loadings, Reliability, and Convergent Validity

Construct	Factor Loadings	Cronbach's Alpha	Composite Reliability	Average Variance Extracted
Distinctive Competencies		0.756	0.833	0.644
DC1	0.923			
DC3	0.834			
DC4	0.689			
Process of Innovation		0.819	0.857	0.675
PI1	0.725			
PI2	0.835			
PI3	0.775			
PI6	0.817			
Knowledge Vacuum		0.828	0.879	0.644
KV1	0.611			
KV2	0.835			
KV3	0.978			

Table 6. Fornell-Larcker Criterion

	Distinctive Competencies	Knowledge Vacuum	Process of Innovation
Distinctive Competencies	0.808		
Knowledge Vacuum	-0.224	0.823	
Process of Innovation	0.471	0.106	0.812

Table 7. HTMT (Heterotrait-Monotrait) Ratio

	Distinctive Competencies	Knowledge Vacuum	Process of Innovation
Distinctive Competencies			
Knowledge Vacuum	0.389		
Process of Innovation	0.493	0.155	

Table 8. VIF of Each Indicator

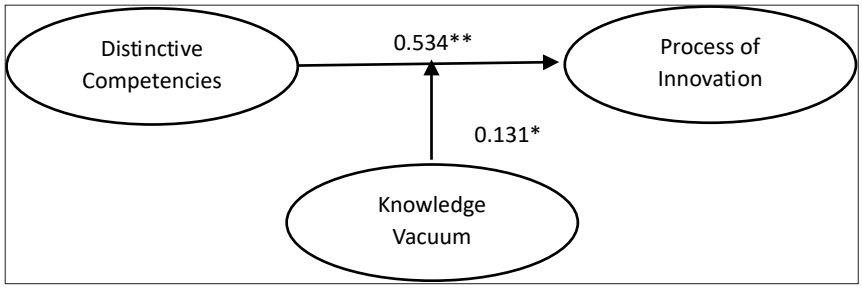
Construct	VIF
Distinctive Competencies	
DC1	1.535
DC3	1.577
DC4	1.417
Process of Innovation	
PI1	1.995
PI2	2.275
PI3	2.226
PI6	1.390
Knowledge Vacuum	
KV1	1.669
KV2	1.968
KV3	2.619

Table 9. Values of Q^2 Calculation

	SSO	SSE	Q^2(= 1-SSE/SSO)
Distinctive Competencies	107.00	107.00	
Knowledge Vacuum	107.00	107.00	
Process of Innovation	145.00	133.92	0.071

Table 10. Hypotheses Testing

Hypothesis	Path	T-Value	P-Value	Result
H1	DC → PI	3.195	0.003	Supported
H2	KV as a moderator between DC → PI	0.371	0.436	Not supported



*) not significant

**) $p<0.05$

Figure 2. Path Coeficient of Loading Factors

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