DESIGN THINKING PROCESS IN SME, IS IT STILL POWERFUL IN DEALING WITH THE COVID 19 MARKET TURBULENCE?

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Abstract: Studies on SME new product development utilizing the design thinking methodology during the pandemic have received little attention from academics. This study aims to examine how a firm's new product and performance are impacted by the design thinking process. The study was carried out at the height of Covid-19's market dominance. Data was gathered using an online survey of 187 SMEs from diverse industries located throughout Indonesia. Purposeful sampling is conducted to find the chosen companies, particularly those that have altered their business model or added new products. The data is then analysed and modelled using SEM-PLS to determine how the concepts connect. This study discovered that SMEs can still use the design thinking method to assist them in coping with the effects of the pandemic. It has also been demonstrated that market volatility makes the design thinking method less effective. The study highlights the significance of a firm's absorptive capacity for fostering the design-thinking process. The results of this study demonstrate how design thinking helps a business succeed during a period of significant changes in customer behaviour, bridging a knowledge gap. The study's conclusions might help SMEs modify their business practices during and after the pandemic.

Keywords: Design Thinking, Absorptive Capacity, Covid-19 Market Turbulence, Firm Performance, SME

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A firm's success is determined by its ability to comprehend the innovation process (Cheng and Yang, 2019; Guimaraes and Paranjape, 2019). The actions or stages involved in developing a brand-new product, whether in the form of a good or a service, are known as the innovation process. The innovation process begins from the moment an idea or a discovery arises until they are used or made commercially (Efrata et al., 2019; Salerno et al., 2015). With the help of this process, new goods will be created that are superior in terms of cost savings, product quality, and user benefits, hence enhancing the firm's competitive advantage (Aliasghar et al., 2019). Researchers have begun empirically exploring the many invention pathways (Cooper, 2008; Efrata et al., 2020;

Salerno et al., 2015; Waldman and Bass, 1991). According to the organisation's or project's unique attributes, the empirical research by Salerno et al. (2015) demonstrated numerous variances in the linear stages of the innovation process.

Unlike the previous NPD process, design thinking (DT) offers an NPD process that is non-linear, flexible, and has iterations (Liedtka, 2014). DT is defined as a concept that utilizes designers' perspectives to find what humans need by utilizing feasible technology and viable business strategies to be transformed into customer value (Brown, 2008). As a human-focused and centered concept, DT helps the NPD process reveal the customer's tacit and unspoken needs through an empathic in-depth user research process (Meinel et al., 2020). These DT stages rely on stakeholders' involvement to actively play a role in each stage (Buhl et al., 2019). The DT NPD process is proven to provide quality function advantages in the form of feasibility and relevance for customers (Meinel et al., 2020) to improve business performance. Some of the core activities in this DT include empathizing, problem framing, visualization and experimenting (Carlgren et al., 2016). The beginning process begins with research involving stakeholders as the subject of the NPD process, namely to know and fully understand consumers' deep needs and expectations (Roberts and Darler, 2017). The results of this research are transformed into problem framing for brainstorming to find the best solution through the visual ideation process. The next step is iteration prototyping to test the solution and improve the product to be delivered to the customer (Nakata and Hwang, 2020). Until now, the determining factors of the innovation process with the DT approach have still not received much attention from researchers. Research conducted by Nakata and Hwang (2020) is still limited to the dynamic mindset that exists in the organization as a factor that drives the DT stage. Limited research also occurs in studies that examine the consequences of NPD processes with a DT approach. The study by (Meinel et al., 2020) was conducted using the experimental method at each stage of DT and found better performance in the group that applied DT in the NPD process. Until now the research space for the determinants, consequences and contingencies of DT has remained largely unexplored (Micheli et al., 2019).

Some researchers conducted studies to investigate the antecedents that drive the innovation process. The determinant that precedes the innovation process is the ability to manage sources of knowledge, especially absorptive capacity (ACAP). ACAP's excellence is key to the firm's increasing competitive advantage through innovation (Cohen and Levinthal, 1990). Firms that can obtain external information and knowledge will find it easier to understand the dynamics of the external needs of stakeholders and adopt technological advances. This integration also forms new, more diverse perspectives and understandings. The ability to carry out this synergy is an intangible asset of the firm that will be ready to be exploited. Some empirical evidence also shows ACAP as a determinant of the innovation process (Kohtamäki et al., 2020; Ramayah et al., 2020). However, Aliasghar et al. (2019) research showed that the realization of ACAP has no effect on the innovation process. It indicates that the firm's ability to integrate and exploit new knowledge from external stakeholders (i.e. customers) cannot be used in the NPD process.

Several studies that examine the relationship between ACAP and innovation and performance processes have shown mixed results. Knowledge acquisition and assimilation as part of ACAP have no effect on performance product innovation (Engelman et al., 2017; Ramayah et al., 2020). Likewise, empirical research (Ahmed et al., 2019) revealed that ACAP has no effect on business performance. The findings of this study show that external knowledge does not impact innovation and business performance, which is counter-intuitive to business process logic. It also showed that it turns out that the innovation process developed by previous researchers is not fully suitable for conditions in the field. Therefore, it is necessary to have more precise modeling to describe the business processes that occur.

The selection of SMEs as the object of research is based on the dynamic marketplace conditions, so companies must always innovate their products. The

firm's ability to create new products through an efficient NPD process is a necessity for SMEs. Through understanding the configuration and determining the success of NPD, it is hoped that sustainability can be maintained. In addition, limited studies are still modelling NPD processes with a DT approach in dynamic market environment conditions (Micheli et al., 2019). Research by Nakata and Hwang (2020) encouraged the need for research that focuses on the antecedents of DT, thus helping companies in applying DT as a whole. The study will be conducted in SME-scale companies that have implemented a DT approach in NPD processes, with 2 main reasons. The first is the large dominance of leaders in SME companies. It is due to the low complexity of the organizational structure and the lack of institutionalization of norms of behaviour between individuals in the firm (Ensley et al., 2006). Second, the SME has already applied the NPD process with a DT approach. NPD processes with a DT approach differ from classical NPD processes that are linear sequentially (Salerno et al., 2015). Although the activities are interrelated in the DT approach, they can be applied non-consecutively throughout the DT process (Brown, 2009).

LITERATURE REVIEW

DT Process

Unlike inventions that prioritize novelty, innovation also emphasizes the importance of value that those who use it feel. Therefore, consumer involvement as co-creators is key in the innovation process. Based on the Service Dominant Logic (SDL) theory approach, two important things are relevant to the innovation process. First, value is experiential to anyone in a market or exchange process, depending on how they express their experience. This value is unique and different from one another (Lusch and Vargo, 2014). Second, value is always created by cooperation between parties that allows providing benefits through direct or indirect interaction. This service-oriented view emphasizes the importance of relational interaction (Lusch and Vargo, 2006). Co-creation of value occurs through the participation of those who will receive benefits through the use and integration of resources (Vargo and Lusch, 2016). This theoretical approach is felt to be appropriate so that the NPD process can create the desired innovation. When consumers are faced with many choices, they will choose products that offer value that brings benefits (Gummesson, 1997). This uniqueness creates uncertainty in every stage of the innovation process. With limited resources, it is too risky for companies to force the innovation process to run by relying only on internal knowledge. Therefore, it is expected that producers will no longer focus on the physical product but on creating value that arises and is perceived by consumers (Grönroos, 2006). An innovation process approach is needed that focuses on the value of the benefits obtained by users, as well as the active involvement of the beneficiary in the dynamics of the NPD process.

The concept of DT was first proposed by Brown (2008), namely applying the thought process of a designer when innovating. DT is defined as creating a new product with a problem-solving approach that puts the user as the subject, playing a role in determining the value of the benefits of a product (Brown, 2009). DT is a human-centered concept. A concept that places the consumer or user as the central subject (Roberts and Darler, 2017). In each stage, NPD focuses on human needs (Brown, 2008; Carlgren et al., 2016). This process has involved stakeholders from the early stages of development, avoiding mismatches in the perception of expected product value between developers and users of new products (Liedtka, 2014). DT is often considered an alternative to the conservative liner of the innovation process as proposed by Salerno et al. (2015) and (Cooper, 2008). In DT, the process is in the form of non-linear activities, meaning that the process is not necessarily sequentially and can be carried out simultaneously (Da Silva et al., 2020; Plattner et al., 2010). One of the main differentiators in the DT process is an iteration in each stage of the innovation process (Gruber et al., 2015). This concept also uses iterations. That is, if it encounters a failure, stages can be repeated (Da Silva et al., 2020; Plattner et al., 2010) Compared to other NPD approaches, DT is considered superior in terms of feasibility, relevance and specificity of products (Meinel et al., 2020)

There has been no consensus grouping of DT stages in the NPD process (Da Silva et al., 2020). The researchers previously grouped into 3-6 stages(Carlgren et al., 2016; Liedtka, 2014; Micheli et al., 2019; Pande and Bharathi, 2020). This research sorts out each process activity through a practical approach (Plattner et al., 2010). This approach classifies five groupings of DT process stages, namely empathy, problem definition, ideation, prototype and market testing. Empathy is interacting with the user to get latent needs through observation, exposure and engagement (Brown, 2009). Furthermore, problem definition identifies problem insights through reframing and re-perspective of initial problems based on information obtained from previous processes (Gruber et al., 2015). Brainstorming various new concepts that can provide solutions and deliver value to stakeholders is presented in the ideation stage (Geissdoerfer et al., 2016; Nakata and Hwang, 2020). Next, in the prototype stage, possible solutions are presented physically and visually to be communicated and presented to stakeholders (Carlgren et al., 2016). In the final stage, prototypes are tested to determine their robustness and effectiveness. This stage is to assess whether this solution can provide benefits and value to users (Gruber et al., 2015). Several empirical studies showing the effect of absorptive capacity (ACAP) on NPD performance show conflicting results. Studies conducted by several researchers observed a direct influence between ACAP on innovation performance (Albort-Morant et al., 2018; Hong et al., 2019; Kostopoulos et al., 2011; Lin et al., 2016; Rangus and Slavec, 2017; Scuotto et al., 2017) or firm performance (Zhang, Gupta, Sun, & Zou, 2020). On the other hand, some findings show a lack of robustness in the relationship between ACAP and innovation performance (Engelman et al., 2017) (Engelman et al., 2017)(Ahmed et al., 2019). Specifically, ACAP does not robustly affect the linear innovation process (Aliasghar et al., 2019). For this reason, the DT innovation process, which prioritizes the active participation of stakeholders at each stage, should be a bridge between the two. Several studies point to the importance of the innovation process as a determinant of firm performance (Chang, 2019; Guimaraes and Paranjape, 2019). However, empirical evidence suggests inconsistent and contradictory results in explaining the influence of innovation processes and NPD performance. Empirical research examining this relationship shows a positive influence between the formalization of the innovation process and the performance of new products (Holzweissig and Rundquist, 2017; Millson, 2016; Reid and Brady, 2012). Meanwhile, the studies of Cheng and Yang (2019); Fontana and Musa (2017) in SMEs found inconsistencies in each stage of the innovation process as a determinant of the success of new products. Although the research of Nakata and Hwang (2020) has tried to use a non-linear innovation process, the model developed does not reflect iterations in the process. Instead, researchers still use the linear paradigm in explaining the NPD process.

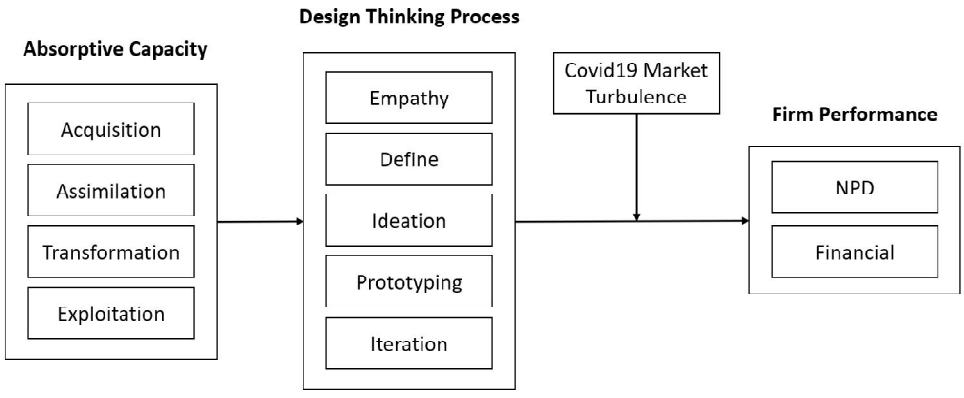

Figure 1. Research Model

Absorptive Capacity toward DT Proses NPD

Several research findings show a positive link between Apac and innovation performance (Albort-Morant et al., 2018; Hong et al., 2019; Kostopoulos et al., 2011; Lin et al., 2016; Rangus and Slavec, 2017; Scuotto et al., 2017) However, the relationship between ACAP and the innovation process still does not attract much attention from researchers. ACAP can encourage the running of NPD processes with the DT approach in two ways. First through acquiring and internalising knowledge as resources and second through processing and utilising knowledge as an instrument of innovation. The first-way ACAP plays a major role in determining the magnitude and range of external knowledge (Hurmelinna-Laukkanen et al., 2012). The firm gains new knowledge from the target customers through interaction and discussion (empathy). This new external knowledge includes customers' basic and latent needs, which are mixed with existing knowledge in the firm. Both are analyzed and reframed to determine the main problem, which is a guide to finding solutions (problem definition). Knowledge as a resource is circulated to internal parties in the firm. Furthermore, using the creative process, internal teamwork works to create potential solutions and refine them into potential products (ideation). Second, companies use prior and new knowledge as instruments in the innovation process (Aliasghar et al., 2019). The knowledge that the organisation's members have internalized makes the firm able to create and develop solutions which can be applied and utilized by users (prototyping). This initial product is tested on the target customer for product improvement (market testing). In this case, apac encourages the innovation process through a transformation through the stages of brainstorming, prototyping and market testing to further enter the commercialization stage.

H1: The higher the firm's ACAP, the smoother the DT process activities in the firm.

DT Proses NPD & NPD Success Performance

Researchers have widely carried out studies exploring the NPD process using the DT concept (Micheli et al., 2019). In their study, the researchers clustered research using the DT concept, and one of the innovation research directions still open is the relationship between DT and firm performance. The effectiveness of the NPD process by using DT to improve new products or firm performance has also become a concern for many researchers. In their study, Meinel et al. (2020) found that companies that adopt DT in the NPD process will increase creativity in the creation process team. In turn, this DT will also help produce new products with higher levels of feasibility, viability and desirability in the eyes of consumers (Meinel et al., 2020). Nakata and Hwang (2020) researched companies from various industries in the US, finding that DT applications in the NPD process, including the stages of discovery, ideation and experimentation, improve new product performance.

The NPD process using the DT approach can occur through each DT stage activity. First, empathy activities use a user focus approach through field observation, listening to user experiences, engaging with user difficulties and listening to user feedback (Carlgren et al., 2016). This effort is made to identify deep or latent needs. The identification of this deep or latent need will help in finding the value expected by the user so that it can be hypothesized as follows

Information from empathy activities is then reassembled to get a complete perspective on the main problem. The trick is to reframe, determine patterns and develop them into alternative problems (Carlgren et al., 2016). It is then pursed to formulate a problem that will guide the next process. Identifying and formulating this problem will determine NPD's successful performance. Third, in this process, is ideation. There are two main activities in ideation, namely brainstorming and concept development (Liedtka, 2014). Brainstorming involves generating possible solutions through the creative process. Then, several emerging alternative solutions are converged and arranged into one comprehensive solution concept. The solution concept that is built from this stage is expected to have the ability to deliver value to the user.

The concept of a built-up solution must be communicated to stakeholders visually. For this reason, efforts are needed to transform intangible concepts

into tangible ones. This tangible solution allows stakeholders to see, hear, touch and do interactive engagement with new concepts or products. The prototype form of this solution helps users understand the product and facilitates stakeholders to make improvements. If this stage goes well, the success rate of new products will certainly be higher.

The last is to do market testing of the product. At this stage, the product is tested for technical aspects, utility and the possibility of product commercialisation. This testing is also to get feedback from stakeholders, especially users who will later take advantage of the product. Prototypes are tested to determine whether this concept/product can solve problems and deliver value to consumers. So the hypothesis in this study is

H2: The more this DT process is carried out consistently in the firm, the better the performance of the firm.

Market Turbulence Covid-19

Market turbulence in this study is interpreted as a dynamic external change characterized by shifting market share and value from existing consumers that occurs quickly. This market turbulence can occur due to rapid changes in composition and consumer tastes (Jaworski and Kohli, 1993). In this study, market turbulence emerged as a direct result of the Covid-19 pandemic. Turbulence during the pandemic has had a negative impact on firm performance in countries with weak healthcare systems (Hu and Zhang, 2021). In this case, the CEO's managerial ability to manage the firm directly impacts the firm's performance, including in bringing up innovation (Kumar and Zbib, 2022). This uncertainty is a condition that must be anticipated in the NPD so that consumers appreciate the products created. NPD with the DT approach is considered appropriate because, at every stage of the process, it always involves the consumer, both as one of the co-creators (Carlgren et al., 2016; Roberts and Darler, 2017). DT places consumers as subjects in the process (Brown, 2009). The concept of change in market dynamism was first proposed by (Jaworski and Kohli, 1993) to see the relationship between market turbulence and the relationship between market orientation and firm performance. This concept was used by several later studies (Huang et al., 2014; Mehrabi et al., 2019; Moorman and Miner, 1997; Sethi and Iqbal, 2008) found change in market environment is a factor that moderates the relationship between firm performance and its antecedents.

Consumers are the main actors in the market. In a dynamic market, the institutional ecosystem around consumers is changing rapidly. It has led to changes in consumer preferences, including new products that more accurately represent new consumer values. Dynamic market conditions also mean a shift in consumers due to mobility, age, economic ability and others. A change follows this shifting of the consumer segment in value because of its inherent nature in each individual.

H3: Market turbulence as a direct impact of the Covid19 pandemic moderates the influence of the DT process on firm performance

METHOD

Data was collected from SME companies from various industries from all over Indonesia using purposive sampling methods. The goal is to ensure that the firm has met the expected criteria. Namely, the firm has innovated by bringing up new product lines during the pandemic. The position of the research subject includes the owner, manager or certain positions that are seen as understanding the entire innovation process and firm performance. Respondents were asked to answer on a linear scale with a range of values of 1-10 points, strongly disagreeing on the left and strongly agreeing on the right (Nunnally and Bernstein, 1994). Questionnaires are distributed online. Respondents who answered incompletely were excluded from the sample. A total of 187 respondents met the criteria and answered the questionnaire completely. The measurements on the research model are taken from several studies that have been conducted before. ACAP adapts measurements from Flatten et al. (2011) and Božiè and Dimovski (2019) for variable measurements. The DT variable adapts measurements from Nakata and Hwang (2020). Next, the measurement of market turbulence and firm performance variables was

adapted successively from Jaworski and Kohli (1993) and Reid and Brady (2012). Each indicator in this study exceeded the threshold of 0.7 for Cronbach's alpha and 0.6 for composite reliability measurements, indicating the fulfilment of convergent validity conditions. For AVE, the value is higher than the correlation coefficient, so the discriminant validity condition has also been met in this study. The hypothesis of this study was tested using PLS-SEM, which was considered the most suitable to explore complex models, test predictive effects, and with limited samples can produce optimal statistical benefits (Hair et al., 2017).

Table 1. Operational Definition and Indicators of the Variables

Variable	Conceptual Definition	Indicators
Absorptive Capability (Božiè and Dimovski, 2019; Flatten et al., 2011)	Dynamic ability in processing external and internal information into knowledge and how to utilize it for business purposes	1. Gather information within the industry 2. Use information within our industry 3. Deal with information beyond the industry 4. Ideas are communicated cross-departmental 5. Cross-departmental support to solve problems 6. Information communicates promptly to all departments. 7. Cross-departmental meetings to interchange information. 8. Ability to use collected knowledge 9. Absorb new knowledge for further purposes 10. Link existing knowledge with new insights. 11. Apply new knowledge in their practical work 12. Supports the development of prototypes 13. Reconsiders technologies and adapts new knowledge 14. Ability to work by adopting new technologies.
DT Process Nakata and Hwang (2020)	The process that is based on the design approach, through the stages of empathy, define, ideation, prototyping and iteration to answer problems with human-centered solution	1. Data on customers to discover deep needs 2. Discover new insights on customers 3. Make fresh discoveries about customers 4. Expand both problem and solution space 5. Reframe the initial problem to expand the solution space 6. Finding patterns, framestorming 7. Challenge what's assumed to work with a new one 8. Brainstorming concepts to meet customers' wants 9. Arriving at fundamentally new concepts 10. Asking questions to ideate new concepts 11. Prototyping for team members and potential user 12. Prototyping for a better understanding of the solution 13. Prototyping supports internal integrity 14. Prototype acts as a boundary object 15. Testing ideas to refine new products 16. Experimenting to develop new products 17. Adjusting new products on customer feedback
Market Turbulence Jaworski and Kohli (1993)	Market dynamics as a result of changes in the composition and preferences of consumers	1. Customers' preference change over time 2. Customers tend to look for new products 3. Demand for our products from new customers 4. New customers tend to have different product

Variable	Conceptual Definition	Indicators
Product Success Performance Reid and Brady (2012)	The new product succeeds in bringing the firm to excel competitively and, in turn, will improve financial performance	1. The sales impact of new products meets the expectation 2. The success of new products meeting sales and profit objectives 3. The profit impact of new products meets the expectation 4. Profitability relative to competitors meets the expectation 5. The firm grows better than its main competitors 6. Profitability is better than the main competitors 7. ROI is better than the main competitors

RESULTS

The results of the Q-square calculation in this study were 0.349. Thus it can be concluded that the model in this study has a relevant predictive value, where the model used can explain the information in the research data by 34.9%. The SRMR value in this study was 0.07, below the threshold value of 0.08 (Hu and Bentler, 1998), indicating that this research model met the required goodness of fit criteria. As shown in Table 3, the results of this study indicate that ACAP has a positive effect on the design thinking process, confirming hypothesis 1 with a beta value = 0.78 with a p-value of < 0.001. The design thinking process was also confirmed to be a change in firm performance with a beta value = 0.385 with p < 0.001, thereby confirming hypothesis 2. Furthermore, the influence of moderation from market turbulence as a direct impact of the Covid-19 pandemic on the influence of design thinking on firm performance was also confirmed in this study (hypothesis 3) which is p < 0.05. The beta value = -0.049 indicates that the amount of market turbulence pressure will weaken the impact of the DT process on firm performance.

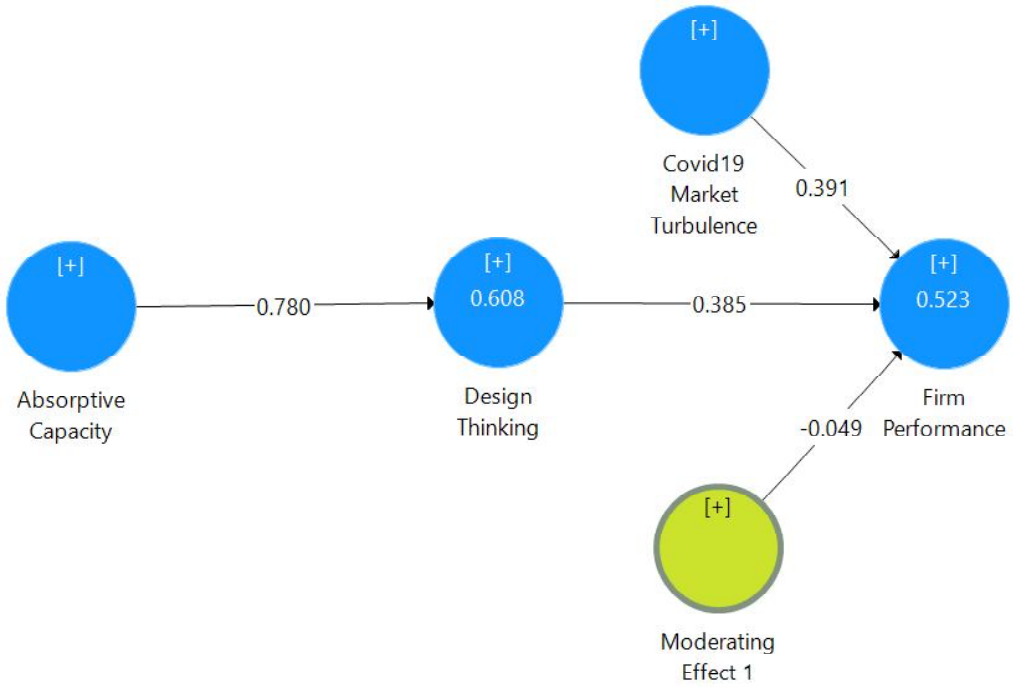

Figure 2. The Path coefficient and coefficient of determination

Table 2. Validity and Reliability Scale

Variable	Cronbach's Alpha	rho_A	Composite Reliability	AVE
Absorptive Capacity	0,942	0,944	0,951	0,637
Covid19 Market Turbulence	0,829	0,850	0,885	0,660
Design Thinking	0,969	0,970	0,972	0,672
Firm Performance	0,930	0,936	0,943	0,704
Moderating Effect 1	0,966	1,000	0,958	0,299

Table 3. Synthesis of Path Analysis

Path	Path Coeff.	t-stat	p-value
Absorptive Capacity → Design Thinking	0,780***	22,709	0,000
Design Thinking → Firm Performance	0,385***	5,303	0,000
Covid19 Market Turbulence → Firm Performance	0,391***	6,084	0,000
Moderating Covid19 Market Turbulence → Firm Perform.	-0,049*	1,670	0,047

Notes: ***p < 0.001; **p < 0.01; *p < 0.05; ns = not significant

DISCUSSION

Absorptive Capacity and Design Thinking

The purpose of this study is to determine the effectiveness of the DT process during the pandemic, in other words, whether DT can be a solution to improve firm performance, which tends to decline during the pandemic. For this innovation process to run well, of course, it must be supported by the firm's ability to manage information that is transformed into knowledge. For this reason, absorptive capacity is the key to the success of the DT process. The results of this study reinforce the research findings of Aliasghar et al. (2019). In line with this, the results of this study also indicate the importance of absorptive capacity as a determinant in innovation performance (Ramayah et al., 2020). These findings reinforce the importance of companies being able to manage information. In the DT process, customer aspirations are an important source of information that creates innovation. In line with the preposition of (Cankurtaran and Beverland, 2020)firm's ability to transform all important information from customers in the problem recognition phase or during the iteration process is key to the success of the DT process.

Design Thinking and Firm Performance

Furthermore, the results of this study also found a relationship between the intensity of the DT process on the success of the firm, both directly through NPD and indirectly (financial performance). DT can at least provide solutions to SMEs to adjust to market upheavals. Due to the benefits of the DT process, which prioritizes human needs, business managers may be able to act swiftly (Meinel et al., 2020). In uncertain conditions, involving users to participate in creating product innovations is certainly a brilliant thing (Roberts and Darler, 2017). Companies can immediately come up with innovative products that are urgent during the disruption of the pandemic, ensuring that every product produced can be immediately absorbed by the market.

The DT process guarantees that innovations in NPD will meet the conditions of viability, feasibility and desirability (Meinel et al., 2020). The results of several previous studies show the role of DT in driving the digital transformation process in companies (Magistretti et al.,2021). During the Covid-19 disruption, where mobility access became very limited, digital transformation became the main choice. If this innovation process goes well, then this will

increase the success of NPD (Nakata and Hwang, 2020), which in turn will also improve the firm's performance (Reid and Brady, 2012).

Covid19 Market Turbulence and Firm Performance

Several studies have shown that there is consistently a direct influence between market turbulence conditions on firm performance (Hu and Zhang, 2021; Kumar and Zbib, 2022; Yang and Yang, 2021). The firm's endurance to be able to anticipate the occurrence of turbulence certainly varies. Angelidou et al. (2022) found a link between the age of the firm to the new product line introduction and the speed in responding to turbulence. The longer the firm's life, the more likely it is to be successful in launching NPD. However, the same type of firm responded more slowly to market dynamics. In addition, the firm's digital capabilities also affect the firm performance. This capability is mediated by market capitalizing and operational adjustment agility (Li et al., 2022). Another factor that can determine the survivability of companies during the Covid-19 pandemic is access to skilled and educated workers (Farooq and Bakhadirov, 2022). In this case, a qualified workforce will encourage higher productivity, lower costs, increased innovation, and efficient decision-making, thus positively impacting firm performance.

Moderating Covid19 Market Turbulence and Firm Perform

Berbeda dengan hasil penelitian (Nakata and Hwang, 2020) yang menemukan tidak adanya efek moderasi dari market turbulence pada pengarauh DT terhadap firm performance, penelitian ini menemukan hasil sebaliknya. The results of this study show that the occurrence of a pandemic will reduce the power of DT in ensuring the success of NPD. Other findings in this study show that the strong pressure of market disruption during this pandemic strengthens the success of NPD in the market, which in turn will boost firm performance. In this case, it is not enough for the firm to focus only on the creation of NPD alone. Innovation must touch more fundamental things in the firm, such as business model innovation, organizational structure or innovation in the use of technology (Hall et al., 2022). This result is indeed counter-intuitive with the rasionale. It will probably happen because the abrupt onset of the pandemic prevented SMEs from operating at full capacity. The innovation process using DT is, therefore, not entirely functional. One explanation could be that the CEO is responsible for rapidly and effectively deciding on strategic decisions in SMEs. It is reinforced by Kumar and Zbib (2022), who discovered that CEO skill benefits firm performance.

CONCLUSIONS

This research provides insight and fills in the research gaps that arise in explaining the effectiveness of the DT process method in creating innovations during the pandemic. The firm's ability to manage and transform customer aspirations is certainly SME's success in surviving the pandemic. DT process can still show its advantages through its human-centered process, so it is hoped that it can be more precise to effectively create products that provide value or benefit to its users. The length of the period of market disruption requires business managers not to stop at product innovation alone but requires to carry out a fundamental process of business and organizational transformation.

IMPLICATIONS

The results of this study theoretically provide strengthening implications for the relationship between absorptive capacity and the innovation process. The research contributes to a form of the innovation process that follows the initial configuration of the DT process (Brown, 2008) that has not received much attention from researchers. In addition, this research also fills a gap in Nakata and Hwang's research. In SMEs, market dynamics in the form of disruption of the Covid19 pandemic weakened the effectiveness of the DT process on the success of NPD. It is likely inextricably linked to the characteristics of SMEs, which still heavily rely on the CEO's ability to be more responsive to market demands (Kumar and Zbib, 2022). The results of this study provide awareness of the effec-

tiveness of the DT process that occurs in SMEs, especially in Indonesia at a time of market dynamism.

LIMITATIONS

This study focused on SMEs, which are quite different in size and sector. The DT method is still being used in SMEs in various ways, even though it has been chosen for a business that has innovated. It affects the accuracy of measurements that count on the DT process being carried out fully and consistently. Second, the Covid19 epidemic provided a test case for market turmoil. The pandemic is putting strain and disruption on the firm's operations and the market, which could affect how consistently the DT process is used throughout the firm.

RECOMMENDATIONS

The findings of this study point the way for future research to concentrate on various topics, including initially picking a particular sector or on a more uniform business scale. It will enable a more accurate measurement of the innovation process. Second, more consideration must be given to the DT stages in order to better align them with the peculiarities of the sector or particular business size. Some DT phases may not be openly carried out in SMEs. Third, the study's findings still offer the opportunity to assess market dynamism under various turbulence scenarios.

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