

The Mediating Role of Innovation Capabilities on the Relationship between Dynamic Capabilities and Firm Competitive Performance

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Purpose: The purpose of the study is to better understand the relationship between dynamic capabilities and firm competitive performance, and how innovation capabilities, specifically (a) product capability and (b) process capability, may play a mediating role in this relationship.

Design/Methodology/Approach: Simple Random Sampling technique was adopted to choose SMEs to collect data based on information obtained from Hungarian SMEs associations. A total of 565 completed questionnaires were obtained, with response rate of 65.50%. Confirmatory factor analysis (CFA) was used with AMOS 24 to assess the reliability and validity; and Cronbach's alpha coefficient was additionally used to assess the dependability of the scales. The proposed model was put to the test using structured equation modelling (SEM).

Results: The study results show that dynamic capacities have a significant direct effect on innovation capabilities: product capability and process capability. The study also proves that both product capability and process capability have a significant impact on a firm's competitive performance.

Conclusion: The study concludes that the relationship between dynamic capabilities and competitive firm performance is partially mediated by innovation capabilities. The study suggests that before enhancing product innovation capability, entrepreneurs should consider reorganizing and reallocating resources into process innovation capability. This study contributes to our understanding of the mediating mechanism of innovation capabilities through which dynamic capabilities enhance firm competitiveness performance.

Keywords: *Innovation capabilities, Dynamic capabilities, Competitive firm performance, Technological innovations*

1 Introduction

In today's rapidly advancing technological landscape, the market environment is growing increasingly complex, where customer expectations are continuously changing, and product life cycles are becoming shorter. To compete in such a changing global market, organizations must innovate by developing new products and services to stay

competitive (Hwang et al., 2019). Owing to these radical and unavoidable changes, firms are compelled to adapt to dynamic market structures and produce innovative products to maintain a competitive advantage and long-term sustainability. Under these conditions, scholars believe that 'innovativeness' is vital for any firm to compete in a competitive market environment (Huseyine et al. 2016). Innovation is believed to have a significant impact on a company's business success, productivity, job creation,

and drive economic growth and success (Abuhashesh et al., 2019a).

It is argued that possessing the ability to innovate is crucial for achieving long-term competitive performance in today's extremely competitive business environment (Zehir et al., 2015). Before delving into innovation capabilities, it is pertinent to grasp the concept of capabilities. Capabilities refer to a firm's skills and abilities to exploit its resources in a most productive way (Wheelen et al., 2018; Robbins and Coulter, 2016). Innovation aptitude, on the other hand, encompasses the abilities and expertise required to advance and develop new technologies (Romijn and Albaladejo, 2002). In other words, successful technological innovation demands critical capabilities, especially in areas such as manufacturing, marketing, organization, strategy, planning, learning, and resource allocation (Yam et al. 2004). In this context, Wheelen et al., (2018) introduced a new dimension by noting that capabilities can become 'dynamic' when they are modified and reconfigured, making them more adaptable to face uncertain conditions in organizations. To understand the synergies between dynamic capabilities and gaining a competitive advantage, it is believed to be of paramount importance for any organization to develop dynamic capabilities aligned with market expectations. This enables organizations to acquire a competitive edge.

Given this context, the purpose of the study is to gain a deeper understanding of the relationship between dynamic capabilities and firm competitive performance as well as how innovation capabilities, in particular (a) product capability and (b) process capability, may act as a mediating factor in this relationship. Thus, the context of the study assumed significance due to technological advancements and a rapidly changing competitive market environment. Because of these factors, there is a growing interest in researching organizations' capabilities and how these can promote competitiveness, business practice and performance of any firm (Hwang et al., 2019). Previous research on organizational performance primarily focused on organizational resources, demonstrating their role in innovation, competitive advantage, and overall organizational growth (e.g. Penrose, 1959; Wernerfelt, 1984; Barney, 1991). However, recent research on organizational growth and performance has shifted to empirically investigate how innovation capabilities facilitate dynamic capabilities to enhance competitive firm performance (Helfat & Martin, 2015; Mostafiz et al., 2019a; Tasheva & Nielsen, 2020). Preliminary studies have explored the relationship between dynamic capabilities and organization's competitive advantage (e.g., Chaharmahali & Siadat, 2010; Krzakiewicz, 2013). However, the existing research has also shown a lack of adequate scientific studies addressing why firms still fail despite the potential synergy between dynamic capabilities and firm competitive performance. Given this context, the present study aims to fill the knowledge

gap by addressing the following research questions: How significant is the role of innovation capabilities in influencing dynamic capabilities to achieve a better competitive advantage for a firm? In doing so, the present study focuses on three aspects: first, analysing the role of dynamic capabilities such as (a) Sensing capability (b) Learning capability (c) Integration capability and (d) Reconfiguration capability on product and process capabilities. Secondly, the study examines the mediating role of innovation capabilities, specifically (a) product capability and (b) process capability on competitive firm performance. The present study draws upon Teece (2007), and Teece et al, (2018) to address the research questions and fill the knowledge gap.

Organization of the Study:

This paper is organized into seven parts. The first part serves as the introduction, establishing the context and significance of the study while emphasizing the role of dynamic capabilities in ensuring firm competitive performance. The second part represents the literature review, from which hypotheses are derived. The third part outlines the study's objectives. The fourth part delves into the research methodology. The fifth part presents the results, and the sixth part provides the discussion and conclusion. The final part encompasses theoretical and managerial contributions and offers insights into future directions for the study.

2 Literature review and development of hypotheses

2.1 Understanding Dynamic Capabilities and Innovation Capabilities

Innovation capabilities and dynamic capabilities are often used interchangeably while discussing the competitive advantage of any organization (Breznik and Hisrich, 2014). To start with dynamic capabilities, these are defined as the capacities of a firm to combine, develop and rearrange internal and external skills to address a rapidly changing market environment (Teece et al., 1997, p.516). Eisenhardt and Martin (2000) add that product development, strategic decision-making, and alliance-building are also included in the list of dynamic capabilities. Dynamic capabilities aim to achieve competitive advantage through combining and effectively utilizing all resources of a firm (Arranz et al., 2020). It is argued that these capabilities are capable enough in any competitive environment to solve an organization's problems by using sensing opportunities and taking market-oriented decisions timely (Teece et al., 1997). However, innovation refers to the capacity to introduce a new product or service or bring innovative changes in the organizational structure and administrative system (Damanpour, 1991). Under innovation, firms frequently

implement new behaviours or procedures, as well as new programmes, policies or ideas (Mothe & Uyen, 2010). Thus, the aptitude for innovation refers to the abilities and expertise required to advance and develop new technologies (Romijn and Albaladejo, 2002).

Thus, the goal of innovation capabilities is to provide stakeholders with new processes, products and services that have greater value. In order to improve the existing processes and produce better services or goods, these capabilities also put a strong emphasis on implementing radical organizational changes (O' Sullivan and Dooley, 2008). It is to mention that owing to the market's short product life cycles and high rates of new product manufacturing, innovation capability is crucial for superior innovation performance.

2.2 The impact of Dynamic capabilities on Product capability

Teece (2007) states in an organization, dynamic capabilities play a pivotal role in identifying and seizing opportunities while also equipping the firm to address threats. Moreover, these capabilities enhance competitiveness and contribute to the firm's long-term sustainability. In particular, one of the dynamic capabilities, that is, sensing capability, helps in gathering relevant market information (Teece, 2018), which is critical for any firm or company. It is imperative because predicting market trends and customer orientation assist firms in recognizing customer needs and wants. In particular, with reference to the service sector, sensing capabilities play a critical role in targeting customers and serving their needs. Thus, sensing capabilities are concerned with understanding and identifying the customer needs and changing the dynamics of

the market environment (Teece, 2014; Zitkiene, Kazlauskienė, Deksnys, 2015). Sensing capabilities also facilitate a firm's required resources and capture value.

As far as the learning capabilities are concerned, Collis (1994) posits that organizational learning capabilities present a pivotal component of an organization's dynamic capabilities, with the potential to transform the organization into a dynamic firm. It is believed that organizational learning can shape the behaviour of an enterprise by expanding knowledge and instilling new perspectives (Olavarrieta & Friedmann, 2008). The process of organizational learning encompasses a firm's capacity to perceive the market, get new information, distribute, and interpret it (Day, 1994). It is asserted that learning capabilities, particularly market sensing, can enhance a company's performance (Day, 1994, 2002; Tseng & Lee, 2014).

Adding another dimension of dynamic capabilities, Teece, Pisano, and Shuen (1997) assert that dynamic capabilities also signify an organization's ability to cope with the rapidly changing market environment by integrating, developing and reconfiguring the internal and external competencies. This argument highlights the necessity to examine how integration capabilities can influence the product capability of an organization. Referring to reconfiguring capabilities, it is said that these capabilities have the capacity to create value, which has a direct impact on the firm's operational capabilities (Wilden et al., 2016). The present study also examines whether or not reconfiguration capability positively impacts product capability. Given these arguments, the present study examines the role of dynamic capabilities on product development in a firm. Thus, the study framed the following research hypothesis.

H1a: Sensing capability has a positive impact on Product capability

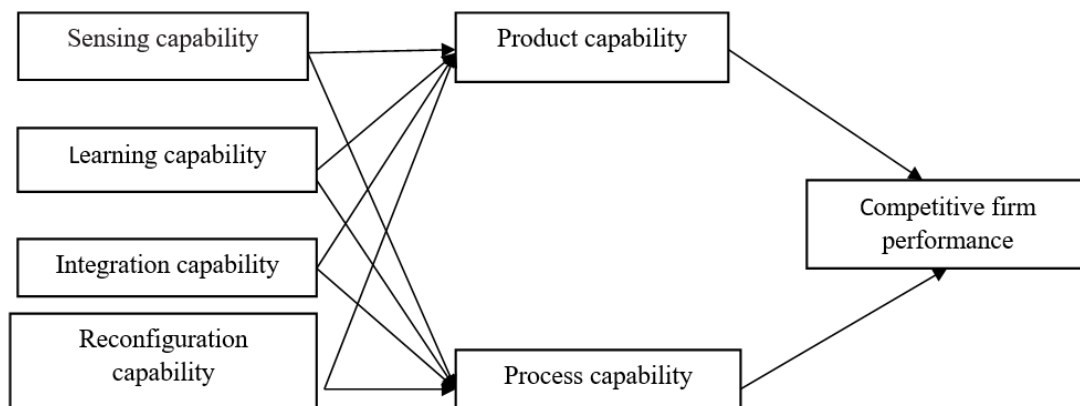


Figure 1: Conceptual framework of the Study

H1b: Learning capability has a positive impact on Product capability

H1c: Integration capability has a positive impact on Product capability

H1d: Reconfiguration capability has a positive impact on Product capability

2.3 The impact of dynamic capabilities on Process capability

Sensing capability is a critical and indispensable component of dynamic capabilities (Teece, 2018; Froehlich and Bitencourt, 2019), known for its positive influence on firm performance (Kihara, Ngugi, and Ogallah, 2016). Sensing capabilities not only facilitate generating and disseminating market intelligence in a firm but is also responsive to changing market conditions (Pavlou and El Sawy, 2011; Teece, 2018). Thus, these capabilities positively impact the innovation of products and services (Al-Madadha et al., 2023). Further, it is argued that sensing capabilities enable firms to monitor the market continuously, find market opportunities accurately, and understand market threats (Fang et al., 2014). Given this context, the study framed the following hypotheses:

H2a: Sensing capability has a positive impact on Process capability

H2b: Learning capability has a positive impact on Process capability

H2c: Integration capability has a positive impact on Process capability

H2d: Reconfiguration capability has a positive impact on Process capability

2.4 The impact of Innovation capabilities on firm competitive performance

Innovation capabilities become more crucial to a firm's competitive performance. The ability to innovate can be described as enhancing and managing the knowledge and technology already in existence and also to create new ones. Owing to the rapid technological advancements and knowledge creation, it is pertinent for any firm to develop and adopt innovation capabilities that, in turn, achieve dynamic competitive advantage (Romijn and Albaladejo, 2022). Innovation capabilities, according to Alder and Shenbar (1990), can also be defined and understood in many aspects such as: (i) these capabilities can manufacture new products and services according to the market demands, (ii) while producing the new products and delivering new services, innovation capabilities can apply required technological assistance that not only addresses the present needs of the customers but also satisfy the future demands, and (iii) these capabilities can also have the

capacity to receive and face the unexpected opportunities and threats created by the competitors. Further, innovation capabilities can provide insights for firms so that the management of firms can identify the strongest and weakest points, where a firm should develop. Due to these reasons, it is emphasized that innovation capabilities are the critical components to developing effective, innovative outcomes within a firm. This process ensures the generation and transformation of knowledge and skills into products, processes and systems, which is beneficial for both firms and stakeholders (Rajapathirana, Jayani, R.P., and Yan Hui, 2017). Thus, firms with innovation capabilities may be able to successfully combine the essential skills and resources to foster innovation (Lawson and Samson, 2001). To put it in simple terms, innovation capabilities can be understood as the ability to bring innovations in the areas of technology and knowledge continuously as a response to rapidly changing market environment (Saunila et al. 2014). Referring to achieving competitive advantage, Tidd (2006) asserts that innovation can promote a positive impact between manufacturing new products and competing with the market performance. It has the ability to replace outmoded products with new ones, which ensures new product development relative to competitors. In light of this, the ensuing hypotheses have been developed.

H3a: Product capability has a positive impact on Competitive firm performance

H3b: Process capability has a positive impact on Competitive firm performance

2.5 Mediating effects of Product capability on firm competitive performance

One of the key areas that the study attempts to probe is the mediating effects of innovation capabilities on firm competitive performance. It is evident from the existing literature that innovation capabilities are considered to be the key assets of a firm and have the potential to implement the entire strategy and sustain the competitive advantage (Lawson & Samson, 2001). As a mediating role, innovation capabilities facilitate firms to quickly introduce new products according to the needs of the changing market and challenge the ongoing competition. Thus, innovation capabilities can be comprised of assets and resources which are necessary for the firm competitive performance. Shou et al., (2018) argue that up-to-date information and knowledge are seen as a source of innovation for any firm, and the firms must look into opportunities in market and technologies. In this context, sensing capabilities play an important role in dealing with the situation. Interestingly, it is highlighted that sensing capabilities should be mediated by innovation capabilities to have an effect on a firm's

financial performance. It is highlighted that if any firm's sensing capabilities are strong, it leads to higher technological innovations (Zhou et al., 2017). With these arguments, the study framed the following hypotheses:

H4a: Product capability mediates the positive effect of Sensing capability on Competitive firm performance

H4b: Product capability mediates the positive effect of learning on Competitive firm performance

H4c: Product capability mediates the positive effect of Integration capability on Competitive firm performance

H4d: Product capability mediates the positive effect of Reconfiguration capability on Competitive firm performance

2.6 Mediating effect of the process capability on firm competitive performance

Concerning an organization's competitive performance, Martin-de Castro et al., (2013) state that creating and maintaining a competitive advantage for an organization depends on developing and implementing the necessary technological innovations. In other words, firm's propensity for promoting innovative approaches is more crucial in the market environment to gain a greater competitive advantage (McAdam and Keogh, 2004). In today's dynamic and competitive business environment, innovation capability within these organizational capabilities is essential for achieving a sustainable competitive advantage (Zehir et al., 2015). Scholars also conceptualized that innovation capabilities are the combination of product innovation and process innovation (Camison & Vilar-Lopez, 2014; Nwachukwu, Chladkova & Oltatunji, 2018), which has a more significant impact on the process capability that, in turn, influences the firm performance. Innovation capability in terms of process capability can be understood from Akman and Yilmaz (2008) who believe that the qualities of internal promotional activities and the capacity to comprehend and effectively respond to the external environment are all important factors that facilitates an innovative organizational culture. In light of this, the study put forth the following hypotheses:

H5a: Process capability mediates the positive effect of Sensing capability on Competitive firm performance

H5b: Process capability mediates the positive effect of learning on Competitive firm performance

H5c: Process capability mediates the positive effect of Integration capability on Competitive firm performance

H5d: Process capability mediates the positive effect of Reconfiguration capability on Competitive firm performance

3 Methodology

3.1 Questionnaire Design and Measurements

The survey questionnaire designed by using Google forms tool. It contains three sections, First section contains respondents and SMEs profile, second and third section contain product capabilities and process capabilities of competitive firm performance. This study measurements developed based on pre-existing studies. The dynamic capabilities were implemented in four-dimensional variables: sensing capability, learning capability, integration capability, reconfiguration capability with four items were designed for each construct. The innovation capabilities were implemented in two-dimensional variables: product capability and process capability, in total ten items were designed to measure the innovation capabilities. Regarding competitive firm performance, it is a single variable, and 10 items were designed to measure it. These measurements were adopted from existing studies Teece, (2018), Kareem and Kummitha,(2020), Calantone et al.(2002), Tohidi and Mandegari (2012), Zehir et al. (2015), Shou et al. (2018), Al-Madadha et al., (2023). (List of Items see in appendix 1). All the questions were designed on seven-point Likert scale ranging from 1- strongly disagree to 7- strongly agree.

3.2 Sample and Data collection

There are several reasons to investigate SMEs in this study. First, SMEs being are closer to the market, have flexible systems to adopted to changes occurring in the external market, which contributes to the growth of firm performance (Zehir et al., 2015). Second, SMEs play a vital role in Hungarian economic growth as they bridge the gap between MNCs and customers (Nyikos et al., 2021). Therefore, we have chosen Hungarian SMEs to validate our research model. The Sampling of SMEs for our research was purposeful and based on the OPTEN databased, which includes all the present and former businesses registered in Hungarian business registry (OPTEN,2022). SMEs were selected using random sample drawn from three different firm size strata (two to nine employees, 10 to 49 employees and 50-200 employees), with additional controls to ensure the sample represented various regions and sectors. The sample was very well distributed within Hungarian SMEs. For example. 56 percent of respondents were from capital city Budapest region compared with 44 percentage of respondents from different parts of the country. The selected SMEs are mainly classified as Technical SMEs, Wholesale and retail trade SMEs, Information and communication. This selected SMEs deal with wide range of product development activities such as new technology

Table 1: Demographic characteristics

Variables	characteristics	N	Percentage
Firm age (year)	Less than 10 years	280	50%
	11-20 years	190	34%
	More than 21 years	90	16%
Firm size (number of employees)	Less than 10	120	21%
	10-30	130	23%
	31-50	230	41%
	51-100	80	14%
	More than 100	230	41%
Industry	Manufacturing	244	44%
	Wholesale and retail trade	122	22%
	Information and communication	80	14%
	technical activities	114	20%

Table 2: Descriptive statistics

Constructs	Mean	SD	Sensing capability	Learning Capabilities	Integration Capabilities	Reconfiguration Capabilities	Process innovation capability	Product innovation capability	Competitive firm performance
Sensing capability	4.573	0.460	1						
Learning Capabilities	4.517	0.434	.668**	1					
Integration Capabilities	4.692	0.407	0.589**	.589**	1				
Reconfiguration Capabilities	4.694	0.402	0.534**	.596**	.583**	1			
Process innovation capability	4.459	0.463	0.659**	.547**	.216**	.542**	1		
Product innovation capability	4.129	0.674	.298**	.598**	.198**	.763	.591**	1	
Competitive firm performance	4.114	0.677	.232**	.347**	.442**	.216**	.442**	.763**	1

** Correlation is significant at the 0.01 level (2-tailed).

creation, pharmaceutical distribution, technical activities and information technologies.

After initial information gathered from targeted SMEs, One of the authors make telephone call for approval, a questionnaire email was sent to either one of the owners, who were part of the top management (Where the SME had less than 25 employees), or one of the top executive

(Not necessary having the ownership of the SMEs (In case of larger SMEs) and ask them fill and distribute questionnaire among the top level management in SMEs . Out of 500 selected SMEs 800 email questionnaires are sent to CEOs, managers, top level employees, and senior executives. At the same time, one of the authors visited some of the SMEs to collected 100 face to face questionnaire

data between September to December 2022. A total of 565 completed questionnaires were obtained. The sample included 250 micro firms, 180 small firms and 70 medium sized firms, with a response rate of 65.50%. We chose to collect more than one questionnaire from the same SMEs. Thus, (Kareem and Kummitha,2020; Chavez et al.,2017) suggest that competitive firm performance achieved in SMEs not only from top level CEOs or managing directors of the SMEs but also from production and operational managers of the firm. This approach has provided to understand the overall prospect from top level executives to middle and low-level managers functional area of competitive firm performance. The table 1 presents the demo-

graphic characteristics of sample. The results show that half of the enterprises (50%) had age less than 10 years. The majority of the enterprises (41%) had firm size (31-50 employees). Most of the enterprises (44%) belonged to the manufacturing industry.

3.3 Data analysis and results

3.3.1 Descriptive statistics

Table 2 shows the descriptive statistics. The results indicate that the means values for all the variables ranges

Table 3: Reliability and validity

Constructs	Measurement Items	Factor Loading	A	CR	AVE	PValue
Sensing capability	SC1	0.798	0.849	0.851	0.590	0.000
	SC2	0.702				0.000
	SC3	0.848				0.000
	SC4	0.716				0.000
Learning Capabilities	LC1	0.723	0.778	0.790	0.510	0.000
	LC2	0.766				0.000
	LC3	0.742				0.000
	LC4	0.717				0.000
Integration Capabilities	IC1	0.642	0.765	0.781	0.501	0.000
	IC2	0.770				0.000
	IC3	0.730				0.000
	IC4	0.596				0.000
Reconfiguration Capabilities	RC1	0.730	0.846	0.854	0.594	0.000
	RC2	0.770				0.000
	RC3	0.642				0.000
	RC4	0.697				0.000
Process innovation capability	Proc_IC1	0.692	0.810	0.840	0.569	0.000
	Proc_IC2	0.814				0.000
	Proc_IC3	0.705				0.000
	Proc_IC4	0.697				
	Proc_IC5	0.751				0.000
Product innovation capability	Prod_IC1	0.866	0.898	0.902	0.651	0.000
	Prod_IC2	0.851				0.000
	Prod_IC3	0.820				0.000
	Prod_IC4	0.669				
	Prod_IC5	0.811				0.000
Competitive firm performance	CFP1	0.781	0.940	0.938	0.595	0.000
	CFP2	0.809				0.000
	CFP3	0.860				0.000
	CFP4	0.896				0.000
	CFP5	0.821				0.000
	CFP7	0.839				0.000
	CFP8	0.855				0.000
	CFP9	0.880				0.000
	CFP10	0.532				0.000

A= Cronbach's alpha, CR =Composite Reliability and Average, AVE=Variance Extracted

between (4.459-4.694) with a standard deviation (0.402-0.463) which means that respondents positively agreed with questionnaire statements. Also, the results revealed that all constructs are significantly associated with each other.

3.3.2 CFA results: reliability and validity

The reliability and validity of measurement items were tested by performing confirmatory factor analysis (CFA), by using AMOS 24. Discriminant validity and convergent validity were utilized to estimate the validity of measurement items. The reliability of the scales was assessed by using Cronbach's alpha coefficient as seen in (Table 3). The results show that Cronbach's alpha coefficient for all constructs ranges between 0.765 and 0.940 which are higher cut-off value 0.50. This emphasizes that all the measurement items are internally consistent (Hair et al., 2010). The convergent validity was measured in three important indicators, which are factor loadings, Average Variance Extracted (AVE), and Composite Reliability (CR). This study establishes 24 items (see in Table 3). Hair et al., (2006) suggests that the items with factor loadings

greater than .50 can be maintained. This study reveals that the item loadings all exceeded the cut-off value and statistically significant ($p < 0.05$) (see table 4). In terms of composite reliability (CR), the results show that CR for all constructs ranges between 0.781-0.938 which are above 0.50, demonstrating that all the constructs have adequate level of composite reliability (CR) as suggested by Hair et al. (2012). Concerning the average variance extracted (AVE) value, the results report that AVE for all the constructs is located between 0.501-0.651 which is higher threshold (.50) which is suggested by Hair et al., (2010). Based on the mentioned above, this study demonstrates a good reliability and validity of measurement items.

Discriminant validity also was used to measure whether the variables that theoretically should not be highly correlated to each other (Fornell & Larcker, 1981). In this study used (Fornell & Larcker, 1981) they suggested that if the square root of the AVE for a construct is higher than the correlation values among all the constructs then discriminant validity is confirmed. Table (4) presents that the square root of the AVE scores of all the variables is higher than the inter-construct correlations which confirms the discriminant validity of the constructs.

Table 4: Discriminant validity

	Sensing capability	Learning Capabilities	Integration Capabilities	Reconfiguration Capabilities	Process innovation capability	Product innovation capability	Competitive firm performance
Sensing Capability	0.768						
Learning Capabilities	0.730**	0.699					
Integration Capabilities	0.734**	0.674**	0.688				
Reconfiguration Capabilities	0.653**	0.687**	0.672**	0.771			
Process innovation capability	0.668**	0.612**	0.677**	0.637**	0.754		
Product innovation capability	0.421**	0.336**	0.139**	0.262**	0.458**	0.807	
Competitive firm performance	0.226**	0.176**	0.16**	0.154**	0.324**	0.766**	0.771

Notes: Bold values in diagonal represent the squared root estimate of AVE. AVE= Average Variance Extracted

The goodness-of-fit measures were performed to assess the quality of fitness of the measurement model. The results demonstrate a good model fit (CMIN/df= 1.321, GFI=0.901, TLI= 0.910, CFI=0.921 RMSEA=0.051). Therefore, the measurement model shows good construct validity and reliability.

3.3.3 Common method bias Checks

This research is used a cross-sectional data with a single-report questionnaire, therefore common method variance (CMV) may affect the quality of the measurements (Podsakoff and Organ, 1986). Harman's single-factor test was applied to solve this issue by performing exploratory factor analysis (EFA). The results reveal that the total variance for a single factor, is less than 50% indicating that common method bias does not affect the interpretations of the results.

4 Results

Structured equation, modelling (SEM) was performed to examine the hypothesized model. The study tests direct and indirect effects. First, this study investigates the direct effect of dynamic capabilities on innovation capabilities, also the effect of innovation capabilities on competitive firm performance as shown in table 5 and figure 1. The SEM results show that all four constructs of dynamic capabilities: sensing capability ($\beta=0.176$, $p < 0.001$), learning capability ($\beta=0.416$, $p < 0.001$), integration capability ($\beta=0.215$, $p < 0.001$), and reconfiguration capability ($\beta=0.268$, $p < 0.001$) all have a positive and significant impact on product capability, thereby H1a, H1b, H1c, and H1d are supported. It seems the learning capability has the largest impact on product capability. Likewise, the results reveal that sensing capability ($\beta=0.310$, $p < 0.001$), learn-

ing capability ($\beta=0.160$, $p < 0.001$), integration capability ($\beta=0.179$, $p < 0.001$), and reconfiguration capability ($\beta=0.263$, $p < 0.001$) all have a positive and significant impact on process capability, therefore H2a, H2b, H2c, and H2d are supported. The results showed that sensing capability was more likely enhance to process capability in comparison with other dynamic capabilities. Moreover, the SEM results show that the two constructs of innovation capabilities: product capability ($\beta=0.330$, $p < 0.001$), and process capability ($\beta=0.755$, $p < 0.001$) all have a positive and significant impact on competitive firm performance, thus H3a and H3b are supported. In addition, process capability was more associated with competitive firm performance.

Second, this study investigates the indirect effect of dynamic capabilities on competitive firm performance by mediating role of innovation capabilities as shown in table 6. The bootstrapping was applied to estimate the 95% confidence interval of the indirect effect. The results show that the product capability ($\beta=0.755$, $p < 0.05$) positivity and significantly mediates the relationship between learning capability and competitive firm performance. Also, product capability ($\beta=0.150$, $p < 0.01$) positivity and significantly mediates the relationship between reconfiguration capability and competitive firm performance. Thus, H4a and H4d are supported. Which means the product capability explains well the linkage between learning capability, reconfiguration capability and competitive firm performance. However, the results shown that product capability doesn't mediate the relationship between sensing capability and competitive firm performance ($\beta=0.080$, $p > 0.5$) as well as the the relationship between integration capability and competitive firm performance ($\beta=0.012$, $p > 0.5$), thereby H4a and H4c are not supported.

Furthermore, the results reveal that process capability ($\beta=0.341$, $p < 0.05$) positivity and significantly mediates the relationship between sensing capability and competi-

Table 5: SEM results of direct effect

No	Paths	Beta Coefficient	P value	Results
H1a	Sensing capability → Product capability	0.176	0.000	Supported
H1b	learning capability → Product capability	0.416	0.000	Supported
H1c	Integration capability → Product capability	0.215	0.000	Supported
H1d	Reconfiguration capability → Product capability	0.268	0.000	Supported
H2a	Sensing capability → Process capability	0.310	0.000	Supported
H2b	learning capability → Process capability	0.160	0.000	Supported
H3c	Integration capability → Process capability	0.179	0.000	Supported
H4d	Reconfiguration capability → Process capability	0.263	0.000	Supported
H3a	Product capability → Competitive firm performance	0.330	0.000	Supported
H3b	Process capability → Competitive firm performance	0.755	0.000	Supported

tive firm performance, relationship between learning capability and competitive firm performance ($\beta=0.187$, $p < 0.01$), and the relationship between integration capability and competitive firm performance ($\beta=0.223$, $p < 0.01$). Therefore, H5a, H5b, and H5c are supported. But the results show that process capability has no mediation effect on the relationship between reconfiguration capability and competitive firm performance ($\beta=0.079$, $p > 0.05$). Thus, H5d is not supported. In conclusion, process capability plays a key role rather than product capability in the association between dynamic capabilities and competitive firm performance.

5 Discussions and Conclusions

This paper investigates the impact of dynamic capacities on competitive firm performance, assuming that in-

novation capabilities mediate this relationship. This study found that dynamic capacities, such as sensing capability, learning capability, integration capability, and reconfiguration capability have a significant direct effect on innovation capabilities: product capability and process capability. These findings are in line with (Pundziene et al., 2021; Froehlich and Bitencourt, 2019) who found that dynamic capabilities are key elements for the development of innovation capability and drive and enrich the firm's innovation of products and processes.

Moreover, this study demonstrates that both product capability and process capability significantly impact competitive firm performance. Notably, process capability exhibits the strongest effect on competitive firm performance. Continuous development of processes may lead to reduced production costs and manufacturing waste, thereby enhancing competitive firm performance. This finding is consistent with (Ferreira et al., 2018) who argue that

Table 6: SEM results of indirect effect

No	Paths	Beta Coefficient	P value	95%LL	95%UL	Results
H4a	Sensing capability → Product capability → Competitive firm performance.	0.080	0.238	-0.004	0.029	Not supported
H4b	learning capability → Product capability → Competitive firm performance.	0.210	0.031	0.130	0.620	Supported
H4c	Integration capability → Product capability → Competitive firm performance.	0.012	0.247	-0.040	0.046	Not supported
H4d	Reconfiguration capability → Product capability → Competitive firm performance	0.150	0.007	0.180	0.440	Supported
H5a	Sensing capability → Process capability → Competitive firm performance	0.341	0.001	0.196	0.501	Supported
H5b	learning capability → Process capability → Competitive firm performance.	0.187	0.011	0.071	0.301	Supported
H5c	Integration capability → Process capability → Competitive, firm performance	0.223	0.007	0.354	0.90	Supported
H5d	Reconfiguration capability → Process capability → Competitive firm performance	0.079	0.236	-0.038	0.204	Not supported

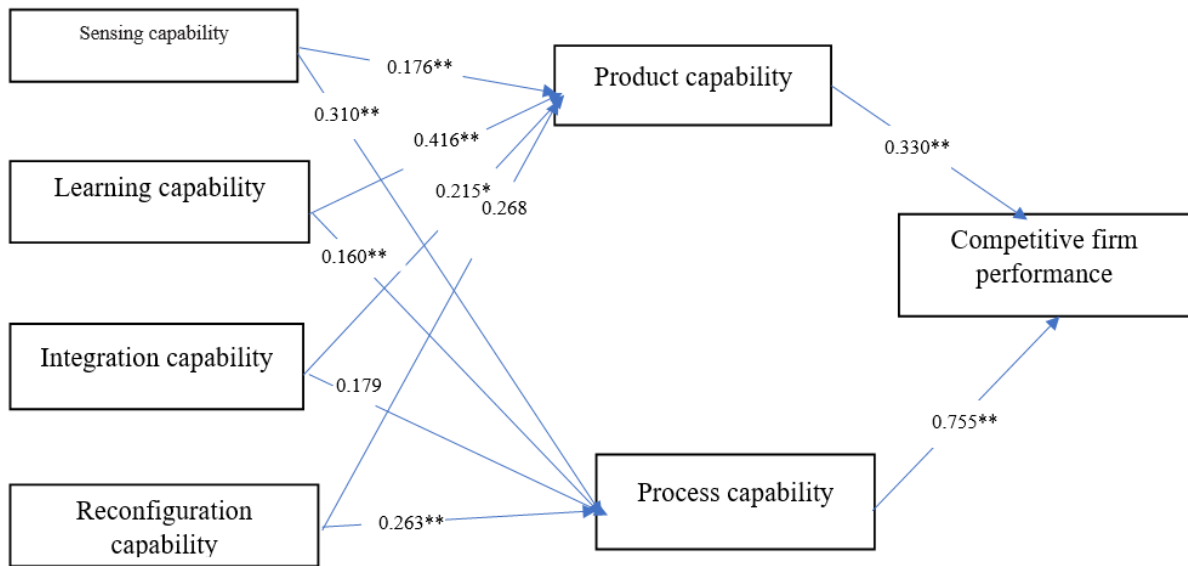


Figure 2: The SEM model analysis

innovation capabilities are a fundamental asset of a firm, as well as a positive, and key driver of competitive firm performance. Whereas this finding is significantly different from some prior studies. For example, Ferreira et al., (2019) found that innovation capabilities didn't have a significant impact on competitive firm performance.

This study confirms that innovation capabilities construct product capability and process capability that partially mediated the association between dynamic capabilities and competitive firm performance. These findings are in agreement with previous studies for instance (Pundziene et al., 2021; Mostafiz et al., 2021) who found that innovation capabilities partially mediated the relationship between dynamic capabilities and competitive firm performance. Furthermore, the results reveal that product capability doesn't mediate the relationship between sensing capability, integrating capability and competitive firm performance. While process capability doesn't mediate the relationship between reconfiguration capability and competitive firm performance. This indicates that process capability has a stronger mediating role in the relationship between dynamic capabilities and competitive firm performance. The results of this study also support the ideology of (Mostafiz et al., 2021; Teece, 2018) who argue that in the manufacturing industry, it is fundamental to improve the process innovation capability (e.g. reduce production costs; create and manage a portfolio of interrelated technologies), followed by product innovation capability (e.g. expand the range of products). Thus, entrepreneurs should reconfigure and locate resources into process innovation capability before enhancing product innovation capability. In conclusion, this study contributes to understanding the

mediating mechanism of innovation capabilities through which dynamic capabilities improve firm competitiveness and performance.

6 Theoretical and managerial contributions

This paper makes several contributions to the literature on dynamic capabilities and innovation capabilities. This study confirms that dynamic capabilities can shape and drive innovation capabilities (e.g. product and process capabilities). Furthermore, the results address a theoretical and practical gap by confirming the indirect impact of dynamic capabilities on competitive, firm performance, mediated through innovation capabilities.

In terms of managerial contributions, the paper offers the following contributions. Our results demonstrate that innovation capabilities can be cultivated through dynamic capabilities, helping companies enhance their competitiveness. In addition, the study reveals that both process and product innovation capabilities lead to improved competitive firm performance. Furthermore, our results show that dynamic capabilities such as sensing capability, learning capability, integration capability, and reconfiguration capability are important for firms' scale-up processes. Thus, managers should strive to link firms' dynamic capabilities to the practical build-up of innovation capabilities, which could enhance sustainable competitive advantage. However, the study confirms that process innovation capability has the strongest mediating impact on the relationship between dynamic capabilities and competitive firm performance.

mance. Thus, we suggest managers should pay more attention to innovation processes.

6.1 Limitations and future research

First, this study did not examine any moderation effects between dynamic capabilities and innovation capabilities. Firm's age and size could be a significant moderator between dynamic capabilities and their innovation capabilities. Second, this study investigated SMEs in the manufacturing industry in a single country and conducted a cross-sectional study. So, the generalizability of the research results is limited. It will be more interesting if future research applies to samples from multiple industries and carry out a comparative study between economies.

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Posredovalna vloga inovacijskih zmogljivosti pri razmerju med dinamičnimi zmogljivostmi in konkurenčno uspešnostjo podjetja

Namen: Namen študije je bolje razumeti odnos med dinamičnimi zmogljivostmi in konkurenčno uspešnostjo podjetja ter kako lahko inovacijske zmožnosti, zlasti (a) zmožnost izdelka in (b) zmožnost procesa, igrajo posredniško vlogo v tem odnosu.

Zasnova/metodologija/pristop: Izbrali smo tehniko preprostega naključnega vzorčenja za izbiro malih in srednjih podjetij (MSP) za zbiranje podatkov na podlagi informacij, pridobljenih od madžarskih združenj MSP. Pridobljenih je bilo 565 izpolnjenih vprašalnikov, odzivnost pa je bila 65,50 %. Za oceno zanesljivosti in veljavnosti je bila z AMOS 24 uporabljena potrditvena faktorska analiza (CFA); Cronbachov koeficient alfa pa je bil dodatno uporabljen za oceno zanesljivosti lestvic. Predlagani model je bil testiran z modeliranjem strukturiranih enačb (SEM).

Rezultati: Rezultati študije kažejo, da imajo dinamične zmogljivosti pomemben neposreden učinek na inovacijske zmogljivosti: zmogljivost izdelka in zmogljivost procesa. Študija tudi dokazuje, da tako zmogljivost izdelka kot zmogljivost procesa pomembno vplivata na konkurenčno uspešnost podjetja.

Zaključek: Študija zaključuje, da je razmerje med dinamičnimi sposobnostmi in konkurenčno uspešnostjo podjetja delno posredovano z inovacijskimi sposobnostmi. Nadalje nakazuje, da bi morali podjetniki pred izboljšanjem zmogljivosti za inovacije izdelkov razmisliti o reorganizaciji in prerazporeditvi virov v zmogljivosti za inovacije procesov. Ta študija prispeva k našemu razumevanju mehanizma posredovanja inovacijskih zmožnosti, prek katerega dinamične zmožnosti povečujejo konkurenčnost podjetja.

Ključne besede: *Inovacijske zmožnosti, Dinamične zmožnosti, Konkurenčna uspešnost podjetja, Tehnološke inovacije*

Appendix 1: List of Items see in

Sensing capability

1. Our firm conducts environmental assessment to identify new job opportunities.
2. Our firm ensures the performance assessment.
3. Our firm encourages the collaboration readiness.
4. Our firm encourages the changing and renewal.

Learning Capabilities

1. Frequent industry knowledge learning program.
2. Frequent internal educational training.
3. Frequent knowledge sharing and establishment of learning groups.
4. Frequent internal cross-department learning program.

Integration Capabilities

1. Focus on customer information collection and potential market exploration.
2. Employ specialized firms to collect industry information for managerial decisions.
3. Focus on integrating industry-related technologies to develop new products.
4. Record and integrate historical methods and experiences in handling firm issues.

Reconfiguration Capabilities

1. Clear human resource reallocation procedure
2. Fast organizational response to market changes
3. Fast organizational response to competitor's actions
4. Efficient and effective communication with cooperative organization

Process innovation capability

1. Our firm continuously develops processes to reduce production costs.
2. Our firm has valuable knowledge for innovating manufacturing and technological processes.
3. Our firm is able to create and manage a portfolio of interrelated technologies.
4. Our firm assigns resources to the production department efficiently
5. Our firm is able to offer environmentally friendly processes

Product innovation capability

1. Our firm is able to replace existing products .
2. Our firm is able to expand the range of products .
3. Our firm considers emerging trends in designing new products.
4. Our firm is able to develop innovative products.
5. Our firm is able to reduce the time to develop a new product.

Competitive firm performance

1. We offer competitive prices
2. We are able to compete based on quality
3. We offer high quality products to our customers
4. We deliver customer orders on time

5. We provide dependable delivery
6. We provide customized products
7. We alter our product offerings to meet client needs
8. We cater to customer needs for “new” features
9. We are first in the market in introducing new products
10. We have time-to-market lower than industry average.