The Mediating Effect of Competitive Advantage between Innovation Capability and Firm's Competitiveness: A Study on Manufacturing Firms in Ethiopia

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Abstract

The mediation function of competitive advantage between innovation capability and firms' competitiveness was examined in this study. In order to examine the causal links between the dependent variable (competitiveness), the independent variable (innovation capability), and the mediating variable (competitive advantage), a survey research design with data collected from primary data sources was used. From a total of 300 structured questionnaires that were given to proportionally chosen industrial enterprises, 270 were correctly completed and returned. Data was collected from Addis Ababa and Surrounding Sheger Cities being centers of industrialization in Ethiopia. Both AMOS v23 and SPSS v26 were used to analyze the outcome. While structural equation modeling was utilized to test hypotheses, confirmatory factor analysis (CFA) was utilized to evaluate the validity and dependability of the data. The result shows that the direct effect of innovation capability on firms competitiveness was positive and significant (β=0.67, p=0.000, C.R=10.15), the direct effect of Innovation capability on competitive advantage was positive and significant (β=0.71, P=0.000; C.R=9.86), the direct effect of Competitive advantage on competitiveness was significant and the indirect effect or mediated effect of innovation capability on competitiveness was also positive (β=0.20). Further the Standardized indirect (Mediated) effect of Innovation Capability on Competitiveness was significantly different from zero at the 0.01 level (P=.008 two-tailed), lower bootstrap CI (0.063) and upper bootstrap CI (0.311). In conclusion, the finding from the current study informs that innovation capability has a significant direct and indirect effect on firms' competiveness. Moreover, it was found that competitive advantage has a partial mediation role between innovation capability and competitiveness. Accordingly, it is recommended that owners of manufacturing firms in Ethiopia should properly develop their innovation capability practices to gain competitive advantage and competitiveness.

Key terms: *Innovation capability, Competitiveness, Competitive advantage, manufacturing industry*

1. INTRODUCTION

The current operating structure of Ethiopia's large and medium-sized manufacturing enterprises is dynamic and fiercely competitive due to the entry of numerous smallholder factories (Elias & Bayelign, 2022). Innovation is a crucial instrument for company success, as it can drive total organizational successes through concept renewal and improvements in many organizational areas (Alhemairy & Hussain, 2022). According to Todeschini et al. (2017) and Edwards-Schachter (2018), innovation is one of the factors that have revolutionized business in recent decades, with innovators outperforming non-innovators in terms of profitability (Mittal & Agarwal, 2020; Masud, 2020). Furthermore, due to the volatility of the global market, organizations cannot ensure their long-term viability unless they innovate (Tidd & Bessant, 2018). This is because today's challenges cannot be solved with yesterday's solutions. Because Ethiopian customers have access to a large variety of imported goods, yet Ethiopian enterprises make little incremental improvements to improve efficiency and competitiveness, it is thought that improving innovation aptitude is particularly significant to Ethiopian firms (Elias & Bayelign, 2022). Jamai et al. (2021) posited that in a market characterized by intense global rivalry and swift transformation, companies endeavor to adjust their approaches by incorporating novel or enhanced forms of innovation to capitalize on current prospects. According to (Ponta et al., 2021; Robertson et al., 2023), innovation is a key component that raises a company's value and acts as a catalyst for better performance. Adam &Alarifi (2021) contended that for all Contemporary enterprises survival in a world characterized by competition, change, and crises, innovation is a necessity. In addition, it was asserted that while the world is becoming increasingly competitive, it is important for many businesses to be innovative by challenging themselves to come up with new and different ways of doing things (WB, 2019). According to Flak &Głód (2020), any value that a company offers that persuades clients to choose its goods or services over those of its rivals are considered a competitive advantage. Therefore, by effectively combining and expanding resources and competencies, a company can gain a competitive edge (Novitasar & Agustia, 2022). According to Ploenhad et al. (2019), a company's competitive advantage is determined by how well it manages market share rivalry and by how much of a competitive edge it has over its rivals.

In the current study competitive advantage measured with cost, quality, delivery dependability and variety was used as an intervening variable. Competitiveness is a function of many interrelated firm factors including productivity, market share, profitability, efficiency, product range, value creation and customer satisfaction (Kiveu et al , 2019). Even though, there is no hard and fast rule to define competitiveness that applies to all industries, in strategic management firm level competitiveness has been taken as a substitute of business performance (Jambor & Babu, 2018). This study addresses the relationship among the stated variables directly and indirectly. For all of the relationships empirical investigation was conducted. In regards to the direct effect of innovation capability practices on competitiveness of firms in various industries, many previous studies established that innovation is an antecedent that leads to better performance and competitiveness (Farida & Setiawan 2022; Nicholas et al. 2024; Dessie et al, 2022; Rajapathirana & Hui, 2018). Still, other studies produced findings that are not consistent (Wei &Luo, 2022; Issau et al., 2022; Yulianto &Supriono, 2023) and are also undertaken in developed nations than Ethiopia leading to disagreement and geographic gap demanding further studies. This study also tries to link innovation to firms' competitive advantage and also competitive advantage to firms' competitiveness. According to the dynamic capability hypothesis and many previous works like

(Parente et al. 2018; Yang et al., 2022) company's capacity for innovation, adaptation, learning as well as generation of novel ideas is essential to securing and maintaining a competitive advantage. Similarly, many previous works proved that competitive advantage would lead to competitiveness and greater firm performance (Wijayanto, et al, 2019; Aidara et al., 2021). Coming to the mediation role of competitive advantage, while some of the studies approved that competitive advantage has a mediation role between Innovation capability variables and firms competitiveness (Novitasari & Agustia, 2022; Songkhla, et al 2022; Yuliantari and Pramukki; 2022; Firdaus & Sakinah; 2022), some others (Setyawati, et al 2017; Wanjiru, et al 2019; Wahyuni, et al 2020) came up with a different findings and were also under taken in other countries than Ethiopia, that calls for further investigation. Hence , Studying innovation behaviors and types on firms in developing countries like Ethiopia is of a necessity as innovation efforts of firms in developing countries could be different from those of the developed one (Le, S. T. K. ,2020). Moreover, in Ethiopia none of the previous studies on Innovation and firm performance did include the mediation role of competitive advantage. More over the rationale of focus on manufacturing firms is that the sector is expected to engage in more innovative ideas in their work processes compared to the service sector. In addition, the current study employed structural equation modeling AMOS bootstrapping to test the mediating effect of competitive advantage between innovation capability and competitiveness of manufacturing firms which was missing in the previous studies.

1.1. Research objectives

1. To Examine The Direct Effect Of Innovation Capability On Competitiveness Of Manufacturing Firms In Ethiopia
2. To Investigate The Effect Of Innovation Capability On Competitiveness Of Manufacturing Firms In Ethiopia
3. To Explain The Effect Of Competitive Advantage On Competitiveness Of Manufacturing Firms In Ethiopia
4. To Examine The Mediating Role Of Competitive Advantage Between Innovation Capability And Competitiveness Of Manufacturing Firms In Ethiopia

2. Theoretical framework and Literature Reviews
2.1. Innovation diffusion theory

Innovation diffusion theory defines an innovation as any concept, procedure, or item that is perceived as novel by an individual or another unit of adoption, such as a firm (El Malouf, & Bahemia, 2023). The unit of innovation in the current study is Ethiopian manufacturing firms evaluating their innovation adoption and its impact on their performance is a good fit. (Rogers, 2003) proposed five attributes of innovation. Individuals' perceptions of these attributes determine an innovation's rate of adoption, which shows the relative speed at which an innovation is adopted by individuals of a social system. An additional factor influencing the rate of adoption of innovation is the social. A system's social and communication structure can help or hurt the diffusion of innovations inside it. As El Malouf and Bahemia (2023) point out, the communication structure actually reflects the distinct aspects that are discernible in the structured communication flows inside a system. According to Rogers (2003), there are five stages in the innovation decision-making process: knowledge, which occurs when a person is made aware of the innovation and gains an understanding of its workings; persuasion, which occurs when a person develops an attitude toward the innovation decision, either positively or negatively; engagement in activities leading to a decision to accept or reject the innovation implementation; confirmation, which occurs

when a person uses the innovation; and seeking confirmation for a decision they have already made, which they may later reverse if they come across contradictory information about it. This study is mainly focused on the degree to which innovation types are being adopted in the manufacturing sector of Ethiopia and its impact on competitive advantage and competitiveness, this theory is the right guide.

2.2. Innovation Capability

Innovation is a fundamental element of business success, signifying the collective accomplishments of an organization through the revitalization and enhancement of concepts (Alhemairy & Hussain, 2022). As one of the factors that have changed businesses in recent decades, innovation in the form of new products, processes, marketing strategies, and organizational structures has made innovators more profitable than non-innovators (Todeschini et al., 2017; Edwards-Schachter, 2018). According to Jamai et al. (2021), businesses try to adjust their strategies by introducing new or improved innovation types in order to take advantage of opportunities that are available in a market that is characterized by intense global rivalry and rapid change. The act of using new or improved products, processes, and systems that is, doing things differently to transform knowledge into value is known as innovation (Wallace & Kilika, 2021). Tidd and Bessant (2018) emphasized that an organization's capacity for innovation will decide its long-term survival, given that the global market volatility of today makes it impossible for yesterday's answers to guarantee a solution to today's problems.

2.3. Competitive Advantage

A company's competitive edge is its ability to prevent rivals from replicating its successful approach once it generates long-term benefits (Novitasari & Augustia, 2022). Porter's approach is frequently used to measure a company's competitive advantage, which can significantly improve firm performance and serve as a positive signal for firm performance (Anwar et al., 2018). According to Akram et al. (2018), a firm's competitive strategies can be considered sustainable and are considered a crucial component of high-level performance when they are difficult or expensive for other firms to replicate. According to Wanjiru et al. (2019), competitive advantage refers to the firm's strategic capabilities that stem from its distinct resource and attribute combinations, enabling it to outperform rivals in the industry. Competitive advantage can be measured using metrics such as quality, cost, delivery, safety, and morale (Ambarwati, 2020).

2.4. Firms' competitiveness

Competitiveness is a concept that shows up in all aspects of human life regardless of the size and type of organizations both at micro level to the broader and larger Macro level and even in personal and social life Virjan, et al.(2023) and its chain spans over global, national, local, enterprises and strategic business units (Farhikhteh & Farhikhteh, 2023). In a similar vein, Shved&Bila (2017) confirmed that one of the biggest issues facing the modern economy is fostering a high degree of competitiveness among businesses, industries, and entire economies or their areas. Kuźmiński et al. (2020) define competitiveness as the capacity of businesses, industries, regions, nations, and supranational areas to produce a comparatively high level of employment and a comparably high income from production elements. Firms' competitiveness in the current study was used as an endogenous variable and used fur metrics frequently used in management literatures. These are

firms profitability compared to others in the same industry, productivity, market share growth over time and sales level of all products.

3. Empirical literature review and Hypothesis development

3. 1. Innovation capability and firms' competitiveness

Plenty of empirical literatures were in place to show the link between innovation capability and competitiveness. A study on the Empirical Analysis of Technology Innovation to Promote the International Competitiveness of China's Manufacturing Industry, done by Long Wei and Qi Luo in 2022, revealed that innovation capability may greatly increase the manufacturing industry's ability to compete internationally. The study conducted by Aynaddis (2023) examined the impact of innovation orientation on the performance of micro and small manufacturing enterprises in specific towns within the Awi Zone of Ethiopia. The findings indicated a positive and substantial correlation between firm performance and innovation in terms of product, process, marketing, and organizational innovation. After examining the effects of innovation capability on firm performance through innovation kinds in Malang City, Indonesia, Yulianto & Supriono (2023) come to the conclusion that neither process innovation nor product innovation has a major impact on firm performance.

According to an empirical study by Jamia et al. (2021) on The Impact of Innovation Type on Financial and Non-financial Performance of SMES, product innovation has a significant impact on firm performance in the manufacturing sector, and product innovation and marketing have the biggest effects on the expansion of agro-food firms.

H$_{a1}$: Innovation Capability significantly affects manufacturing firms competitiveness firms in Ethiopia …………. ……….. *(1)*

3.2. Innovation capability and Competitive advantage

Innovation plays a key role in gaining a competitive advantage in the knowledge-based economy era since it allows businesses to differentiate themselves and better hold onto their advantage (Suhaeni, 2018). Businesses with innovative capabilities can create new goods that outperform those of their competitors, providing them with a competitive advantage. To summarize, companies may sustain a stronger market position by differentiating their products and offering unique services, all while utilizing their inventive skills to gain a competitive edge (Novadhiyavast & Hidayati, 2023). It was stated that using customer satisfaction as a competitive advantage necessitates significant changes to corporate strategy frameworks, market trends, and production processes. Small and medium-sized businesses (SMEs), whose sustained development demands critical intervention, are the focus of this argument (Sattar, 2024). Daidj et al. (2022) claim that technological advancement could have profound impacts on the economy, change The findings from this study supports the flexible capacities theory, which holds that small and medium-sized businesses' (SMEs') ability to innovate in a competitive manner is essential to their survival.

Ha2: Innovation capability significantly affects manufacturing firms' competitiveness

3.3.Competitive Advantage and Firms Competitiveness

Empirical studies have confirmed the significant effect that competitive advantage has on performance. Firdaus & Sakinah (2022) investigates the Relationship between Innovative Work

Behavior, Competitive Advantage and Business Performance confirms the positive and significant. Wijayanto, et al, (2019) studied The Effect of Competitive Advantage on Financial Performance and Firm value conclude that competitive advantage has a positive and significant effect on financial performance and firm value. Potjanajaruwit (2018) did a study entitled Competitive advantage effects on firm performance on startups in Thailand concludes that competitive advantage had a direct positive effect on the performance of startups in Thailand. Prado et al.'s (2022) found that product innovation, pricing capability, and marketing intelligence as a source for competitive advantage for startups performance in Peru.

Ha3: *Competitive advantage significantly affects manufacturing firms' competitiveness … (3)*

3.4. Innovation capability, competitive advantage and competitiveness
Wanjiru et al (2019) studied on the mediating effect of Competitive Advantage on the Relationship between Corporate Strategies and Performance of Manufacturing Firms in Nairobi City confirmed that competitive advantage has a mediating effect on the relationship between corporate strategies and firm performance. Novitasari&Agustia (2022) Who Studied Competitive Advantage As A Mediating Effect In The Impact Of Green Innovation And Firm Performance Proved that Competitive Advantage Mediated The Effect Of Green Innovation On Firm Performance. Yuliantari and Pramukki (2022) who studied The Role of Competitive Advantage in Mediating the Relationship between Digital Transformation and MSME Performance in Bali found out that competitive advantage served as a partial mediation of the relationship between digital transformation and MSME performance. The impact of innovation, value chains, and competitive advantages on Indonesian higher education performance was examined by Purnomoa et al. in 2022. The association between innovation, value chains, and higher education achievement was found to be mediated by competitive advantages.

Ha4: The effect of innovative capability on and organizations' competitiveness is mediated by competitive advantage.

Based on the above empirical links among the independent, dependent and mediating variable the following conceptual framework was created.
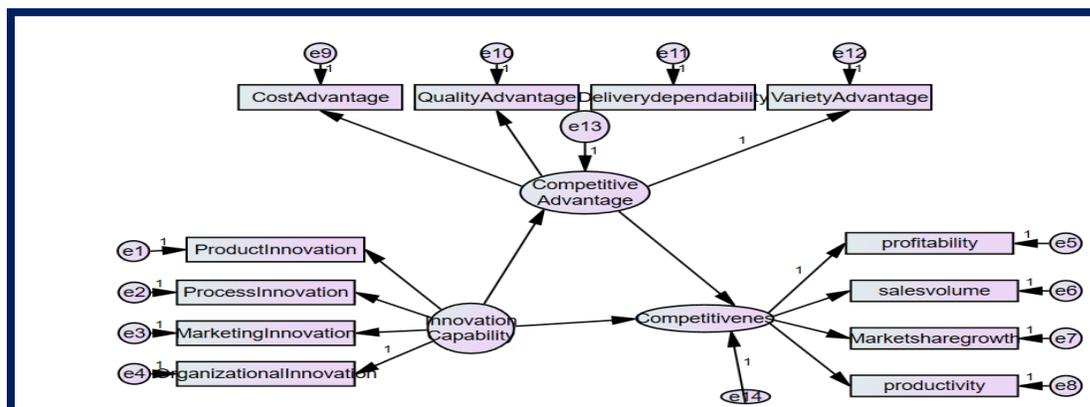

Fig 1: conceptual framework, designed by the researchers, January 2023

4. Research methodology

4.1. Research Design and Population of the study

Cross sectional study design with data collected from primary data sources was used in this study. The target populations of the study were manufacturing firms operating in Ethiopia. From manufacturing firms, Large and medium sized firms were chosen because focusing on large and medium sized firms due to the closeness of those firms to innovation and competitiveness compared to those firms with less size as witnessed in previous studies (Daksa et al., 2018; Sözbilir, 2018; Kalko et al., 2022) . Currently according to the official report from The Investment commission of Ethiopia January (2023) there are about 3687 legally registered Large and medium sized manufacturing firms from which 3500 of them are currently active. The study sampled 300 manufacturing firms using (Kothari, 2004) formula.

$$n = \frac{N*p*q*z^2}{e^2(N-1)+p*q*z^2} ,$$

Where n is the sample size,

Z is the precision level (at 0.96 confidence interval); p is the proportion to be included in the sample (let 50% included thus, p=0.5), and q = 1-p (1-0.5=0.5). N is the target population. Hence n= (3500*0.5*0.5 *(1.96)^2) / (0.05)^2 (3500-1) +0.5*0.5*(1.96)^2 = 330. The final sample size was adjusted using finite population correction formula (FPC). Consequently, nf =330/ (1+0.0966) = 300. When ultimate sample size (nf) and c = n/N are given.

4.2. Instrument And Data Collection Method

Using five-point Likert scales that were validated and taken from earlier investigations, all research variables were measured. For innovation capability questionnaire was adopted from standard measurement from Oslo Innovation Manual (OECD, 2018) used by many authors like (Kiveu et al., 2020; Dessie et al, 2022; Elias &Bayelign, 2022; Kidest, 2023). This is used to assess the innovation implementation of manufacturing firms with (1) = Absence of innovation implementation (5) =original products/processes are Innovated. Firm competitiveness was measured using five point likert questions ranging from 1 = very poor, we are the worst in the industry; 5 = excellent with four variables of; Profitability, Sales volume, Market share growth and productivity (Jambor and Babu, 2018). Competitive advantage was measured with 16 items adopted from (Ferreira et al., 2021) considering cost quality, delivery dependability and variety with likert scales ranging from 1= Strongly disagree to 5= Strongly agree. Data was collected from Addis Ababa and surrounding Sheger city Administrations.

5. Result and Discussion

This study applies structural equation modeling to analyze data and come up with the findings on data collected from 300 randomly selected manufacturing firms in Ethiopia. Of the collected data 270 of them (139 large industries and 131Medium industries) were properly filled and used for data analysis making the response rate 90%. Using a stratified random sample technique questionnaires were sent to various manufacturing enterprises within the industrial sector.

5.1. Construct Validity and Reliability Assessment result

Construct reliability and validity were assessed using factor loadings from confirmatory factor analysis and evaluated using both internal and composite reliability. Cronbach's alpha with a value of 0.70 or higher deemed is adequate to measure internal consistency and the study result is also in this guideline as shown in table 1. Kamranfar et al. (2023) underline that the prerequisites for construct reliability assurance are indicators with higher factor loadings, the acceptable result of composite reliability would be greater than 0.7. Hence, composite reliability was assured. Table 1 also displays the construct validity results of the study. It is determined by utilizing the average variance extracted (AVE) (Sujati et al., 2020*),* and loadings must be >0.5 with a significant corresponding p value (p<0.05) for a measurement tool to have acceptable convergent validity. Based on the results of the confirmatory factor analysis displayed in Figures 2, 3, and 4, and Table 1, the AVE are above 0.5, Confirming the absence of any issues with convergent validity. Similarly, the composite reliability results in Table 1 were all above 0.7, and the average variance extracted was also above 0.5. The square root of the average variance computed in the table is for the purpose of establishing the discriminant validity.

Table 1 Reliability and Validity Test Results

Variables	Item-Total Correlation	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)	Square Root Of AVE		
Ability to innovate	0.45	.859	0.924	0.752	0.87		
Innovation in product	.629**	.821	0.866	0.564	0.75		
Innovation in Processes and innovation in marketing	.791**	.817	0.83	0.573 0.752	0.76	0.87	00766
	.543**	.866	0.91	0.636	0.78		
Innovationin Organizations	.631**	.910	0.92	0.694	0.84		
Competitive advantage	.523**	.902	0.923	0.844	0.92		
Cost Advantage	.663**	.899	0.971	0.923	0.94		
Quality Advantage	.850**	.858	0.95	0.772	0.87		
Delivery	.780**	.875	0.93	0.863	0.93		
Variety Advantage	.546**	.821	0.851	0.622	0.79		
Competitiveness	0.423**	.905	0.930	0.800	0.89		

Discriminant validity test was also conducted which According to Sujati (2020) is gained by comparing the inter factor correlation among variables with square root of the average variance extracted and if the correlation value between these constructs is less than the square root of the AVE, discriminant validity is assured. Table 2.displays that the square root of the AVE displayed diagonally in bold are all above the inter factor correlation among the variables, confirming that there is no any discriminant validity issue. For instance, the square root of the average variance extracted for innovation capability is 0.87 which is above all the inter-factor correlation in that column.

Table 2 Discriminant validity using cross correlation and square root of AVE

	Variables	1	2	3	4	5	6	7	8	9	10	11
1	Innovation capability	0.87										
2	Competitiveness	.62**	0.89									
3	Competitive advantage	.54**	0.456	0.92								
4	Product Innovation	.56**	0.536	.59**	0.862							
5	Process Inno	.52**	0.456	.489*	.56**	0.975						
6	Marketing Innovation	.51**	.57**	.53**	.65**	0.48*	0.974					
7	Organizat.inno	.56**	.49**	.64**	.581*	.46*	0.45*	0.841				
8	Cost advantage	.41**	.52**	.57**	.574**	.453	0.53*	0.63	0.91			
9	Quality	.435**	.61**	.65**	.51**	.60**	.523	.63*	.52	0.91		
10	Delivery depe	.52**	.40**	.54**	.62**	.44**	.56**	1	.65**	0.643*	0.92	
11	Variety	.433**	.498*	.55**	.472**	.52**	.64**	.59**	1	0.56*	0.45**	0.78

6. ASSUMPTIONS OF STRUCTURAL EQUATION MODELING
6.1. Multivariate Normality

The values of skewness and kurtosis were used to determine if the data matched the requirements for multivariate normality. When these values were seen, all of the study's variables had values that were normally distributed and fell between the suggested ranges for the absolute value, which should be within -+1.96 and -+7, respectively, as suggested by (*Hair et al. 2014*) as shown in table 3. .

Table 3 Skewness and kurtosis analysis for Multivariate normality

	N Statistic	Skewness		Kurtosis	
		Statistic	Std. Error	Statistic	Std. Error
Product Innovation	270	-1.085	.148	.060	.295
Process Innovation	270	-1.266	.148	.280	.295
Marketing Innovation	270	-1.094	.148	-.100	.295
Organizational Innovation	270	-1.055	.148	-.133	.295
Profitability	270	-1.325	.148	.572	.295
Sales Volume	270	-1.574	.148	1.266	.295
Market Share growth	270	-1.155	.148	.563	.295
Productivity	270	-1.555	.148	1.777	.295
Cost advantage	270	-1.370	.148	.948	.295
Quality Advantage	270	-1.172	.148	.383	.295

Delivery dependability	270	-1.403	.148	1.129	.295
Variety Advantage	270	-1.371	.148	1.131	.295

6.2. Multi colliniarity diagnostics

For Multicolliniarity test result to be non-problematic, variance inflation factor should be <5, tolerance should be >0.25 (Hair et al, 2022; tests was conducted by different methods and the inter-factor correlations should be <0.85. The test result of the study in **Figure 2, 3**&4 and Table 4 illustrate the correlation values for each of an instrument's factors <0.85; VIF <5 and tolerance >0.25.

Table 4: Multicolliniarity diagnostics using Pearson Correlation, Tolerance and VIF

		1	2	3	4	5	6	7	8	9	10	11	VIF	Tolerance
1	Innovation capability	1											.953	1.049
2	Competitiveness	.62**	1										.680	1.471
3	Competitive advantage	.54**	0.456	1									.943	1.060
4	Product Innovation	0.25*	0.53**	0.59*	1								.789	1.267
5	Process Innov	.52**	0.456	0.48*	0.56	1							.890	1.123
6	Marketing Innovation	.51**	.57**	0.53*	0.65	0.48	1						.757	1.320
7	Organizationnov	.35**	.49**	.64**	.58	.46	.45**	1					.894	1.122
8	Cost advantage	.41**	.52**	.57**	.57**	.45	.53**	0.63	1				.494	2.025
9	Quality	.43**	.61**	.65**	.51**	.60**	.52**	0.63	.52**	1			.470	2.130
10	Delivery dependailty	.51**	.40**	.54**	.62**	.44*	.56*	1	.36**	.46*	1		.499	2.005
11	Variety	.34**	.498*	.55**	.472**	.52*	.64*	.59**	1	.5	0.4*	1	.504	1.986

*** = Correlation is significant at 0.000

6.3. Sufficiently Large Sample Size

According to the SEM guidance of >200 sample sizes, the current study's sample size of 270 is adequate for the analysis. Furthermore, Kaiser Mayor Olkin (KMO), with a minimum result of 0.50 required, was assured. As a KMO value of.907 significantly above the lowest threshold for factor analysis and a Chi2 = 2424, DF = 66, P <.001 considerably different from zero, Table 5 provides the details.

Table 5: KMO and Bartlett's Test

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.907
Bartlett's Test of Sphericity	Approx. Chi-Square	2244.893
	DF	66
	Sig.	.000

7. Confirmatory Factor Analysis (CFA) For Measurement Model validation

Confirmatory factor analysis was conducted to test the measurement model of the current study to assure if the proposed relationships fit to theory. It is a culture for structural equation modeling to test for the measurement part of the model before turning to the structural part. Here all of the variables with first and second order character were tested for validity. This also helped to calculate the reliability and validity requirements in the study.

7.1. Validation of Innovation capability as 1st order measurement model

First order measurement model was performed on the four indicators of innovation capability. In which the model goodness of fit test result (GOF) was found to be a perfect fit as it was indicated in Table 6 for all study variables. All the fit indices were above the recommend cut point.
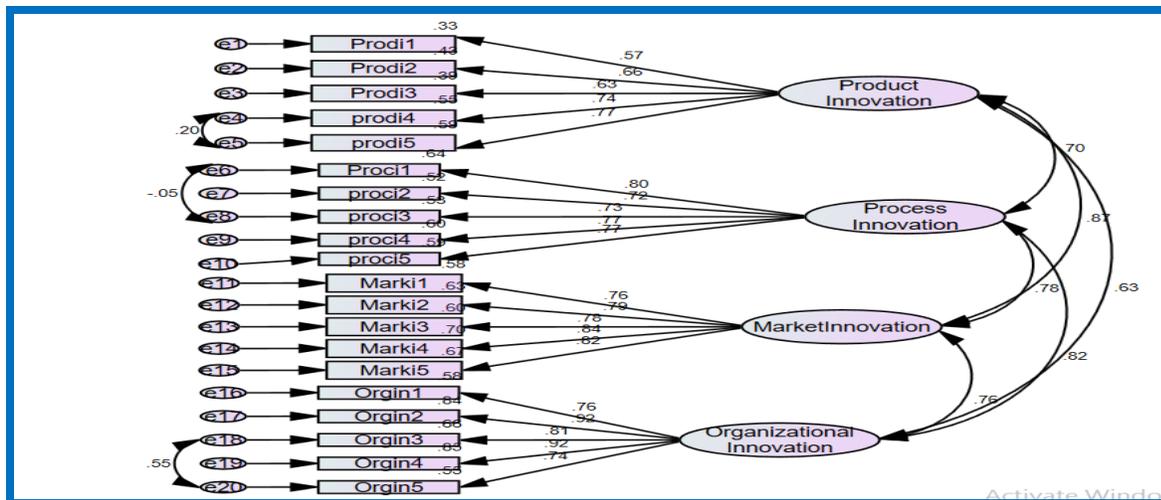

Fig.2 Measurement Model For First Order Factors

7.2. Validation of measurement model for firm competitiveness

The measurement model result for firm competitiveness show that the data and theory fit each other perfectly with all the values of the model fit indices above cut off point where, Ch2/Df=2.016; GFI= 0.992; AGFI=0.962; CFI=0.998; RMSEA=0.041; P value and pclose values all are greater than 0.05 in line with the requirement for model fit as shown in table 6.
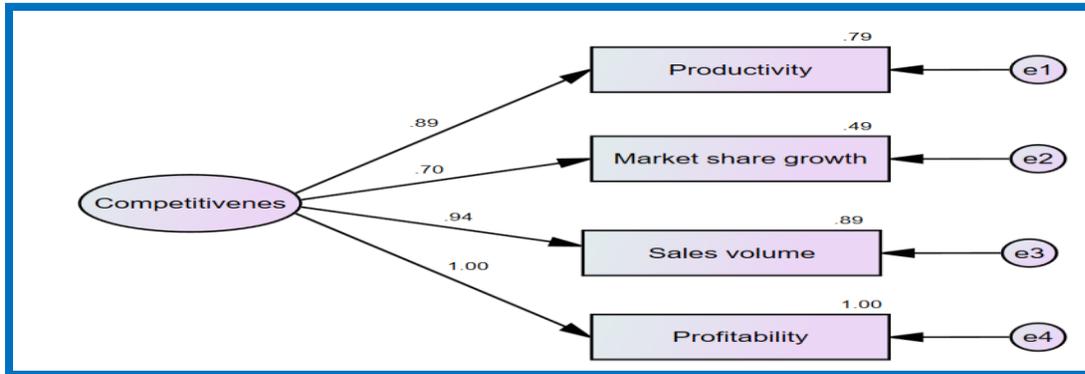
Figure 2: Measurement Model for Firm Competitiveness

7 .3. Validation of innovation capability as 2nd order factor

In this study, four first order factors (product, process, marketing and organizational innovations are explained by innovation capability as higher-order factor structure was formulated as described on **figure4.** The model goodness of fit test result (GOF) was found to be a perfect fit with Chi-square =94.509, DF= 79; CMIN/DF=, 1.196**; P=** .112 and all others were within the limit as shown in Table 6.
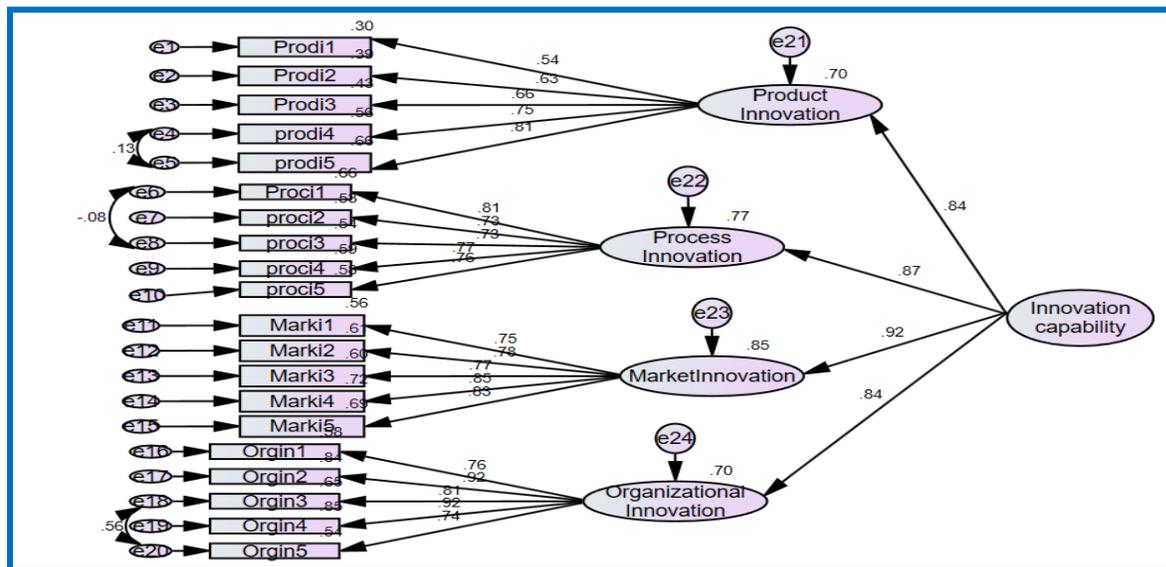

Fig. 4: Measurement model for Innovation capability as 2nd order factor

7.4. Validation of competitive advantage as 1st order factor

Four indicators of competitive advantage were validated for first order factor as depicted on **Figure 5**; the model goodness of fit test result (GOF) was found to be a perfect fit with Chi2= 97 .444, DF=79; CMIN/DF= 1.233; P=0.78; as well as all other indicators were found to be in a satisfactory model fitness. Details were provided in Table 6.
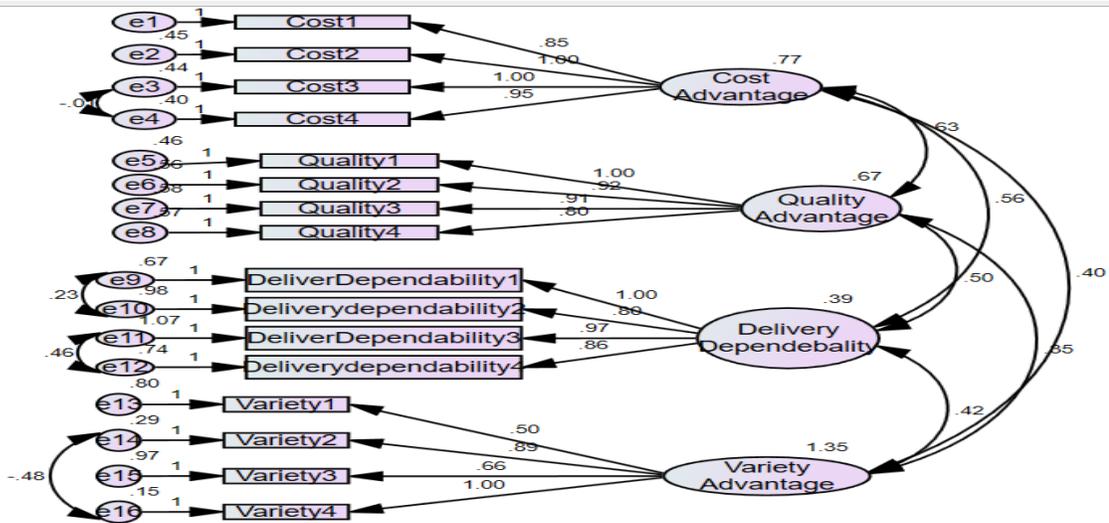
Figure 5, Measurement model for competitive advantage as first order factor

7.5. Validation of Competitive Advantage as 2nd Order Factor

According to figure 6 and table 8 all four sub dimensions Of Competitive Advantage with their respective measurement items were loaded well on their higher order latent variable scoring above 0.5 factor loading cut off point. The model goodness of fit test result (GOF) with, Chi2= 94.016; DF =81, CMIN/DF=1.161; P=0.153 which is >0.05 was a perfect fit as shown in Table 6. In summary competitive advantage can be measured as second order factor with those sub variables.
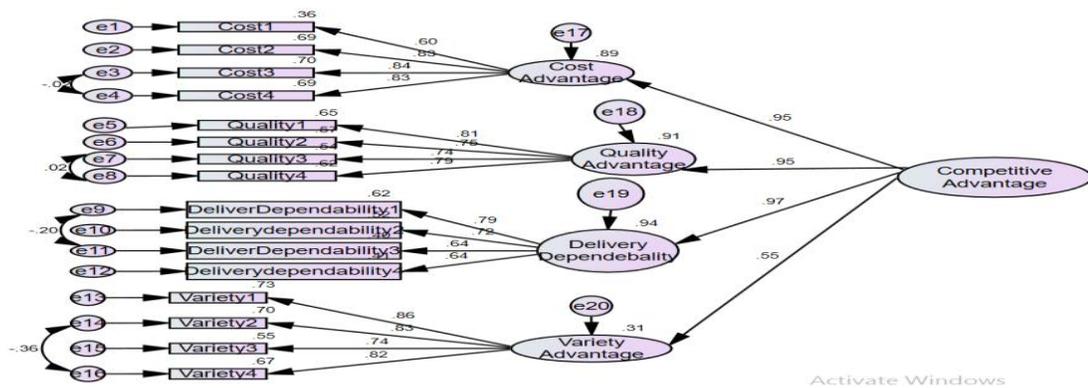

Figure 6: 2nd order measurement model for competitive advantage

Table 6. Summary of model fit test resukts for all study variables

Model Fit assessment Benchmarks	CH2/DF≤5	GFI ≥ 0.90	AGFI≥ 0.90	TLI≥ 0.90	CFI	RMSEA ≤ 0.08	P-value ≥ 0.05	P-close 0.05	≥
	Model fitness test result for the variables								

Innovation capability 1st order	*1.153*	*0.946*	*0.926*	*0.993*	*0.995*	*0 .024*	*0.106*	*0.999.*
Innovation capability 2nd order	*1.196*	*0.97*	*0.935*	*0.970*	*0.977*	*0.027*	*0.112*	*0.983*
Competitiveness	*1.161*	*0.959*	*0.932*	*0.994*	*0.996*	*0 .024*	*0.153*	*0.990*
Competitive advantage 1st order	*1.233*	*0.957*	*0.926*	*0.994*	*0.993*	*0 .029*	*0.78*	*0.937*
competitive advantage 2nd order	*1.233*	*0.95*	*0.92*	*0.990*	*0.993*	*0.029*	*0.87*	*0.973*

8. Full Structural equation model testing (Structural part)

In this study the structural model was formulated as shown on figure 7. The model goodness of fit test result (GOF) was a perfect fit as detailed in table 8.

Table 8: Model adequacy of fit summary of the structural part

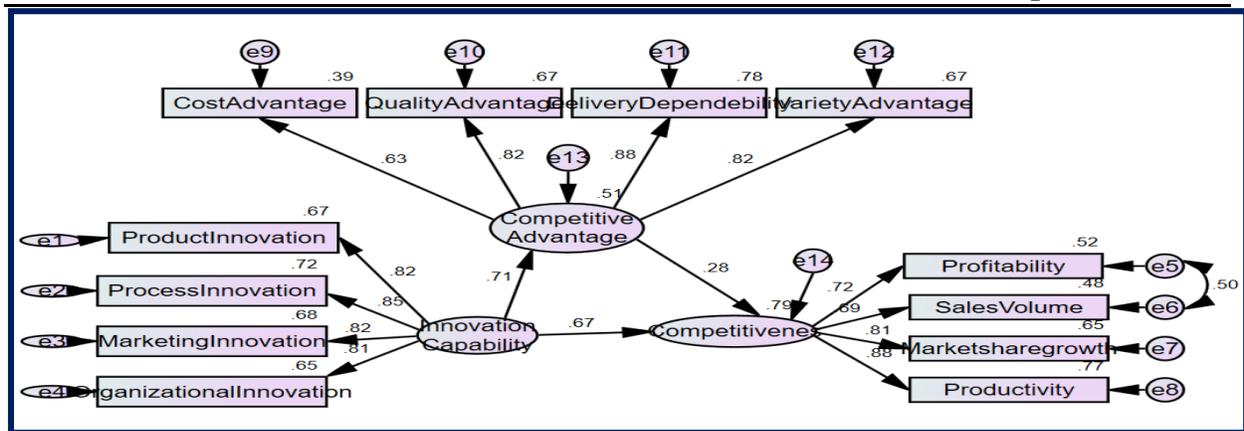| Model Fitness Standard	Benchmark	Outcome
Chi2 /Df	≤5	1.286 (satisfactory)
GFI	≥ 0.90	0.971 (satisfactory)
AGFI	≥ 0.90	0.944(satisfactory)
TLI	≥0.90	0.991 (satisfactory)
CFI	≥ 0.90	0.995 (satisfactory)
RMSEA	≤ 0.08	0 .033 (satisfactory)
P value and PClose	≥ 0.05	P=.104; P close 0.879 (perfect fit)

Figure 7: Full Structural Model of the mediation model

8.1. Path Analysis Result and Discussion

The current study establishes the mediated effect of innovation capability on competitiveness of manufacturing firms in Ethiopia. The mediation role of competitive advantage was also assessed. Using Structural equation modeling with AMOS software the relationship between the dependent, independent and the mediating variable was formulated as shown on Figure 7. Assessment of the path coefficients seeks important points like whether the results are statistically significant and relevant. Statistical significance was established based on Amos Bootstrapping in which the P label and the critical ratio (C.R) was produced. As such, it can be inferred that all the p values and critical ratios for all the path coefficients among the variables in the path models are positive and significant ($P<0.001$; $C.R>1.96$). In terms of relevance, path coefficients should be between -1&1 and the result is also within this threshold. Table 9 details the path relationships. The result shows that the standardized direct (unmediated) effect of Innovation capability on Competitiveness is 0.67. That is, due to the direct (unmediated) effect of innovation capability on Competitiveness, when innovation capability goes up by 1 standard deviation, Competitiveness goes up by 0.67 standard deviations. The effect of innovation capability on competitive advantage was also positive and significant (B=0.71, P=0.00, C.R=9.86), effect of Competitive advantage on firm's competitiveness was also positive and significant (B= 0.28, p=0.00; C.R=4.396). As all paths were significantly different from zero, the precondition for mediation analysis was satisfied. The total effect of innovation capability on competitiveness is .87 which is the result of the direct effect plus the indirect effect (0.67+0.20= 0.87) The R^2, value which is 0.79, indicates the explanatory power of the model in which both innovation capability and competitive advantage together explains about 79% of variations in the competitiveness of manufacturing firms in Ethiopia which is consistent with (Hair; 2022) who proposed that, R-square values falling on or greater than 0.75 are considered as substantial. Only 21% of the variations in firms' competitiveness were accounted for other factors.

Table 10: Standardized regression weights (Group number 1 - Default model)

			Estimate	S.E.	C. R	P label
Competitive Advantage	<---	Innovation Capability	.71	.072.	**9.86**	***
Competitiveness	<---	Innovation Capability	.67	.066	**10.15**	***
Competitiveness	<---	competitive Advantage	.276	.061	**4.396**	***

***: P is significant at 0.000

The evaluation of the direct, indirect, and mediated impacts is given in Table 10. According to Baron and Kennys' 1980 approach to mediation analysis, the indirect effect of innovation capability on competitiveness through competitive advantage, or 0.28, is the outcome of the direct relationship between innovation capability and competitive advantage and the direct relationship between competitive advantage and competitiveness. On the other hand, Amos Bootstrapping produces the result immediately than all the processes employed in the earlier approach. The indirect impact of innovation on competitiveness is 0.282, which is significantly different from zero, according to Table 11's results of a two-tailed significance test.

Table11. Standardized Direct, indirect total Effects (Group number 1 - Default model)

	Innovation Capability	Competitive Advantage	Competitiveness
Competitive Advantage	.71	.000	.000
Competitiveness	.67	.28	.000
Standardized Indirect Effects (Group number 1 - Default model)			
Competitive Advantage	.000	.000	.000
Competitiveness	.20	.000	.000
Standardized Total Effects (Group number 1 - Default model			
	Innovation	**Competitive**	**Competitiveness**
Competitive Advantage	**.71**	**.000**	**.000**
Competitiveness	**.872**	**.282**	**.000**

8.2. Mediation analysis using Direct and Indirect Effects and Amos Bootstrapping

In the above analysis results it was observed that all the path relationships among the variables were found to be significant. But to test the mediation results significance, Amos Bootstrapping was utilized, as this method has become increasingly acceptable to test the significance level of the indirect effect (Hair, et al, 2022). The result in table 12 shows that the standardized indirect effect of Innovation Capability on Competitiveness is significantly different from zero at the 0.01 level (P=.008 two-tailed), Lower bootstrap CI (0.063) and upper bootstrap CI (0.311) also is in concurrence with Hayes, (2018) mediation analysis which is noted that if the upper and lower bounds of the 95% Confidence Intervals (CIs) do not contain zero, the indirect effect is considered significant. In regards to the mediation type, this study confirms partial mediation of competitive advantage between Innovation and competitiveness. As all path coefficients among the path relationships were all significant. More over the direct effect after the inclusion of the mediated variable was reduced which shows the reduced amount is due to the mediation role.

Table 12: Standardized Indirect Effects - Two Tailed Significance (BC) (Group number 1 - Default model)

	Innovation capability	Competitive advantage	Competitiveness	Lower bootstrap	Upper bootstrap
Competitive Advantage	-----	----	----	0.063	0.311
Competitiveness	0.008				

Table13 the result from hypothesis testing
*** p<0.001

Hypothesis	**Beta**	**S.E.**	**C.R**	**P value**	**Remark**
Innovation capability → Firm	0.676	0.072	8.657	***	**Supporte**

Innovation capability →competitive Advantage	0.71	0.066	9.598	***	**Supported**
Competitive advantage →Competitiveness	0.276	0.061	4.396	***	**Supported**
CA mediates the relationship between innovation and Competitiveness	0.20	0.055	3.6	***	**Supported**

From the above hypotheses we developed the following regression equation

Competitiveness = β0+ 0.67*Innovation capability + 0.71IC*0.28CA

8.3. Conclusion and Recommendation

This study establishes the mediated effect of innovation capability on competitiveness of manufacturing firms in Ethiopia. In this process, the whole sub dimensions of innovation capability practices (product, process, marketing and organizational) were taken as a lower order latent variables and also competitive advantage as a higher order factor was measured with four sub indicators of lower order latent variables of cost, quality, and variety and delivery dependability. As bootstrapping was used to verify the significance of the path coefficients all links from the exogenous variable to the mediating as well as the exogenous variable to endogenous variable and also from the mediating variable to the endogenous variable were significant that fulfills for the mediation process to take place. Accordingly, Innovation capability has a standardized direct effect of 0.67 on competitiveness. In other words, because innovation capability directly affects competitiveness, a one standard deviation increase in innovation capability corresponds to a 0.67 standard deviation increase in competitiveness. This is in addition to any potential indirect impact innovation capability may have on competitiveness. Furthermore, there was a positive and significant direct unmediated influence of innovation capability on competitive advantage (B=0.71, P=0.00, C.R=9.86), as well as a positive and significant direct unmediated effect of competitive advantage on firm competitiveness (B=0.28, p=0.00, C.R=4.396) indicating all path coefficients significance relationship. Coming to the total effect that innovation capability had, it has a total impact of.87 on competitiveness. The model's explanatory power, as indicated by the R2 value of 0. 79, that explains approximately 79% of variations in the competitiveness of manufacturing firms in Ethiopia when innovation capability and competitive advantage are combined. It was then recommended that, for Ethiopian firms to sustain themselves in a globalized market, where competition is booming, developing innovative capability are very essential to drive quality and productivity so that to stay profitably in the market and they are required to effectively engage in innovative activities.

8.4. Contribution of the study

This study demonstrated how innovation capability significantly affects a firm's ability to compete through the mediating role of competitive advantage. Managers should focus their efforts on enhancing their competence since innovation capability directly affects competitive advantage and competitiveness in a good way. The results of this study suggest that, in order to survive in the rapidly evolving global market of today, owners and managers manufacturing companies in Ethiopia those categorized under large medium should remain vigilant about implementing newness or improvements in their products, marketing systems, processing procedures, and organizational system.

8.5. Limitations and future directions

The first recommendation for further research is that this study be repeated in both the current area and other locations that were not included in the study contexts. In order to make the research inclusive of all sizes of firms, other interested researchers could build on the findings of this study by investigating the impact of innovation capability on other micro and small scale enterprises. Furthermore, other financial institutions and other sectors that have been the subject of extensive research in nations other than Ethiopia can also be evaluated for the impact of innovation capabilities.

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