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Nexus between consumer insight and competitive advantage: Examining the mediating role of technology adoption in small and medium enterprises in Ethiopia

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Abstract

This study investigates the relationships among consumer insight, technology adoption, and competitive advantage in SMEs of Ethiopia. A total of 282 employees from (small and micro enterprises (SMEs) operating in the Sidama Regional State of Ethiopia were interviewed to collect data, and structural equation modeling (SEM), supported by exploratory factor analysis (EFA) and confirmatory factor analysis (CFA), was used to analyze the results. The results of the investigation conveyed, consumer insight has significant direct impact on competitive advantage with 0.46 regression weight. Likewise, consumer insight has a direct significant impact on adoption of technology with a regression weight 0.73. Technology adoption also has positive significant effect on competitive advantage with regression weight 0.65. Consumer insight can influence competitive advantage directly and through adoption of technology. In the present investigation, technology adoption plays a partial mediation role between consumer insight and competitive advantage with a regression weight 0.47. The outcome of this investigation reveals the importance of technology adoption to advance competitive advantage in SMEs, and they imply that businesses should place a strong priority on technology adoption. SMEs better execute new processes and adapt to the demands of the market by advancing technology adoption. The study provides theoretical comprehension of practices of sustainable business and provides important suggestions for firms seeking to enhance their competitiveness.

Keywords: Consumer insight, Technology adoption, Competitiveness, Small and micro enterprises

Introduction

The ability of small and micro enterprises (SMEs) to leverage consumer insights is a growingly recognized source of competitiveness in the rapidly evolving world market environment of the modern world (Sudirjo, 2023). The comprehensive knowledge of the consumer preferences, habits, and trends can allow SMEs to tailor their offers and make their customers more satisfied and loyal. Consumer insight with the help of market research and behavioral economics served as a foundation, and now, it has started to include the use of technology and data analytics to derive useful insights into customer behavior (Horng et al., 2022).

Interplay between consumer insight and the competitiveness of SMEs has become a reality because of the advancement in technology. Firstly, the consumer insights were initially generated mainly through the conventional approaches to market research, with an emphasis on qualitative information. As companies depended on the strategic importance of majoring on customer requirements, empirical research brought out the influence they have on business competitiveness (Kant and Niguse, 2025). The capability to collect and analyze the insights of consumers also increased significantly in the development of digital technologies as well as information analytics.

Empirical research has brought out the importance of customer intelligence in defining corporate processes in different industries. It is studied that the information assists the businesses in improving their positions on the market and profitability (Ghobakhloo et al., 2022). Nevertheless, very little is known about the fact that the use of technology is a mediating variable of this relationship, especially in the developing countries. Even though the majority of SMEs recognize the importance of consumer insights, most of them have to face the reality of issues in the field, including the inaccessibility of advanced technologies, the absence of digital skills in their staff, and no money to adopt data-driven strategies (Alkhatib and Valeri, 2024). These challenges have hindered SMEs from fully leveraging these insights, emphasizing the need for targeted studies to understand this relationship more comprehensively (Fatonah and Haryanto, 2022).

The SMEs need to focus on effective utilization of consumer insights in achieving competitiveness, particularly in the emerging countries such as Ethiopia. Ideally, SMEs would apply good consumer knowledge in formulating the company strategies, which would enhance their market responsiveness, product development, and customer satisfaction. The studies have

Journal of Science and Inclusive Development Vol. 8, No. 1, DOI:10.20372/jsid/2026-398

also shown that a significant number of SMEs have been confused in the quest to reflect customer insights into business processes, which results in disparity between customer expectations and their actual experiences (Farida and Setiawan, 2022). However, the particular issues the Ethiopian SMEs face when adopting technologies and applying consumer insights have not been well discussed in the previous literature (Niguse et al., 2025). The latter differences show that it is necessary to conduct an in-depth study of the relationship between consumer insight, the use of technology, and competitiveness in this idyllic setting (Sudirjo, 2023).

There is a knowledge gap about how these factors combine to affect competitive advantage because the majority of current research concentrates on either consumer insights or technology adoption separately (Rua and Santos, 2022). There are also evident gaps in context; since many issue articles are centered on developed economies, they may not be relevant to the Ethiopian market due to its distinct consumer habits, limitations of technology, and market dynamics (Omowole et al., 2024).

By examining the association amongst consumer insights, technology adoption, and competitiveness in SMEs of Ethiopia, the current investigation seeks to bridge these gaps. This study examines the mediating position of technology adoption in the connection between consumer insights and competitiveness among SMEs in Ethiopia. The investigation would provide insight to the practitioners, and policymakers and help in guiding further research and strategic orientation to make Ethiopian SMEs more competitive and give them the knowledge and tools necessary to facilitate a more innovative and flexible SME sector.

Empirical literature

Consumer insight and competitive advantage

By proactively finding and exploiting customer insight, SMEs may greatly improve their competitive position, as a number of studies have indicated. Indicatively, SMEs that installed customer feedback systems indicated higher amounts of customer satisfaction and loyalty, which directly increased their market, share (Kozinets et al., 2021). It confirms the notion that with the knowledge about what customers' desire, SMEs can tailor their products and services in a more attractive way, which makes them more competitive in the market (Nayak et al., 2022).

As well, Skare and Soriano (2021) explored the possibility of using data analytics to extract value in customer knowledge. Depending on the findings they make, SMEs could determine new trends as well as revise their strategy by studying customer behaviors using statistical tools. Besides fostering innovation, the flexibility also provides the SMEs with a competitive advantage because they are able to respond swiftly to the market change. The ability to shift the course based on customer insights is highly valuable in dynamic marketplaces whose customer preferences may change rapidly (Ijomah et al., 2024).

The higher the level of technological integration, the more the SMEs will benefit when it comes to adopting technology due to customer insights. Zhou et al. (2024) questioned retail industry SMEs and found out that those having advanced Customer Relationship Management (CRM) systems could assess customer data more efficiently, and this led to the creation of better-informed decision-making. The research highlighted the role of technology as a moderator to scale the power of consumer insights, which meant that the perceived upshot of consumer insights would not be enforced without adequate technical infrastructure (Mohammad Shafiee, 2022).

Moreover, customer data impact on the competitive advantage does not just stop at product offers to marketing strategies. The SMEs that relied on consumer insights to inform their marketing efforts experienced a rise in engagement metrics as well as conversion ratios (Huang et al. 2018). By aligning marketing messages with customer expectations and preferences, these SMEs may differentiate themselves from the competitors and ultimately increase profitability and brand loyalty (Farida and Setiawan, 2022).

It has been emphasized in the literature that it is important that SMEs obtain consumer feedback to make them more competitive. Both Nayak et al. (2022) and Kozinets et al. (2021) emphasize the importance of the feedback provided by the clients' systems that can contribute to a greater number of loyal customers. Skare and Soriano (2021), on the other hand, focus on data analytics as a strategy to identify patterns and swiftly alter strategy. The two approaches emphasize the importance of being responsive, yet Zhou et al. (2024) indicate that the benefits of these approaches require technology integration to maximize the benefits. It is said that without powerful infrastructure, the intelligence gathered is insufficient. Huang et al. (2018) and Farida and Setiawan (2022) also demonstrate how these insights can make marketing more effective as they relate consumer knowledge and the need to make money.

Journal of Science and Inclusive Development Vol. 8, No. 1, DOI:10.20372/jsid/2026-398

H1: There is a positive influence of consumer insight on competitive advantage.

Consumer insight and technology adoption

There is a growing understanding that SMEs seeking to make them more competitive need to take into consideration the association between consumer intelligence and technology adoption. Consumer insights can be the driving force behind the adoption of new technologies aimed at taking care of these needs since they provide valuable information regarding customer preferences, behaviors, and pain points (Nayak et al., 2022). When SMEs know what to expect of their target market, chances are high that they will invest in technology that will enable them to offer improved goods and services (Ghobakhloo et al., 2022). A food-based SME, say one that gathers customer information, might discover that the demand to use greener packaging is on the increase. Such knowledge can prompt the company to implement the latest technology in packaging and enhance its position in the market and make its operations relevant to the expectations of the customers (Tsiu et al., 2024).

Moreover, the collection and analysis of consumer insights often require the use of the latest technological solutions, such as systems of CRM and data analytics platforms. The need to operate more efficiently in handling the data and analyzing it means that SMEs are compelled to employ these technologies as they strive to know their clients better. According to Dagnino et al. (2021), organizations that have a good consumer insight orientation are more likely to invest in technology solutions that can help them obtain and analyze consumer data. This active method does not only help to make better decisions but also develops an idea of creativity within the organization (Sudirjo, 2023).

The attitudes regarding the benefits of implementing technology among the staff members can also be enhanced through the delivery of consumer insights into the corporate plans. The likelihood of employees adopting technology increases when employees see the benefits of technology usage that they can observe to meet the demands of clients, e.g., greater customer satisfaction or higher sales. Staff members of SMEs that devote the most attention to customer insights are more likely to adopt new technologies since they are aware of their significance to the success of the company (Al Karim et al., 2024).

However, the problems connected with the successful transformation of customer insights into technological adoption persist. A lot of SMEs do not have the infrastructure, technical expertise, and resources needed to successfully implement new technology. The absence of digital competency of staff members and financial constraints could become a barrier to the adoption process despite the fact that customer insights can serve to establish the technological needs, as proposed by Olazo (2023). This gap highlights why SMEs deserve special care, such as monetary support and education programs, to enable them to capitalize on the knowledge of their customers that they gather (Fatonah and Haryanto, 2022).

The literature demonstrates the interaction between customer insights and technology adoption SMEs. Nayak et al. (2022) and Ghobakhloo et al. (2022) demonstrate how the awareness of what the customers' desire contributes to the investments in technology. This is indicated by Tsiu et al. (2024) in the food industry. Dagnino et al. (2021), on the other hand, emphasize the significance of having current tools to process insights in the right way. However, Olazo (2023) and Fatonah and Haryanto (2022) demonstrate that, despite the fact that consumer insights may be applicable, it may be difficult to utilize technology productively due to such issues as deficiencies in infrastructure and the shortage of qualified employees.

H2: Consumer insight has positive effect on technology adoption

Technology adoption and competitive advantage

In the modern fast-moving environment of the market, SMEs are heavily dependent on the use of technology to realize not only competitiveness but also gain. SMEs are able to do this by incorporating cutting-edge technologies in their undertakings to streamline their operations, increase productivity, and deliver better services. To illustrate, turnaround times and operating costs can be reduced significantly with automation solutions, and this would allow SMEs to respond more quickly to market demands. According to a study by Bharadwaj (2000), it is evident that the firms that use technology in an effective manner can be distinguished based on their better efficiency and responsiveness and eventually establish a better competitive stance (Olazo, 2023).

The adoption of technology also promotes innovativeness among SMEs, offering them a chance to develop new products and services that will meet the changing market needs (Ye et al., 2021). The owners of SMEs with R&D technologies are able to explore customer preferences and

Journal of Science and Inclusive Development Vol. 8, No. 1, DOI:10.20372/jsid/2026-398

market trends, therefore producing new products that will differentiate them from competitors. Technology-driven businesses are more prepared to adapt to change in the marketplace and also acquire a competitive advantage. Innovation should be encouraged using technical capabilities (Cadden et al., 2023).

There are also no challenges to adoption of technology that are devoid of challenges, particularly to the SMEs with minimal funds. There are a variety of impediments that most SMEs face when adopting and using new technologies to capacity, thus necessitating resources such as funding, skilled employees, and sufficient technological infrastructure. To rise to these challenges, calculated spending of human and technological resources is required, as it is in the case of Wang et al. (2019). These challenges can be minimized, and all possible opportunities to use technology to enhance competitive advantage are considered through prioritizing technology training and support (Sudirjo, 2023).

The studies demonstrated the significance of remaining competitive for small and medium-sized firms. According to Olazo (2023), it works well when one utilizes technology effectively. Ghobakhloo et al. (2022) and Ye et al. (2021) affirm that technology promotes new ideas, which makes the SMEs remain competitive. According to Cadden et al. (2023) and Sudirjo (2023), there exist large issues that complicate the acceptance of technology, which may be useful in spite of them. These issues comprise lack of money and facility issues.

H3: The adoption of technology has a positive impact on competitive advantage.

Mediating role of technology adoption in the association among consumer insight and competitive advantage

There is a growing recognition that to enjoy success in the hypercompetitive marketplaces, SMEs should realize the correlation between customer intelligence and competitiveness (Arsawan et al., 2022). A deep understanding of the preferences and habits of customers, along with their expectations, that is known as consumer insight is the base of making strategic decisions (Fauzi and Ali, 2021). By skillfully using consumer data, SMEs can set their goods and services in a way that will make them change the individual properties of their target customers. Still, to acquire an advantage based on these insights, it is often necessary to rely on the

appropriate technology that allows more comfortable collecting, analyzing, and putting them into practice (Shehadeh et al., 2023).

The mediator of the correlation between competitiveness and consumer understanding is technology adoption. Through the assistance of advanced technical applications, such as social listening tools, CRM software, and data analytics, SMEs will be able to convert unprocessed data on consumers into useful strategies. Using the case of technology, an SME collecting feedback regarding the customers would not be able to get valuable insights without the technology that is able to analyze the collected data properly. Studies indicate that firms that utilize the application of technology in customer data analysis end up designing and developing their product, which leads to their competitiveness. According to this, technology is also used as a linkage between real competitive advantages and customer knowledge (Zhou et al., 2024).

Moreover, the mediating role played by technology adoption may vary depending on the industry and environment. The immediate skills of an SME to evaluate customer information fast and efficiently may be essential in maintaining competitive advantage in rapidly changing markets (Kozinets et al., 2021). An example is that by applying real-time analytics technologies, SMEs can respond quickly to the evolving demand in industries such as technology and retail, where customers can change their tastes and preferences at a very high rate. Since the SME will be able to position itself as a responsive and customer-oriented company, this flexibility will not only help retain its existing clients but also attract new ones (Prados-Castillo et al., 2023; Farida and Setiawan, 2022).

It is, however, necessary to note that the relationship is not only linear. In comparison to the use of technology, the use of initial insights may generate a competitive advantage even without the use of technology, especially in less dynamic industries. As an example, an SME can develop a form of direct customer contact to gain information that guides their products, and they gain a competitive advantage without the use of advanced technology. This implies that, although technology is a highly important enabler, the underlying importance of consumer insights on the development of competitive strategies cannot be overlooked (Horng et al., 2022).

Still, much of the literature is talking about the combination of consumer insights, the embrace of a new technology, and the long-term competitive advantage. According to Arsawan et al. (2022), one should understand what customers desire so that strategic decisions could be made. According to Shehadeh et al. (2023), technology is significant in the utilization of this

Journal of Science and Inclusive Development Vol. 8, No. 1, DOI:10.20372/jsid/2026-398

information. According to Zhou et al. (2024), technology transforms raw data into a format that can be employed as tactics. Instead, as Horng et al. (2022) note, simple consumer intelligence can also give companies an advantage over their competitors without the aid of technology, in particular, in stable markets. This demonstrates the complexity of this connection.

H4: Technology adoption mediates the association among consumer insight and competitive advantage

Conceptual Framework

Based on empirical literature, the following conceptual framework (Figure 1) below was developed.

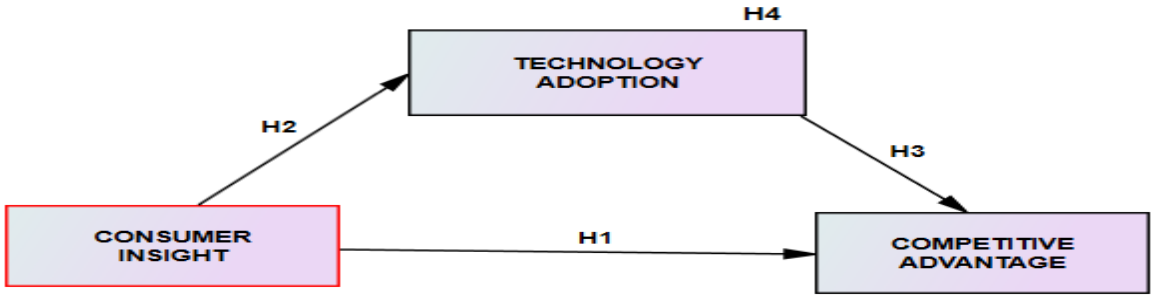

Figure 1 conceptual framework

Methods and materials

Sampling technique

This investigation was conducted in the Sidama National Regional State of Ethiopia, which is 283 km from Addis Abeba, Ethiopia. There are 950 SMEs in the Sidama National Regional State based on the evidence from SNRSEDO (2023). Thus, the target population of this investigation included 950 managers of SMEs. To determine the sample size of manufacturing SMEs in the present investigation, Yamane's (1967) formula was used. It helps figure out how many people need to answer a survey to get valid findings from a bigger group of people, taking into account a certain margin of error and confidence level. By giving a stratified technique to figure out how big a sample should be, it makes sure that the sample correctly reflects the population. This makes the study's results more legitimate as well as the insights easier to generalize.

$n = N/1+N(e)^2$ $n = 950/1+950(0.05)^2 \cong 282$

Where: n = sample size, N= population size= 950, e^2= margin of error at 5%

Stratified sampling was utilized to determine the number of participants chosen from each sector, with a sampling percentage of 0.3, i.e., as indicated in table 1 below, the fraction of the sample is equal to the actual sample size divided by the total population: 282/950. Stratification makes sure that the sample includes people from all parts of the population, which makes the research more reliable. Researchers can get the distinctive traits as well as information of each sector by splitting the population into separate strata depending on industry. This method reduces sample bias and makes estimates more precise, which means that the results are representative of the whole population. In the end, it makes the study results stronger.

Table 1. Sample size determination by stratified sampling

Sector	Number of firms	Sample fraction	Stratified sample	Proportions
Building ,ceramics and construction	89	0.3	26	9.4%
Textile and garment	216	0.3	64	22.7%
Wood, furniture and metal work	418	0.3	125	44%
Leather and footwear	21	0.3	6	2.2%
Agro processing, Food and Beverages	156	0.3	46	16.4%
Chemical	24	0.3	7	2.5%
Mining and handcraft	12	0.3	4	1.3%
Soap and detergent	8	0.3	2	0.84%
Pharmaceutical and Medical Equipment	6	0.3	2	0.63%
Total	950		=282	100%
Sample size	282			
Sample fraction	≅0.3			

Data collection method

Quantitative data was collected using a structured questionnaire given out to SMEs, focusing on their use of consumer insights, technology adoption levels, and perceived competitive advantages. The questionnaire included Likert-scale-type questions starting from "strongly disagree" to "strongly agree" (4 items) for quantifiable analysis.

Journal of Science and Inclusive Development Vol. 8, No. 1, DOI:10.20372/jsid/2026-398

Methods of data analysis

After development of the scales' structure of factors as well as dependability, the postulated association among the constructs was evaluated by SEM. The assessment of effects among the constructs was made possible by the use of AMOS software in the SEM analysis. The suggested model's goodness of fit was assessed using the model fit indices, which included the Root Mean Square Error of Approximation (RMSEA), Comparative Fit Index (CFI), and Chi-square statistic. A well-fitting model would validate the study framework by showing that the data supports the hypothesized relationships (Maydeu-Olivares et al., 2024).

Results

Data adequacy test

Table 2 demonstrates an overview of two key statistical examinations for determining how well the evidence qualifies for factor examination: the Bartlett's Test of Sphericity and the Kaiser-Meyer-Olkin (KMO) measure of the adequateness of the sampling. The resulting KMO value of 0.850 is regarded as excellent. For factor analysis, a KMO value greater than 0.6 is usually considered acceptable; values nearer 1 denote a better level of sampling adequacy as indicated by Table 2. This implies that the survey's items were likely to cluster together; supporting the use of component evaluation, as well as that the sample size was adequate for the study.

Table 2. KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.850
	Approx. Chi-Square	1418.740
	Df	88
	Sig.	0.003

Bartlett's Test of Sphericity provides additional evidence that the data is suitable for factor analysis. The test yielded an estimated Chi-Square value of 1418.740 with 88 degrees of freedom and a significance level (Sig.) of 0.003. The significant result ($p < 0.05$) indicates that sufficient interactions among the data points in the dataset are necessary for factor analysis to be effective. This finding implies that the data points are related and suitable for factoring.

The sum of the variances establishing three distinct fundamental principal constructions is the overall variance recognized in Table 3. The ratio of the primary component's discrepancy to the overall variability is similar to the 51.120% percentage of discrepancy captured by a large ingredient. The sum of the major variances is divided by the overall deviation. The total amount of variation that could be explained by each of the three main portions was represented by the Eigenvalues. Although it might be either positive or negative conceptually, they always take encouraging variation into account in behavior. Since the sum of the Eigen-worths identified three key components, the combined adjustment was consequent.

Table 3. Total variance explained

Component	Initial Eigenvalues			Extraction sums of squared loadings			Rotation sums of squared loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.520	32.240	32.235	4.520	32.240	32.235	3.00	21.4523	21.4523
2	1.39	9.790	42.025	1.39	9.790	42.025	2.17	15.493	36.944
3	1.29	9.091	51.120	1.29	9.091	51.120	1.98	14.168	51.120
4	0.950	6.782	58.892						
5	0.872	6.223	65.115						
6	0.774	5.519	70.634						

Extraction method: Principal component analysis.

The factor loadings for several elements pertaining to consumer insight, technology adoption, and competitiveness are displayed in Table 4, which displays the findings of the factor analysis. The loadings show how strongly each item and its accompanying factor are related. The largest loadings are notably shown for components CA3 (0.818) and CA1 (0.789), indicating that they are most closely linked to competitive advantage. In the consumer insight category, CI2 (0.766) is notable, although TA1 (0.723) has a large loading for technology adoption. The relevance and efficacy of each item in assessing the corresponding constructs are confirmed by their satisfying loadings over the standard cutoff of 0.60. The significance of these elements in comprehending competitive dynamics is shown by this analysis.

Journal of Science and Inclusive Development Vol. 8, No. 1, DOI:10.20372/jsid/2026-398

Table 4. Factor analysis using factor loadings

Items	Factor loadings
CI1	0.686
CI2	0.766
CI3	0.669
TA1	0.723
TA2	0.672
TA3	0.702
CA1	0.789
CA2	0.675
CA3	0.818

Enquiry for factor confirmatory

A statistical procedure known as confirmatory factor analysis (CFA) is applied to see whether or not a set of observed variables is an accurate representation of the number of underlying latent components (which are postulated). It provides the researcher with the understanding of the data organization, as it allows him to either confirm or refute the hypotheses that have been made about the relationships between the variables under consideration and the factors related to them (Groskurth et al., 2024). Evaluating the goodness-of-fit of the proposed model, as well as the acquired data, CFA is used to validate the ideas of the theory and make sure that the measured model may be used in the context of the investigation. All coefficient values in Figure 2, which presents CFA, are lower, implying that there was no multicollinearity across the two structures. What is more, all the factor loadings of figure 2 in the aspect are above the acceptable limit of 0.5.

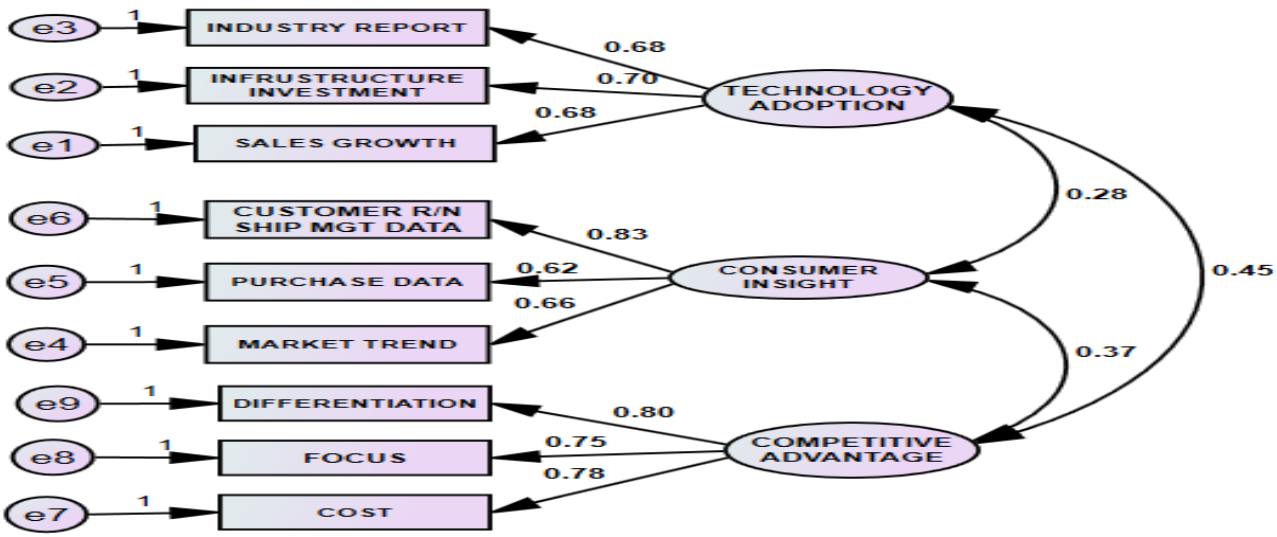

Figure 2. Confirmatory factor analyses

Table 5 presents the covariance amongst the key constructs investigated in the study: technology adoption, consumer insight, and competitive advantage. The covariance estimates, with their standard errors and critical ratios, as well as significance levels, provide a comprehensive overview of the relationships between these constructs.

Table 5. Covariance the key constructs

Covariance			Approximation	S.E.	C.R.	*P*	Hy.
Technology adoption	<-->	Consumer insight	0.246	0.026	9.461	***	H2
Technology adoption	<-->	Competitive advantage	0.305	0.037	8.243	***	H3
Consumer insight	<-->	Competitive advantage	0.260	0.031	8.387	***	H1

The correlation between the consumer insight and technology adoption is 0.246 with an S.E. of 0.026 with a C.R. of 9.461, according to the analysis. This fact supports Hypothesis 2 (H2), which suggests that the level of customer understanding in the company increases with the implementation of technology. This connection highlights the importance of technology in easing the process of collecting and examining consumer information, which in turn elevates the awareness of the organization of the needs along with the preferences of its clients.

Journal of Science and Inclusive Development Vol. 8, No. 1, DOI:10.20372/jsid/2026-398

On the same note, competitiveness and adoption of technology interrelate with each other with a 0.037 S.E., and competitiveness with a 0.305 interrelation. In addition, the vital ratio of 8.243 demonstrates a very important positive correlation. This is reliable with Hypothesis 3 (H3), which shows that the greater the competitive advantage, the greater the adoption of technology. This study highlights the significance of technology in assisting SMEs to take lessons and streamline the processes to enhance their standing on the market.

According to the paper, the interrelation among competitiveness as well as consumer insight is 0.260, with an S.E. of 0.031. Hypothesis 1 (H1) is backed by the C.R. of 8.387, which shows that this link is likewise extremely significant. This implies that gaining a competitive edge is closely correlated with a deeper comprehension of customer insights.

Validation

According to Table 6's validation results, discriminant legitimacy was maintained as the AVE square root is higher than linked comparable correlation outcomes, and convergence validity was attained since the AVE for a company's performance surpasses 0.50. Additionally, when the AVE for customer orientation is higher than 0.50, convergence validity is achieved. The table also presents key reliability as well as validity issues for the constructs of adoption of technology and insight of consumer, as well as competitiveness. The Composite Reliability (CR) value for CI (0.726), TA (0.758), and SCA (0.790) reveals acceptable internal consistency, as results more than 0.7 are generally considered reliable. AVE values indicated that the variables explain a significant proportion of variance, with CI (0.637) and TA (0.656) exceeding the 0.5 acceptable level, while SCA (0.600) is close. The MSV outcome indicates discriminant validity, with MSV lower than AVE for all constructs. These results collectively affirm the constructs' robustness for further analyses, enhancing confidence in their measurement reliability as well as validity.

Table 6. Validity concern

	CR	AVE	MSV	MaxR(H)	CI	TA	SCA
CI	0.726	0.637	0.225	0.848	0.650		
TA	0.7587	0.656	0.134	0.765	0.172	0.661	
CA	0.790	0.600	0.273	0.796	0.382	0.191	0.683

Note: CI = Consumer insight; TA = Technology adoption; SCA = Competitive advantage

Structural equation model

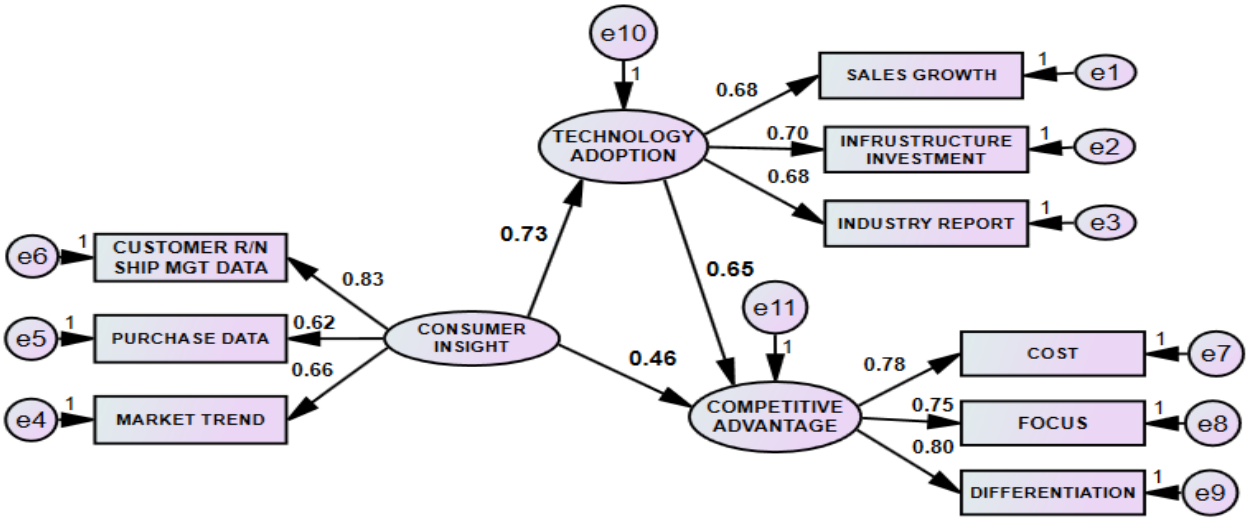

Figure 3. SEM model

Indices for model fit analysis

The chi-square value of 1.962 with a 0.06 value indicates that the model of fits is statistically significant in Table 7. This implies that the information we observed is very similar to what we expected the model to depict. A significance of above 0.05 is typically interpreted as the model being a good fit in structural equation modeling (SEM). This finding demonstrates that the model is capable of reflecting concealed associations. Still, it demonstrates that the assumptions of the model should be considered more closely and that possibly some adjustments should be made to make it more realistic and efficient in demonstrating the way the data evolves.

Table 7: Indices for model fit

Sig.	Chi-Sq	RMR	Fitness Goodness	Fitness Confirmatory	TLI	RMSEA
0.06	1.96	0.04	0.936	0.91	0.912	0.03

RMR = 0.040; the model fits quite well, as lower values imply that the model works well. These indices, along with the TLI value of 0.912 and a Root Mean Square Error of Approximation of 0.031, suggest that the model is successful in explaining a significant amount of data variability, although the chi-square value is not very good. The TLI and RMSEA are not atypical, as they demonstrate that despite the fact that this model may require some adjustments, it can still assist us with the way the variables are interdependent.

Regression examination analysis

Journal of Science and Inclusive Development Vol. 8, No. 1, DOI:10.20372/jsid/2026-398

Table 8 provides the results of the assessment of regression, showing how consumer understanding, technological adoption, and sustainable competitiveness relate to each other. The path coefficient between consumer insight and technology adoption is 0.865, and this suggests that the role of consumer insight is considerable in terms of technology adoption. This means that better companies that use the information of their customers are more likely to adopt the latest technologies that can benefit them. This demonstrates the need-to-know what customers desire so that they can spur technological advancements. The critical ratio (C.R.) of 7.585 and ($p < 0.001$) indicate that this relationship is high.

Table 8. Evaluation of regression

Relative			Approx.	S.E.	C.R.	P	Ass.
Technology adoption	<---	Consumer insight	0.865	0.145	7.585	0.000	H2
Competitive advantage	<---	Technology adoption	0.329	0.133	2.856	0.000	H3
Competitive advantage	<---	Consumer insight	0.958	0.194	7.962	0.000	H1

The investigation also finds that the use of new technology has a significant impact on the competitiveness of a company in the long term, and the path coefficient is 0.329. It shows that its effect is low and positive, which implies that the use of technology could contribute to reinforcing organizational competitiveness. The findings of the investigation are further supported by the C.R. of 2.856, which proves that small and middle-sized businesses can shine particularly in the market when innovative technology is employed. This association illustrates the critical role it is that SMEs incorporate the use of technology in the course of their daily operations in order to remain competitive.

Finally, customer knowledge includes a direct and significant impact on the long-lasting competitive advantage with a path coefficient of 0.958. This C.R. of 7.962 and this high value indicate that understanding the desire of the customer is a significant aspect in realizing a continued competitive advantage. This outcome just illustrates how crucial it is that SMEs should be keen on what is demanded by their customers. These understandings could not only be helpful to them as they implement emerging technologies, but they would also provide them with an immediate advantage over their rivals, and this may result in a long-term presence within the competitive environment.

Mediating role analysis

Table 9 highlights mediation of the association between consumer understanding and competitive advantage through the mediation of technological adoption. Dissipation of the connections between these dimensions and to what extent technology adoption serves in the greater scheme necessitates this examination. The value of 0.46 indicates that there is a direct correlation between the intelligence of consumers and competitiveness. This implies that as the customer understanding increases, competitive advantage is obtained, which means that a significant positive effect is achieved.

Table 9. Mediation evaluation

	Influence	Worth	Path Influence
Consumer insight → Competitive advantage	Direct Influence	0.46	Direct influence stated
Consumer insight → Technology adoption → Competitive advantage	Indirect Influence	0.73*0.65 = 0.47	Indirect Influence Ensued
	Whole influence	0.93	Partial mediation

Conversely, the role of consumer insight on competitive advantage indirectly by adopting technology is also brought out in the table. The value of this pathway is 0.47. This observation implies that the mediating effect of technological adoption facilitates the influence of consumer understanding on competitiveness. The presence of this indirect influence highlights the importance of technology as a tool for transforming knowledge into competitive benefits.

The sum total, or the aggregate effect, of consumer insight on competitive advantage is 0.93. The reason why this is high is that the competitive advantage is highly influenced by the customer intelligence, not only directly but also indirectly through technology. The term "partial mediation" implies that even though consumer intelligence still plays a major direct role in the competitiveness, the use of technology also plays a major role in this relationship.

The mediation study indicates that the use of technology is extremely significant in acquiring customer perspectives and sustainable competitive advantage, yet it could possess some issues. One of the concerns is known as reverse causation, in which case a sustained competitive advantage may influence the way people perceive it rather than the other way round. The linkages may also be influenced by outside variables such as market changes or competition. It is

Journal of Science and Inclusive Development Vol. 8, No. 1, DOI:10.20372/jsid/2026-398

important to consider these alternative possibilities so as to ensure that the results are robust in addition to avoiding the risk of reaching overgeneralized conclusions in the course of inquiry. It means that more research has to be conducted in this area.

Discussion

The current research results are of great assistance in shedding light on the relationship between competitive advantage, technology adoption, and consumer understanding, and highlighting the interaction between these elements and their influence on each other. The high value given to the knowledge of their consumers makes organizations more successful in adopting new technologies, as a substantial positive association between consumer insight and technology adoption is also displayed. This is an indication of the importance of consumer insights in shaping strategic decisions because they aid businesses in identifying and applying solutions that can have a greater likelihood of suitability to the needs and wants of the target customers.

Moreover, the research indicates that the relationship between customer understanding and competitive advantage is largely mediated by the technological adoption. The fact that merely having the insights is not enough, that these insights must be utilized by the organization to land on technologies that enhance their competitive positioning, also has strong support from the significant indirect impact the consumer insight has on competitive advantage in terms of implementing technologies. This finding upholds the notion that the ability to translate consumer insights into technical solutions that can be implemented is a key to long-term competitive performance in the fast-changing market environment of the current time. Such results also resemble past investigation findings of Niguse and Kant (2025), Borji et al. (2025), Zhou et al. (2024) and Rua et al. (2022). The results of this study, however, were contrary to the results of Ijomah et al. (2024) because he discovered that competitive advantage that was moderated by consumer insights had no significance.

The argument that awareness of customer behavior and preferences are significant determinants of organizational performance is further reinforced by the direct influence of consumer insight on the competitive advantage. Companies that are able to gather and analyze customer data are likely to be distinguished from their competitors by adjusting their products and business strategies to fit the market more effectively. This straight line of reasoning supports the

importance of companies investing in customer research and data analytics, as the latter could be a major competitive edge.

The findings of the current research are an insight into how competitive advantage is related to the adoption of technologies and understanding among consumers, especially in terms of the Service-Dominant Logic (SDL) and Resource-Based View (RBV) theory. SDL claims that value is co-created through the interaction between businesses and customers, meaning that the companies that focus on the comprehension of the consumers are better at utilizing newer technologies that offer improvement at the connection. This high positive association between consumer insight and technology adoption in accordance with the RBV theory, which argues that resources and capabilities that are distinct can lead to competitiveness, shows the necessity of applying consumer insights as a strategic resource. When using consumer insights in decision-making processes, businesses are able to find and implement creative solutions that are more aligned with their market target requirements and preferences. This makes them stronger in the market and encourages long-term competitive success.

Ethiopian SMEs should put their money into cheap tech that lets them collect and evaluate data in real time. For instance, mobile CRM systems were constructed for the requirements of the market where they operate. To get the most out of cutting-edge technologies, staff members must be trained regarding the way to apply them. SMEs can additionally employ social media to get responses from customers, which lets them swiftly modify the products and services they provide. Regularly planned workshops along with focus discussions may also help you comprehend more fully what consumers want, making sure that you use the information you get to make decisions. SMEs may become increasingly competitive and responsive in a market that is changing quickly by encouraging a culture that values making decisions based on information gathered.

Also, forming associations with local digital service providers may help medium-sized and small companies get novel offerings that are made only for Ethiopian customers. Working with colleges and academic centers may help you get an improved understanding of how consumers behave as well as what trends are happening in the marketplace. Putting together teams with people from marketing, technology, and product development will make sure that ideas are shared throughout the firm and not maintained in one area. This all-encompassing strategy will

Journal of Science and Inclusive Development Vol. 8, No. 1, DOI:10.20372/jsid/2026-398

not only make products better, but it will also get customers more involved, which ultimately results in more loyalty and a long-term edge over other businesses.

The current study adds to the already existing information since it explains the complex connections between consumer awareness, technology use, and competitive advantage by the use of theoretical perspectives in the field of marketing and strategic management. The results prove the fact that consumer insights are key driving forces of the technical innovation and competitive success rather than the supporters of information. This research adds to the existing knowledge regarding the power of corporations to convert the consumer learning to realistic strategies that make them competitive, focusing on the mediating influence of technology adoption.

The paper will also inspire a reassessment of the paradigms of the past, which in most instances consider these aspects separately. Rather, it promotes a holistic perspective in which the interplay between the organizational strategy, technical gains, and customer behavior are considered to be dynamic. The conceptualization can inform future studies, which would take into account other variables and situations that might moderate such relationships and can render the discussion of strategic management and how they can be applied to practice to be better. In addition, such theoretical concepts as the RBV, addressing the issue of the heterogeneity of resources to achieve a higher competitive advantage, Michael Porter's model of competitive advantage, and the Service-Dominant Logic (SDL), concerned with the establishment of customer contact-based value creation, are validated by the research.

Conclusion

The study highlights the significant role of consumer insight in shaping the complex associations between technology adoption and the competitiveness of SMEs. Findings indicate that consumer insight is among the most critical factors in embracing new technologies. Organizations that place high value on client knowledge are better positioned to leverage technological changes effectively. This connection underscores the importance of integrating consumer insights into strategic decision-making, particularly when selecting and adopting technologies that align with customer expectations. Furthermore, the study demonstrates that the correlation between customer understanding and competitiveness, mediated by technology adoption, is substantial. While consumer insight provides an immediate competitive advantage, its impact is amplified when businesses adopt relevant technologies. This partial mediation effect emphasizes the need

for a holistic approach in which firms not only gather consumer insights but also translate them into actionable technology strategies that enhance performance. To remain adaptive in dynamic markets and meet evolving customer demands, organizations should foster a culture that prioritizes consumer understanding and embraces the latest technological innovations. The study supports the assumption that in today's fast-paced business environment, a synergistic strategy—combining deep consumer knowledge with effective technological adaptation—is a key driver of competitive advantage. This research contributes to the theoretical paradigms of marketing and strategic management by clarifying the intricate relationship between consumer awareness, technology adoption, and sustained competitive advantage. It argues that customer insights are not merely inputs for technological innovation and competitive success but are influential in shaping both. The findings encourage management to adopt an integrated approach that considers the dynamic interplay of organizational strategy, technological advancement, and consumer behavior, with technology serving as a mediating factor. The reinforcement of the Resource-Based View and Service-Dominant Logic frameworks represents a unique contribution, offering practical guidance on how firms can strategically leverage customer knowledge and technology in highly competitive markets. Future research should explore specific types of technologies that enable the integration of customer data into corporate strategies to maximize returns. Identifying the platforms and products that deliver the greatest benefits will help organizations focus their investments more effectively. Longitudinal studies could further examine how these linkages evolve over time, given the rapid pace of technological development and shifting consumer habits. Additionally, inter-industry comparisons would provide valuable insights into sector-specific challenges and best practices in utilizing technology and customer data

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Availability of data

The information needed to conduct the current study is available and provided on a reasonable request.

Competing interest

We confirm that there exists no competing interest.

Journal of Science and Inclusive Development Vol. 8, No. 1, DOI:10.20372/jsid/2026-398

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