

ENTREPRENEURSHIP 5.0 ORIENTED STRATEGIES FOR SUSTAINABLE COMPETITIVE ADVANTAGE

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ABSTRACT

This study examines the influence of Entrepreneurship 5.0 oriented strategies on sustainable competitive advantage. The research focuses on digital technology integration, collaborative innovation and ecosystem engagement, and human-centric entrepreneurial orientation. Data were collected from 64 enterprise managers using a structured survey with a seven-point Likert scale. The analysis includes descriptive statistics, correlation analysis, and linear regression. The results show positive and statistically significant relationships between all independent variables and sustainable competitive advantage. Human-centric entrepreneurial orientation shows the strongest effect, followed by digital technology integration and collaborative innovation. The model explains a substantial portion of variance in the dependent variable, which confirms its explanatory strength. The findings indicate that enterprises that combine technological adoption, external collaboration, and internal orientation toward employees achieve more stable competitive outcomes. The study contributes to the understanding of Entrepreneurship 5.0 and offers a basis for further research and practical application in modern business environments.

Key words: Entrepreneurship 5.0, Sustainable competitive advantage, Collaborative innovation, Ecosystem engagement.

INTRODUCTION

Modern business environments are characterized by complexity, uncertainty, and continuous change. Enterprises adjust strategies to maintain competitiveness over longer periods. The concept of sustainable competitive advantage has gained importance, since organizations focus on long-term positioning in addition to short-term performance (Abbasi Kamardi et al., 2025; Hossain et al., 2022;). Traditional approaches to competitiveness are often insufficient because they neglect the integration of technological and human-oriented elements. New frameworks combine digital transformation with broader organizational and societal considerations. Entrepreneurship 5.0 represents such a framework. It integrates digital technologies, collaboration, and human-centered values into entrepreneurial practice (Putra et al., 2024). This approach emphasizes alignment between technological development

and human needs, as well as cooperation within innovation ecosystems. Enterprises integrate digital technologies, engage in collaborative innovation, and develop orientations that consider employees and stakeholders. Digital technology integration improves processes, decision making, and communication (Huang et al., 2025). Collaborative innovation and ecosystem engagement enable access to external knowledge and support value co-creation (Abazi-Alili et al., 2024; Abbate et al., 2022). Human-centric entrepreneurial orientation focuses on employee well-being, creativity, and organizational culture, which supports adaptability and long-term outcomes (Irawan et al., 2023).

This study investigates the relationships between digital technology integration, collaborative innovation and ecosystem engagement, and human-centric entrepreneurial orientation. Through empirical analysis, the research explores how these factors influence sustainable competitive advantage. This research contributes to the understanding of how Entrepreneurship 5.0 approaches can be implemented for long-term competitiveness in the turbulent modern business environment.

THEORETICAL BACKGROUND

The concept of sustainable competitive advantage is grounded in resource-based theory and dynamic capability perspectives. It refers to the ability of an enterprise to achieve and maintain superior performance relative to competitors over time. This outcome depends on the possession and effective use of resources that are valuable, rare, and difficult to imitate (Hossain et al., 2022; Iriani et al., 2024). Enterprises are not limited to static resource conditions, since changing environments require continuous adjustment of internal structures and strategies. Dynamic capabilities describe the capacity to integrate, reconfigure, and renew internal and external competences in line with market conditions (Alrub & Sánchez-Cañizares, 2025; Hsiao, 2024). These perspectives indicate that long-term competitiveness depends on both resource quality and the ability to adapt organizational processes and decisions. Digital technology integration has been widely examined as a determinant of firm performance and competitiveness. It includes the adoption and use of technologies such as data analytics, cloud computing, and digital communication systems. These technologies support more efficient information processing, coordination of activities, and data-based decision making (Shah et al., 2024; Huang et al., 2025). Organizations that integrate digital tools into their operations are able to improve process transparency and reduce operational inefficiencies. In addition, digital technologies enable new forms of value creation through improved customer interaction and service delivery (Su et al., 2022). However, the effects of digital integration are not uniform across firms. The benefits depend on the alignment between technological investments and existing organizational capabilities, including employee skills and managerial practices (Nasution et al., 2026). Without such alignment, digital tools may remain underutilized and fail to contribute to performance outcomes.

Collaborative innovation and ecosystem engagement are based on open innovation and network theory. Open innovation assumes that firms rely on both internal and external sources of knowledge to develop innovations (Nguyen et al., 2025). Ecosystem engagement extends this perspective by including a wider set of actors such as suppliers, customers, institutions, and strategic partners. Enterprises that actively participate in innovation networks gain access to diverse knowledge bases and complementary resources. This interaction supports joint problem solving and shared value creation across organizational boundaries (Abbate et al., 2022). Empirical findings indicate that firms engaged in collaborative innovation achieve improved innovation outputs and stronger competitive positions (Abazi-Alili et al., 2024). At the same time, effective collaboration requires coordination mechanisms, trust, and clear communication among participants. Human-centric entrepreneurial orientation is derived from entrepreneurship theory and organizational behavior research. It reflects a focus on people within the enterprise, including employees, managers, and stakeholders. This orientation includes support for creativity, openness to new ideas, and attention to employee well-being. It also involves responsible decision making and consideration of broader social outcomes. Organizations that develop such orientations create internal environments that support knowledge sharing and continuous improvement (Irawan et al., 2023). These conditions contribute to higher levels of employee motivation and adaptability. As a result, enterprises are better prepared to respond to changes and maintain stable performance over time.

The integration of digital technology, collaborative innovation, and human-centric orientation aligns with the broader framework of Entrepreneurship 5.0. This framework connects technological development with collaboration and human-centered values (Putra et al., 2024). It suggests that competitiveness emerges from the interaction of multiple elements rather than isolated practices. Digital capabilities provide the infrastructure for data-driven operations and communication. Collaborative networks expand access to knowledge and resources. Human-oriented practices support internal cohesion and adaptability. When these elements are aligned, enterprises are able to create more stable and sustainable competitive outcomes. Empirical evidence indicates that firms that combine digital capabilities with innovation and organizational alignment achieve higher levels of performance and long-term competitiveness (Van Hoang et al., 2025).

METHODOLOGY

The study was conducted to analyze the influence of digital technology integration, collaborative innovation and ecosystem engagement and human-centric entrepreneurial orientation on sustainable competitive advantage. A total of 64 respondents (enterprise managers) participated in the survey. The survey included seven-point Likert scale items, ranging from "strongly disagree" to "strongly agree". The data was collected via online survey, which was distributed via e-mail. Data analysis included descriptive statistics, correlation analysis and regression analysis.

Based on the analyzed literature and the research goals, the following hypotheses are noted:

- H1: Digital technology integration (DIT) has a statistically significant and positive effect on Sustainable competitive advantage (SCA).
- H2: Collaborative innovation and ecosystem engagement (CIE) has a statistically significant and positive effect on Sustainable competitive advantage (SCA).
- H3: Human-centric entrepreneurial orientation (HCE) has a statistically significant and positive effect on Sustainable competitive advantage (SCA).

RESULTS

The results of the descriptive statistics are presented in Table 1.

Table 1: Results of the descriptive statistics

Variable	Mean	Standard deviation	Cronbach's alpha
Sustainable competitive advantage (SCA)	5.32	1.14	0.875
Digital technology integration (DTI)	4.88	1.34	0.905
Collaborative innovation and ecosystem engagement (CIE)	5.44	1.24	0.865
Human-centric entrepreneurial orientation (HCE)	5.76	1.26	0.798

(Source: Authors)

The results of descriptive statistics presented in Table 1 indicate relatively high average values across all analyzed variables, which suggests that respondents generally perceive a strong presence of the observed constructs within their enterprises. Human-centric entrepreneurial orientation shows the highest mean value, followed by collaborative innovation and ecosystem engagement, and sustainable competitive advantage. Digital technology integration has a slightly lower mean, which may indicate uneven levels of adoption across enterprises. The values of standard deviation suggest moderate variability in responses, which points to differences in managerial perceptions. The reported Cronbach's alpha coefficients exceed acceptable thresholds for all variables, which confirms the internal consistency and reliability of the measurement scales used in the study. The results of the correlation analysis are presented in Table 2.

Table 2: Results of the correlation analysis

	SCA	DTI	CIE	HCE
Sustainable competitive advantage (SCA)	1.000			
Digital technology integration (DTI)	0.605	1.000		
Collaborative innovation and ecosystem engagement (CIE)	0.510	0.536	1.000	
Human-centric entrepreneurial orientation (HCE)	0.487	0.598	0.622	1.000

(Source: Authors)

The results of the correlation analysis presented in Table 2 indicate positive relationships among all analyzed variables. Sustainable competitive advantage is positively correlated with digital technology integration ($r = 0.605$), collaborative innovation and ecosystem engagement ($r = 0.510$), and human-centric entrepreneurial orientation ($r = 0.487$). The strongest relationship among independent variables is observed between collaborative innovation and human-centric entrepreneurial orientation ($r = 0.622$), followed by the relationship between human-centric orientation and digital technology integration ($r = 0.598$), and between collaborative innovation and digital technology integration ($r = 0.536$). These values indicate moderate positive associations, which suggest that higher levels of one construct are associated with higher levels of others. The correlation coefficients remain below commonly accepted thresholds, which indicates that multicollinearity is not present and supports the use of regression analysis. The results of the linear regression are presented in Table 3.

Table 3: Results of linear regression analysis

Dep. variable Y	Indep. variables X	β intercept: 1.856	p-value	R^2	F	F Sig.	MSE	RMSE	DW
SCA	DTI	0.414	<0.0001	0.642	187.704	<0.0001	0.187	0.389	1.865
	CIE	0.364	<0.0001						
	HCE	0.432	<0.0001						

(Source: Authors)

The results of the linear regression analysis presented in Table 3 indicate that all independent variables have a positive and statistically significant effect on sustainable competitive advantage. Digital technology integration shows a positive effect ($\beta = 0.414$, $p < 0.0001$), which indicates that higher levels of technology use are associated with higher levels of competitive advantage. Collaborative innovation and ecosystem engagement also show a positive effect ($\beta = 0.364$, $p < 0.0001$), which suggests that cooperation and external interaction contribute to improved outcomes. Human-centric entrepreneurial orientation has the strongest effect among the analyzed variables ($\beta = 0.432$, $p < 0.0001$), which indicates the importance of internal organizational orientation toward people. The overall model shows a coefficient of determination of $R^2 = 0.642$, which means that 64.2 percent of the variance in sustainable competitive advantage is explained by the included variables. The F-statistic ($F = 187.704$, $p < 0.0001$) confirms that the model is statistically significant. The values of MSE (0.187) and RMSE (0.389) indicate an acceptable level of prediction error. The Durbin–Watson statistic ($DW = 1.865$) suggests that there is no issue with autocorrelation in the residuals. These results support all proposed hypotheses and confirm that the selected variables contribute to explaining sustainable competitive advantage. Next, based on conducted research and the analyzed literature a theoretical model for improving sustainable competitive advantage in the context of Entrepreneurship 5.0.

The model is presented on Figure 1.

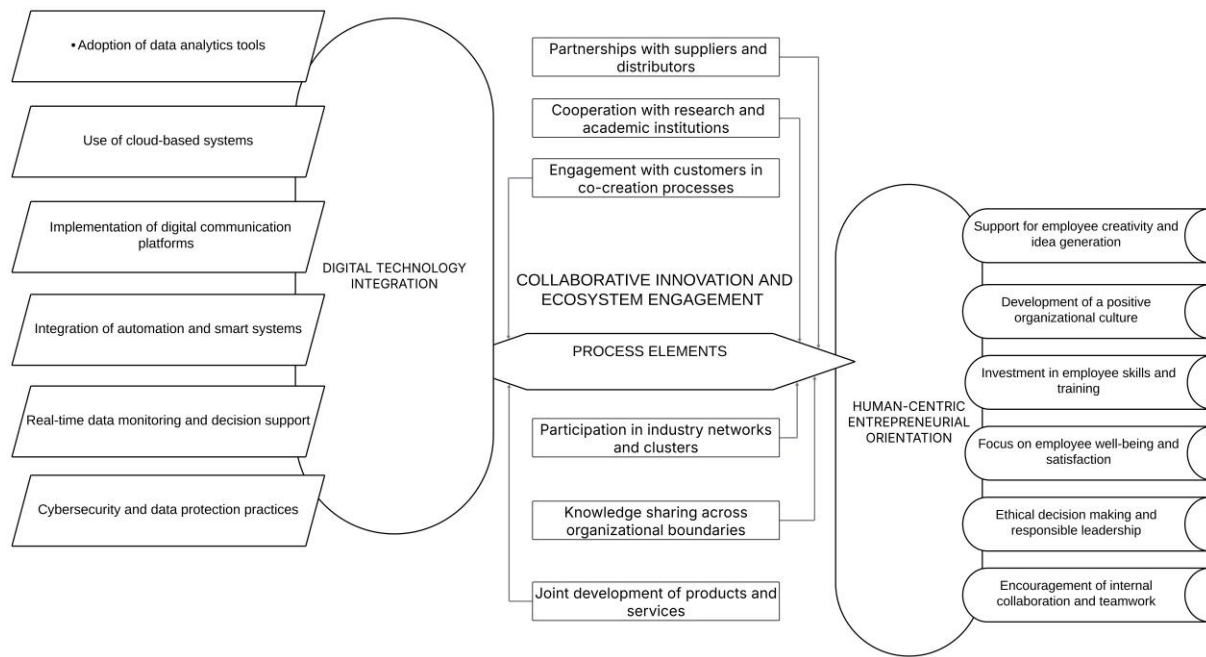


Figure 1: Model for improving sustainable competitive advantage

Digital technology integration includes sub-elements that support structured operations and data use. Adoption of data analytics tools enables better decision making based on available information. Use of cloud-based systems improves access to data and supports coordination across units. Implementation of digital communication platforms enables faster information exchange with internal and external actors. Integration of automation and smart systems improves process consistency and reduces manual work. Real-time data monitoring allows timely responses to changes. Cybersecurity and data protection ensure system reliability and data safety. Collaborative innovation and ecosystem engagement connect enterprises with external knowledge and resources. Partnerships with suppliers and distributors improve coordination in value chains. Cooperation with research and academic institutions provides access to new knowledge. Engagement with customers in co-creation aligns products and services with market needs. Participation in industry networks supports exchange of experiences and practices. Knowledge sharing across organizational boundaries improves problem solving. Joint development of products and services combines capabilities from different actors. Human-centric entrepreneurial orientation focuses on internal organizational conditions. Support for employee creativity encourages new ideas and improvements. Development of a positive organizational culture supports communication and stability. Investment in employee skills ensures readiness for technological and organizational changes. Focus on employee well-being increases engagement and retention. Ethical decision making supports trust and consistent behavior. Encouragement of teamwork improves coordination and knowledge use.

These elements are interconnected. Digital technology provides support for collaboration and internal processes. Collaborative innovation connects external inputs with internal capabilities. Human-centric orientation ensures that employees use technologies and participate in collaboration.

SUGGESTION AND GUIDELINES

Based on the analyzed literature and obtained results, the following suggestions and guidelines for improving sustainable competitive advantage in the context of Entrepreneurship 5.0:

- Enterprises can establish partnerships with external stakeholders such as suppliers, customers, and academic institutions. Such cooperation can lead to shared resources and improved innovation outcomes.

- Individuals within organizations can develop digital skills and adapt to new technologies through continuous learning. Employees can also contribute ideas that support process improvement and organizational development.
- Enterprises can create internal environments that support employee well-being and open communication. This approach can increase motivation and support knowledge sharing across teams.
- Governments can promote education programs that combine technical knowledge with entrepreneurial skills. These initiatives can prepare future workforce participants for complex business environments.
- Enterprises can implement structured training programs that improve employee competencies and adaptability. Regular evaluation of skills can ensure alignment with organizational needs.
- Enterprises can monitor performance through data-driven systems and adjust strategies based on measurable outcomes. Continuous assessment can support long-term stability and competitiveness.

CONCLUSION

The study examined the influence of digital technology integration, collaborative innovation and ecosystem engagement, and human-centric entrepreneurial orientation on sustainable competitive advantage. The results indicate that all analyzed variables have a positive and statistically significant effect on the dependent variable. The regression analysis confirms that the model explains a substantial share of variance in sustainable competitive advantage, which supports the selected research framework. The findings are consistent with theoretical assumptions that link technological, collaborative, and human-oriented factors with long-term competitiveness. The first hypothesis, which assumes a positive effect of digital technology integration on sustainable competitive advantage, is supported. The obtained coefficient indicates that enterprises that use digital technologies more extensively achieve higher levels of competitive outcomes. The second hypothesis, which refers to collaborative innovation and ecosystem engagement, is also supported. The results show that cooperation with external actors and participation in broader networks are associated with improved performance. The third hypothesis, which relates to human-centric entrepreneurial orientation, is supported as well. This variable shows the strongest effect, which indicates that internal organizational practices focused on people are strongly connected with sustainable outcomes. The obtained results suggest that sustainable competitive advantage depends on the combined influence of technological capabilities, external collaboration, and internal organizational orientation. Each of these elements contributes to performance, while their joint presence provides a more stable basis for long-term competitiveness. The proposed theoretical model offers a structured view of these relationships and can support both academic analysis and practical application in enterprise environments.

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