EG Estudios Gerenciales
Journal of Management and Economics for Iberoamerica

Research article

Channels, Applications, and Online Presence of Digital Marketing in the Success of Peruvian Digital Ventures

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Abstract
This study analyzes the influence of digital marketing on the success of digital ventures in Peru by integrating channels, applications, online presence, and business models into a causal model. Using a quantitative approach with a structural equation model applied to 388 entrepreneurs, digital marketing was found to have a positive impact on entrepreneurship (ß=0.5805, p< 0.001), channels (ß=0.7499, p<0.001), and applications (ß=0.4962, p<0.001). Similarly, entrepreneurship improves online presence (ß=0.5086, p<0.001) and promotes alternative business models (ß=0.2857, p<0.001). These results demonstrate the relevance of this topic by overcoming fragmented approaches, offering empirical evidence, and proposing strategies to strengthen the competitiveness, sustainability, and growth of digital ventures in the Peruvian context.

Keywords: market reach; digital business; online presence; business opportunity; media channels.

Canales, aplicaciones y presencia online del marketing digital en el éxito de las empresas digitales peruanas

Resumen
Este estudio analiza la influencia del marketing digital en el éxito de las empresas digitales en Perú mediante la integración de canales, aplicaciones, presencia en línea y modelos de negocio en un modelo causal. Utilizando un enfoque cuantitativo con un modelo de ecuaciones estructurales aplicado a 388 emprendedores, se encontró que el marketing digital tiene un impacto positivo en el emprendimiento (ß=0,5805, p< 0,001), los canales (ß=0,7499, p<0,001) y las aplicaciones (ß=0,4962, p<0,001). Del mismo modo, el emprendimiento mejora la presencia en línea (ß=0,5086, p<0,001) y promueve modelos de negocio alternativos (ß=0,2857, p<0,001). Estos resultados demuestran la relevancia de este tema al superar los enfoques fragmentados, ofrecer pruebas empíricas y proponer estrategias para fortalecer la competitividad, la sostenibilidad y el crecimiento de las empresas digitales en el contexto peruano.

Palabras clave: alcance del mercado; negocio digital; presencia en línea; oportunidad de negocio; canales de comunicación.

Canais, aplicações e presença online do marketing digital no sucesso das empresas digitais peruanas

Resumo
Este estudo analisa a influência do marketing digital no sucesso das empresas digitais no Peru através da integração de canais, aplicações, presença online e modelos de negócio num modelo causal. Utilizando uma abordagem quantitativa com um modelo de equações estruturais aplicado a 388 empreendedores, verificou-se que o marketing digital tem um impacto positivo no empreendedorismo (ß=0,5805, p< 0,001), nos canais (ß=0,7499, p<0,001) e as aplicações (ß=0,4962, p<0,001). Da mesma forma, o empreendedorismo melhora a presença online (ß=0,5086, p<0,001) e promove modelos de negócio alternativos (ß=0,2857, p<0,001). Esses resultados demonstram a relevância desse tema ao superar abordagens fragmentadas, oferecer evidências empíricas e propor estratégias para fortalecer a competitividade, a sustentabilidade e o crescimento das empresas digitais no contexto peruano.

Palavras-chave: alcance do mercado; negócio digital; presença online; oportunidade de negócio; canais de comunicação.

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JEL classification: M31; L26; M13.

How to cite: Calanchez, A.; Chieng, C. Ríos, M. A.; Córdova, J. W. & Zambrano, G. J. (2025). Channels, applications, and online presence of digital marketing in the success of Peruvian digital ventures. *Estudios Gerenciales, 41*(176), 275-289. https://doi.org/10.18046/j.estger.2025.176.7268

DOI: https://doi.org/10.18046/j.estger.2025.176.7268
Recieved: 05-02-2025
Accepted: 22-10-2025
Available onlibe: 19-12-2025

1. Introduction

In the contemporary digital era, the transformation of the entrepreneurial ecosystem has fundamentally redefined the way ventures are conceived and developed. Information and Communication Technologies (ICT) have emerged as essential catalysts for creating innovative entrepreneurial opportunities, particularly in the context of digital marketing. This evolution has generated a strategic imperative to investigate the adoption and impact of digital tools in Peruvian entrepreneurship.

The global landscape evidences a marked trend towards business digitization. In this regard, Satalkina and Steiner (2020) emphasize that digital transformation and the development of new business models are crucial elements in contemporary digital entrepreneurship. This observation is complemented by the findings of Paul et al. (2023), who document a significant transition from traditional business models to digital paradigms in both America and Europe.

Recent research has revealed significant patterns, such as that highlighted by Wang (2025), who emphasizes that digital marketing has revolutionized the supply of products and services, allowing for more precise segmentation and a significant reduction in operating costs. The Peruvian scenario particularly reveals data on the implementation of digital marketing strategies that have had a significant positive impact on sales. For example, a commercial company in Peru recorded an increase in sales from S/. 332,520.00 in 2020 to S/. 498,515.00 in 2021, thereby demonstrating the effectiveness of digital marketing (Cruzado Ymán et al., 2022). These findings are reinforced by Canaza Calsina et al. (2024), who stated that digital marketing strategies focused on customer acquisition, conversion, and content distribution significantly influence the positioning of companies, including universities.

On the other hand, the accessibility and effectiveness of digital platforms have been widely documented. Alcívar et al. (2022) highlighted the ease of implementation of promotional strategies on platforms such as WhatsApp, Instagram, and Facebook. However, Dąbrowska et al. (2024) identified significant challenges to building trust with customers in digital environments. Biclesanu et al. (2021) offer an interesting perspective by suggesting that digital ventures are perceived as less risky and more accessible than traditional businesses.

Masrianto et al. (2022) defined digital marketing capability as a business skill for planning and implementing successful digital ventures, and it has become a determining factor for business success. In the Peruvian context, the effective use of platforms such as Facebook, Instagram, and Google Ads represents a significant opportunity to boost local economic development through entrepreneurship and innovation.

However, a review of recent publications reveals a clear gap: there are abundant descriptions of which tools are used, how often, and how useful they are perceived to be, but there are almost no integrated causal models that connect, in a single framework, digital marketing capabilities and practices, channels and media, applications, forms of online presence, alternative digital business models, and entrepreneurial performance itself. Studies tend to separate the pieces: they measure, for example, network use, promotional reach, or perceived effectiveness, without estimating direct and indirect effects between constructs. Furthermore, frameworks for innovation diffusion, segmentation, consumer behavior, and social networks have rarely been explicitly articulated to explain how adoption translates into sustainable entrepreneurial outcomes.

In light of this, there is still a lack of a consistent operational definition of what we call "digital marketing applications" as a link between capabilities and business models; analyses that explain how channels and media condition the construction of presence (own sites, marketplaces, integrated networks) and, from there, the exploration of alternative schemes (freemium, affiliation, platform, subscription), and validations with structural equation models that allow us to observe within the same analytical framework the magnitude and significance of each relationship in the Peruvian entrepreneurial ecosystem.

This gap raises the question of the study, how and to what extent the different dimensions of digital marketing (channels and media, applications, and forms of online presence) influence the configuration of alternative digital business models and the strengthening of Peruvian digital entrepreneurship? The formulation is based on the logic of the selected theoretical frameworks: diffusion of innovations explains uneven adoption, segmentation supports adaptation to diverse audiences, consumer behavior provides an understanding of the value response, and social networks clarify how links expand reach and legitimacy.

This study aims to comprehensively examine the interrelationship between digital marketing and entrepreneurship in Peru, addressing critical aspects such as digital marketing applications, alternative digital business models, forms of online presence, and digital marketing channels. Consistent with this identified gap, eight specific objectives have been formulated that seek to determine the effect of digital marketing on digital entrepreneurship, analyze the influence on channels and media, assess the impact on their applications, examine the relationship with alternative digital business models, investigate their influence on forms of online presence, and assess the interrelationships between these various components.

Consequently, the relevance of this study lies in the fact that it demonstrates, with robust empirical evidence, how digital marketing is a determining factor in the success of digital ventures in Peru. By analyzing the relationships between channels, applications, and online presence, this study reveals the strategies that directly impact the consolidation and growth of Peruvian digital businesses. Furthermore, by combining the four frameworks into a single structural model, the study provides clarity on causal mechanisms and delivers quantified results that reduce the uncertainty generated by previous fragmented approaches. Thus, the results offer key and applicable information for both

entrepreneurs and public policymakers, enabling them to guide effective actions that strengthen the digital ecosystem and entrepreneurial competitiveness in the country.

2. Theoretical, conceptual and hypothetical review

2.1. Theories Related to the Topic

2.1.1. Diffusion of Innovation Theory (DOI)

The Diffusion of Innovations Theory (DOI) proposed by Everett Rogers explains how innovations are adopted and spread within a social system. This theory identifies five categories of adopters and factors that influence adoption (innovators, early adopters, early majority, late majority, and laggards) (Shahzad et al., 2023), which is useful for analyzing the implementation of digital marketing strategies in Peruvian startups (Mandl, 2019). Factors such as relative advantage, compatibility, and perceived complexity influence adoption (Miniesy et al., 2022), enabling the design of effective strategies to promote the growth of digital ventures (Modgil et al., 2022). This theory supports the following hypotheses by demonstrating how the characteristics of digital marketing innovations affect the performance of digital ventures.

1. *H_1. Digital marketing has a positive effect on digital entrepreneurship.*
2. *H_2. Digital marketing has a positive effect on digital marketing channels and the media.*
3. *H_3. Digital marketing has a positive effect on digital marketing applications.*

2.1.2. Market Segmentation Theory

Closely related to the DOI is the Market Segmentation Theory proposed by Wendell R. Smith, this theory posits that consumers have diverse needs and can be grouped into segments (Ma et al., 2023) based on demographic, geographic, and psychographic factors. Techniques such as clustering, conjoint analysis, and data mining are commonly used to analyze this data and identify specific segments (Camilleri, 2018). In the Peruvian context, this theory helps identify relevant segments and develop effective digital marketing strategies, allowing entrepreneurs to differentiate their offerings and create unique value propositions (Taylor, 2021). Market segmentation underpins the following hypotheses by enabling us to understand how different consumer segments respond to digital marketing strategies.

- *H_4. Digital entrepreneurship has a positive effect on alternative digital business models.*
- *H_5. Digital entrepreneurship has a positive effect on the forms of online presence.*

2.1.3. Theory of Consumer Behavior

Complementing the above theories, the Consumer Behavior Theory, developed by Philip Kotler, seeks to understand how consumers make purchasing decisions (Kotler & Armstrong, 2021). This theory provides a comprehensive framework for understanding the complex interaction between internal factors (psychological, personal, emotional) and external factors (economic environment, social influences, cultural trends, marketing stimuli) that influence consumer behavior and decisions (Shafik, 2024). In the field of digital marketing, it is essential for developing effective segmentation and personalization strategies (Winchester et al., 2014). It also helps Peruvian digital startups to understand consumer needs and preferences in the digital environment (Mafimisebi & Ogunsade, 2022). This theory underpins the hypotheses set out below by providing a framework for analyzing how consumer decisions impact the success of digital marketing strategies.

- *H_6. Digital marketing channels and the media have a positive effect on the forms of online presence.*
- *H_7. Digital marketing applications have a positive effect on alternative digital business models.*

2.1.4. Social Network Theory

Finally, Social Network Theory, proposed by Mark Granovetter, focuses on how social ties affect behavior. This theory highlights "the strength of weak ties" in disseminating information and opportunities (Granovetter et al., 2019) and, in the context of digital marketing, explains how social media influences entrepreneurship by allowing information about products and services to spread quickly among different user groups (Pillai & Ahamat, 2018). Weak connections are particularly valuable for spreading marketing messages and expanding the customer base, which is essential for the success of digital ventures in their various business models. (Chuang et al., 2022) This theory supports the hypotheses by illustrating how online social interactions can enhance the impact of digital marketing strategies on startups.

- *H_8. Digital marketing applications have a positive effect on digital entrepreneurship.*

2.2. Conceptual Approach

2.2.1. Marketing Digital

Marketing studies consumers and competitors in a market, covering multiple aspects such as product, price, distribution, and advertising (Kotler & Armstrong, 2021). In contrast, digital marketing is defined as a set of activities

that allows products and services to be advertised on digital Internet channels, reaching consumers at the right time according to their needs (Masrianto et al., 2022). The Setkute & Dibb (2022) digital marketing is defined as a variety of techniques that use digital channels to achieve objectives, including websites, search marketing, digital advertising, social media, email, and mobile devices. These practices not only help build and maintain customer relationships in a digital environment but have also become an effective tool for developing new businesses.

In this way, digital marketing applications allow real-time data collection from potential customers and the creation of effective interactions. As a result, digital ventures can build brand awareness, position themselves as market leaders, and place their business ideas at the forefront through various media (Martín, 2019). On the one hand, digital business models seek a logical design through which a company plans to advance toward its objectives and access its customers. In this context, it is important to determine whether an offering attracts consumers (B2C) or other companies (B2B) (Taherdoost, 2023). On the other hand, forms of online presence include online advertising and search engine optimization (SEO) (Singh et al., 2025) and content marketing (Calanchez Urribarri et al., 2025). Hence, according to Zwakala & Church (2025), the adoption of technology to develop a digital marketing strategy is vital to a brand's competitiveness.

Therefore, digital ventures use e-commerce sites for transactions and to build customer relationships. Consequently, implementing digital marketing channels is essential for companies to create opportunities for interaction with their brands and products (Martín, 2019). This is achieved through the use of digital devices, platforms, media, data, and technologies, enabling the development of different types of digital marketing such as search engine marketing, online public relations, display advertising, email marketing, and social media marketing (Taherdoost, 2023).

2.2.2. Digital Entrepreneurship

Entrepreneurship refers to the process of identifying a business opportunity, developing an action plan to take advantage of it, assuming business risk, and organizing the necessary resources to turn the idea into a successful reality (Fayena et al., 2020). Meanwhile, digital entrepreneurship is a recent phenomenon that has emerged thanks to various factors, including technological innovation (Redondo-Rodríguez et al., 2023). Digital entrepreneurship is defined as the reconciliation of traditional entrepreneurship with the new way of creating and doing business in the digital age (Le Dinh et al., 2018). According to authors such as Peter Drucker, Steve Blank, Daniel Isenberg, Eric Ries, and The Lean Startup, entrepreneurship requires skills in problem solving, decision making, market exploitation, time and resource management, and team building. These aspects must be combined to create and maintain a profitable business (Quispe Fernandez et al., 2022).

On the other hand, digital entrepreneurship encompasses all startups and the transformation of existing businesses by creating and using novel digital technologies. In this way, innovative solutions can be created that meet the needs of the market (Bican & Brem, 2020). Thus, digital entrepreneurship arises due to technological assets such as information technologies.

According to Mishra & Mukherjee (2024), digital entrepreneurship refers to the sale of digital goods or services through automated networks. This means that digital entrepreneurs can leverage technological tools to reach their target audience effectively.

Chu & Li (2022) define the digital ecosystem as a distributed system of open technologies consisting of digital technologies and devices based on the needs of online users. They use digital technologies to create, distribute, connect, and deliver products and services digitally. In this way, digital entrepreneurs can take advantage of the opportunities offered by the digital ecosystem to develop innovative solutions and reach their target audience (Zheng et al., 2024).

Digital marketing offers digital ventures the opportunity to reach a large number of people more economically and efficiently, saving them time and money. At the same time, it offers them the opportunity to interact with their users, understand their needs, and receive feedback that will help them improve their products and services (Zwakala & Church, 2025). Digital marketing has become a powerful tool for digital entrepreneurs who want to achieve success in the business world (Zheng et al., 2024).

Technological innovation in infrastructure has given rise to digital entrepreneurship, offering numerous possibilities for entrepreneurs (Bican & Brem, 2020). The creation of new digital business models deserves careful consideration by society, especially in terms of the opportunities, obstacles, and key elements for the success of digital ventures.

Figure 1 is presented below, illustrating the conceptual hypothetical model of the study:

3. Methodology

3.1 Research Type and Design

This research was classified as basic-explanatory research, characterized by analyzing the effects and causal relationships between organizational variables (Arias, 2023). This approach allowed for an in-depth examination and understanding of the interrelationship between digital marketing and entrepreneurship in Peru, addressing aspects such as digital marketing applications, alternative digital business models, forms of online presence, and digital marketing channels, thus contributing to the knowledge base in this field (Arias Gonzáles & Covinos Gallardo, 2021).

As for the approach, a quantitative methodology was chosen, which is distinguished by the collection of numerical data and its subsequent statistical analysis. This approach is justified by its ability to establish causal relationships and test hypotheses objectively (Hernández & Mendoza, 2018).

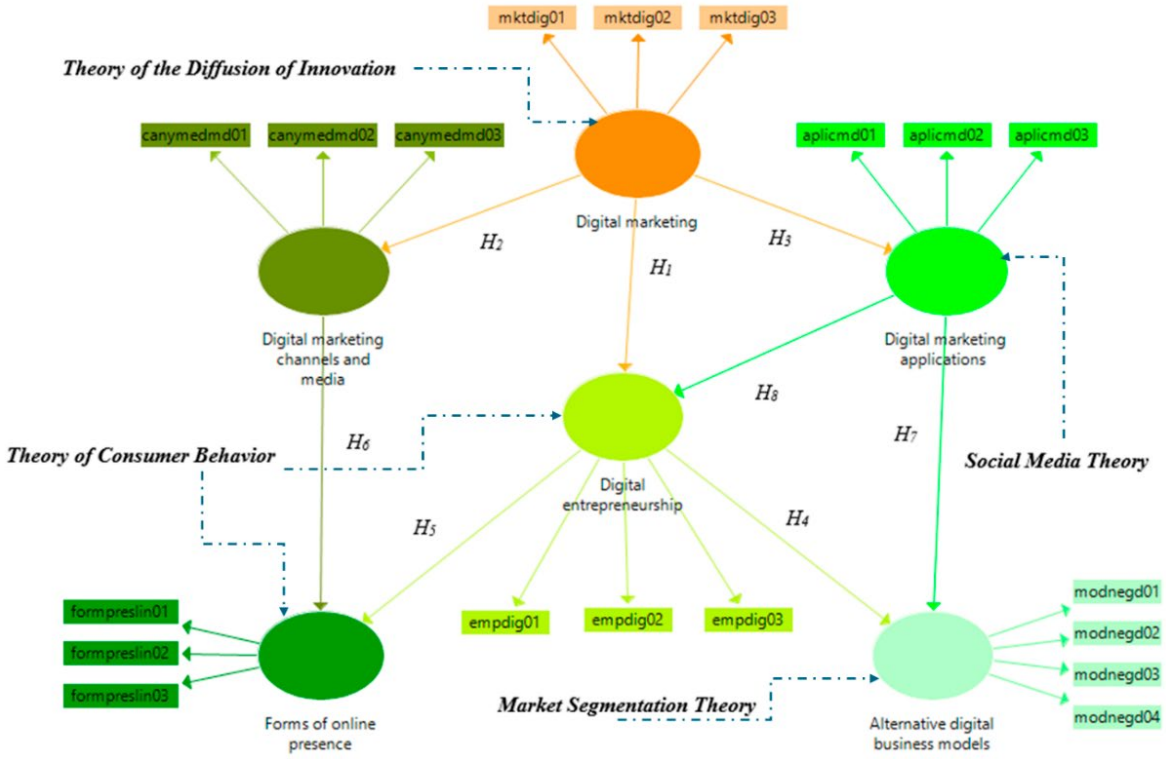


Figure 1. Hypothetical model
Source: own elaboration.

The method used was a survey with a quantitative approach in data collection (Ortiz Ocaña, 2015).

The research design was descriptive-correlational causal and non-experimental cross-sectional. The descriptive-correlational part allowed not only to characterize the phenomenon but also to establish causal relationships between digital marketing and entrepreneurship variables (Kaur, 2019). The non-experimental nature of the design meant that variables were not deliberately manipulated, but rather phenomena were observed in their natural context (Arias Gonzáles & Covinos Gallardo, 2021). Furthermore, as this was a cross-sectional study, data collection was carried out at a single point in time (Serna et al., 2023).

3.2 Population and Sample

The population under study was made up of Peruvian entrepreneurs who used digital tools in their promotional and commercial activities. Regarding sampling, a non-probabilistic snowball method was used, finally reaching 388 valid responses over a three-month period in 2024 (October – December) (Hernández & Mendoza, 2018). To ensure the quality and relevance of the data collected, this research adopted rigorous criteria for selecting participants, considering their experience in digital entrepreneurship and their participation in digital marketing activities. The representativeness of the sample was guaranteed through the inclusion of participants from various economic sectors and types of digital enterprises, who were contacted by social networks, a first group of 75 entrepreneurs and through them the rest of the respondents were contacted.

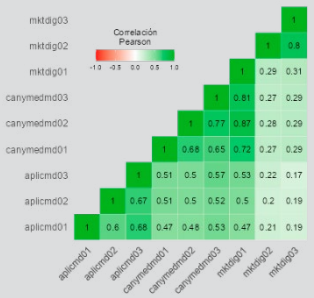
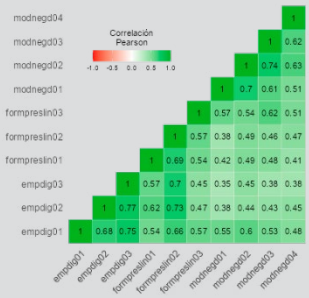
3.3 Data Collection Techniques and Instruments

The technique used was the survey, implemented through a structured questionnaire with closed questions, using a 5-point Likert scale with assessment scales between Totally Disagree (1) and Totally Agree (5) (Kaur, 2019). To ensure the validity of the measurement instrument, several rigorous methodological procedures were implemented:

First, the content validation was carried out through three judgments by experts in digital marketing and entrepreneurship. Subsequently, a pilot test was carried out to verify the comprehension and clarity of the items. An exploratory factor analysis (EFA) was carried out, previously verifying the adequacy of the data using the Kaiser-Meyer-Olkin test (KMO = 0.927) and the Bartlett sphericity test (x^2 = 6101.922, df = 171, p < 0.001) (Nunes et al., 2020). The results confirmed the suitability of the data for this analysis.

Then, a reliability test of the instrument was applied through Cronbach's Alpha and McDonald's Omega according to table 1, obtaining the following results (α = 0.886 and ω = 0.894) for digital marketing and (α = 0.921 and ω = 0.922) for digital entrepreneurship, whose values demonstrate an excellent reliability of the measurement instrument. This means that the questions or items used to measure the constructs of digital marketing and entrepreneurship are highly consistent and reliable (Skaggs, 2022).

Table 1. Scale Reliability Statistics

Measurement scales	Coefficient		Correlation heatmaps
	Cronbach's alpha	McDonald's ω	
Digital Marketing	0.886	0.894	
Digital Entrepreneurship	0.921	0.922	

Source: own elaboration.

3.4 Data Analysis

For the analysis of the data, structural equation modeling (SEM) was used using partial least squares (PLS). This methodological choice is justified by the complexity of the proposed theoretical model, its ability to handle multiple constructs and indicators simultaneously, and its robustness in the face of the non-normality of the data (Hair et al., 2022). The analysis included the evaluation of composite reliability (>0.70), convergent validity by AVE (>0.50), discriminant validity through the Fornell-Larcker criterion (Fornell & Larcker, 1981), and the analysis of the coefficients of determination (R^2). The data collected were processed using SmartPLS software, which is especially suitable for the analysis of structural equation models based on variance (Radomir et al., 2023).

3.5 Ethical Aspects

The research was carried out under strict ethical principles, obtaining the informed consent of all participants and guaranteeing the confidentiality of the information provided. Clear protocols for data protection were established and the right of participants to withdraw from the study at any time was ensured.

3.6 Limitations of the Study

This research has certain methodological limitations that must be considered.

Firstly, regarding sampling. Although a significant sample of 388 valid responses was reached, the non-probabilistic snowball method used could introduce certain biases in the selection of participants. While this method was appropriate to access the target population of Peruvian digital entrepreneurs, the results may not be completely generalizable to the entire population of entrepreneurs in the country.

Second, the cross-sectional nature of the study implies that the data were collected at a single time point in time during the year 2024, which does not allow us to observe the evolution of the variables over time. A longitudinal study could provide a deeper understanding of the causal relationships between digital marketing and entrepreneurship development.

However, it is important to note that these limitations do not invalidate the findings of the study but provide opportunities for future research that could address these aspects through different methodological designs or the inclusion of additional variables.

4. Results

The following are the results of the application of the data collection instruments and the discussion of these according to the research objectives.

Figure 2 presents the Structural Equation Model (SEM) that analyzes the relationships between digital marketing and entrepreneurship and reveals significant findings regarding its measuring and structural components. In the measurement model, robust factor loadings (> 0.7) are evident for all indicators, demonstrating strong convergent validity between latent constructs and observable indicators.

Specifically, the construct "Digital marketing" exhibits significant loads in its indicators: mktdig01 (0.806), mktdig02 (0.769) and mktdig03 (0.783), supporting the validity criteria established by Hair et al. (2022). As for the structural model, it reveals significant route coefficients (ß), where digital marketing demonstrates a substantial influence in various aspects. First, it has a significant impact on digital marketing applications (ß=0.496); secondly, it has a significant influence on digital marketing channels and media (ß=0.750); and finally, it considerably affects digital entrepreneurship (ß=0.580). These findings confirm Kannan and Li's (2017) theory on the transformative role of digital marketing in the creation of business value, facilitating the personalization of offers according to Peter and Dalla (2021).

Additionally, digital entrepreneurship has a significant impact on forms of online presence (ß=0.509), as well as on alternative digital business models (ß=0.286). According to Wahab et al. (2023), the Digital platforms and customer knowledge are crucial for online entrepreneurs, as they are perfectly suited

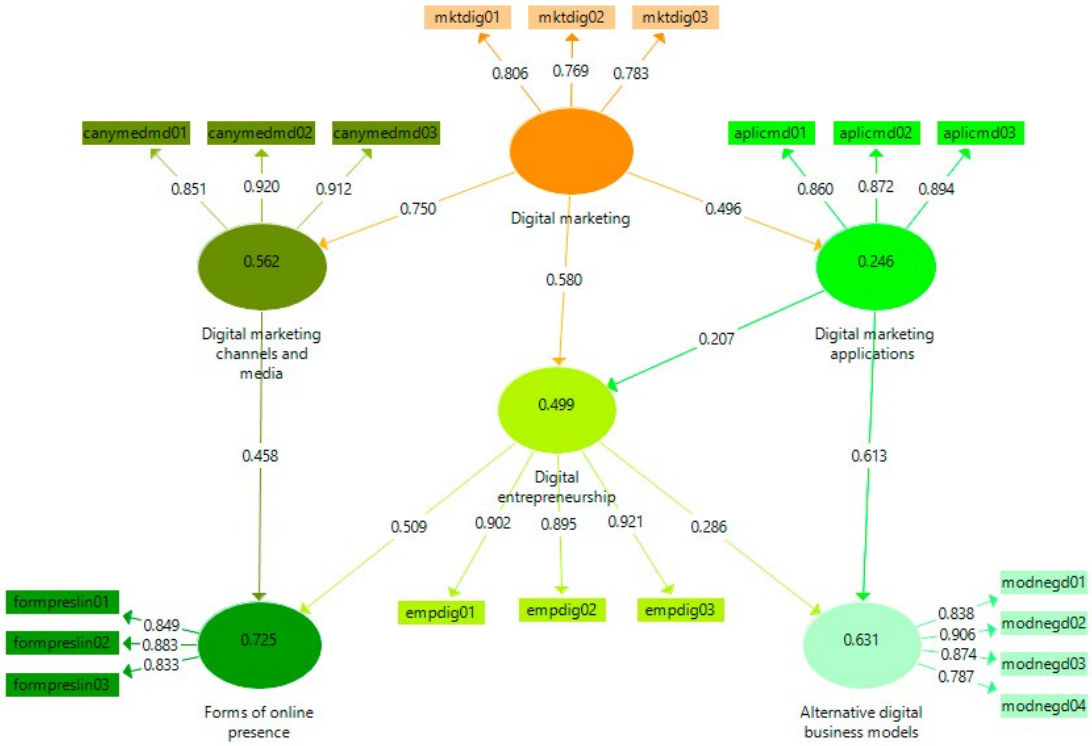


Figure 2. Structural equation model for digital marketing and entrepreneurship.
Source: own elaboration.

to business management in the digital environment. For their part, Blasco-Arcas et al. (2022) y Pires et al. (2022) reinforce how digital marketing enhances the anticipation of customer needs through advanced data analysis.

The coefficients of determination (R^2) range from 0.246 to 0.725, indicating moderate to substantial explanatory power (Zeng et al., 2021). Particularly noteworthy is the R^2 of 0.725 for "Forms of Online Presence," supporting its relevance in today's digital ecosystem. In this regard, Emini and Merovci (2021) emphasize the impact of digital technologies on customer value, while Dumitriu et al. (2019) emphasize the influence of online presence on brand value, given that search engine optimization (SEO) and search engine marketing (SEM) strategies improve brand visibility online, which can lead to increased brand recognition and recall.

This SEM model, supported by Kraus et al. (2018) and Elia et al. (2020), effectively demonstrates the centrality of digital marketing in the business ecosystem, simultaneously evidencing its strong interrelationship with digital entrepreneurship. As a result, there is a fundamental transformation of business operations in the global marketplace, where the integration of digital strategies is crucial for business success.

Table 2 will then present detailed model quality criteria, including R^2, composite reliability, AVE, Cronbach's alpha, and effect sizes (f^2) for each construct, thus providing a more complete view of the robustness and validity of the proposed model.

Table 2 presents an exhaustive analysis of the model's quality criteria, revealing significant results in terms of reliability and validity. First, composite reliability shows remarkably robust values, where Digital Entrepreneurship (DE) reaches the highest value with 0.9322, followed by Digital Marketing Channels and Media (DMCM) with 0.9234 and Alternative Digital Business Models (ADBM) with 0.9138. These results, according to Kline (1999), confirm an excellent internal consistency by exceeding the threshold of 0.8.

Regarding the Mean Extracted Variance (MEV), all the constructs demonstrate a solid convergent validity according to the criteria of Fornell and Larcker (1981). Specifically, Digital Entrepreneurship (DE) presents the highest value with 0.8208, followed by Digital Marketing Channels and Media (DMCM) with 0.801, significantly exceeding the minimum threshold of 0.6. This robustness is further confirmed by the values of Cronbach's Alpha, where Digital Entrepreneurship (DE) stands out again with 0.891, followed by Digital Marketing Channels and Media (DMCM) with 0.8758.

In terms of coefficients of determination (R^2), Forms of Online Presence (FOP) show the highest value at 0.7248, indicating that approximately 72.48% of their variance is explained by the model. Alternative Digital Business Models (ADBM) have an R^2 of 0.6313, while Digital Marketing Channels and Media (DMCM) reach 0.5624, demonstrating substantial explanatory power (Zeng et al., 2021).

The effect sizes (f^2) reveal particularly significant relationships. Digital Marketing (DM) exerts a substantial impact on Digital Marketing Channels and Media (DMCM) with an f^2 of 1.2852, as well as on Digital Marketing Applications (DMA) with 0.7696. Meanwhile, Digital

Entrepreneurship (DE) shows significant effects on Forms of Online Presence (FOP) with an f^2 of 0.6541 and on Alternative Digital Business Models (ADBM) with 0.1671.

These findings provide solid evidence of the quality and robustness of the model, demonstrating not only the reliability and validity of the measurements, but also the significant interrelationship between the constructs of digital marketing and entrepreneurship in the contemporary business context. The results particularly underscore the importance of online forms of presence and digital marketing channels as central elements in the digital transformation of businesses.

Table 3 presents a detailed analysis of discriminant validity using two fundamental criteria: Fornell-Larcker and the HTMT (Heterotrait-Monotrait) ratios. Initially, following the criteria of Fornell and Larcker (1981), Digital Entrepreneurship (DE) demonstrates a solid discriminant validity with a square root of 0.906, significantly exceeding its correlations with other constructs. Similarly, Digital Marketing Channels and Media (DMCM) exhibit a robust MEV square root of 0.895, supporting their conceptual distinction.

Regarding the correlations between constructs, particularly significant relationships are identified. For example, Digital Marketing (DM) shows a substantial correlation with Digital Entrepreneurship (DE) of 0.8362, as well as Digital Marketing Channels and Media (DMCM) of 0.7936. According to Hair et al. (2022), these high correlations, although close to the limit, still maintain discriminant validity as they do not exceed the values of the square root of the corresponding MEV.

The HTMT ratios, which provide a more rigorous criterion according to Henseler et al. (2014), reveal interesting patterns. The highest ratio is observed between Digital Marketing Applications (DMA) and Alternative Digital Business Models (ADBM) with 0.8673, followed by the ratio between DMCM and FOP with 0.8503. These values, although close to the critical threshold of 0.9 still remain within acceptable limits.

However, areas that require special attention are identified. The correlation between DE and FOP reaches 0.89, approaching the critical threshold, suggesting a close conceptual interrelationship. Similarly, the DMCM-FOP correlation of 0.8503 indicates a potential overlap that merits consideration in future refinements of the model. As noted by Voorhees et al. (2015), these near-threshold relationships do not necessarily invalidate the model, but suggest the need for cautious interpretation and possible future adjustments in the operationalization of the constructs.

Taken together, the results validate the overall structure of the model, demonstrating that each construct captures unique aspects of the phenomenon studied, albeit with significant interrelationships that reflect the integrated nature of digital marketing and entrepreneurship in the contemporary business context. This robust validation,

Table 2. Quality criteria

Construct	R^2	Composite Reliability	AVE	Cronbach's Alpha	Significant f^2
Digital Marketing Applications (DMA)	0.2462	0.9078	0.7664	0.8477	DM: 0.7696
Digital Marketing Channels and Media (DMCM)	0.5624	0.9234	0.801	0.8758	FOP: 0.5296
Digital Entrepreneurship (ED)	0.4993	0.9322	0.8208	0.891	FOP: 0.6541, ADBM: 0.1671
Forms of Online Presence (FOP)	0.7248	0.8911	0.7318	0.8173	-
Digital Marketing (DM)	-	0.8291	0.6179	0.7248	ADM: 0.3266, DMCM: 1.2852, DE: 0.5073
Alternative Digital Business Models (ADBM)	0.6313	0.9138	0.7266	0.874	-

Source: own elaboration.

Table 3. Discriminant validity of the structural equations model

Construct	DMA	DMCM	DE	FOP	DM	ADBM
Digital Marketing Applications (DMA)	**0.8755**	0.6504	0.4953	0.6151	0.4962	0.7547
	-	*0.7549*	*0.5642*	*0.7355*	*0.5427*	*0.8673*
Digital Marketing Channels and Media (DMCM)		**0.895**	0.5515	0.7381	0.7499	0.6657
		-	*0.6161*	*0.8503*	*0.7936*	*0.7612*
Digital Entrepreneurship (DE)			**0.906**	0.761	0.6833	0.5895
			-	*0.89*	*0.8362*	*0.6629*
Forms of Online Presence (FOP)				**0.8555**	0.7054	0.6701
				-	*0.8142*	*0.7894*
Digital Marketing (DM)					**0.7861**	0.5684
					-	*0.6377*
Alternative Digital Business Models (ADBM)						**0.8524**

Note: In Table 3, the values present different discriminant validity criteria. The bold values on the main diagonal represent the square root of the MEV for each construct, according to the Fornell-Larcker criterion. The normal values above the diagonal are the correlation coefficients between the constructs, also part of the Fornell-Larcker criterion. The values in italics below the diagonal show the HTMT ratios. The symbol "-" is used on the diagonal for HTMT ratios, as they do not apply to the same construct.
Source: own elaboration.

supported by multiple criteria, strengthens the reliability of the conclusions derived from the structural model.

First, the results of the analysis of external loads and collinearity in Table 5 reveal a robust measurement structure with solid psychometric properties in all the constructs evaluated. In this sense, the external loads show remarkably high values indicating a strong convergent validity.

According to Table 4, Digital Entrepreneurship (DE) demonstrates the most robust loadings, where empdig03 reaches 0.9209, followed by empdig01 with 0.9018, and empdig02 with 0.8952, significantly exceeding the threshold of 0.7 established by Hair et al. (2022). Similarly, the Digital Marketing Channels and Media (DMCM) present similarly robust loadings, specifically canymedmd02 registers 0.9203 and canymedmd03 0.912, demonstrating excellent convergent validity according to the criteria of Fornell and Larcker (1981). Additionally, the Digital Marketing Applications (DMA) maintain remarkable consistency with loadings of aplicmd03 0.8941, aplicmd02 0.8721, and aplicmd01 0.8599.

In terms of collinearity, the variance inflation factors (VIF) show generally favorable values. Consequently, most indicators maintain VIF below 3.0 (Zeng et al., 2021), indicating acceptable levels of collinearity. However, empdig03 has a slightly elevated VIF of 3.1909, although still within the critical limit of 5.0 established by Hair et al. (2022). It should be noted that the lowest VIF values are observed in mktdig01 (1.1151) and formpreslin03 (1.5647), indicating minimal redundancy in these indicators.

On the other hand, the Alternative Digital Business Models (ADBMs) demonstrate a balanced structure with loadings ranging from 0.7872 to 0.906, supported by moderate VIFs between 1.8309 and 2.9885. This consistency, according to Viladrich et al. (2017), suggests a well-calibrated measurement instrument. Likewise, Digital Marketing (DM) presents the widest range of loadings (0.7693 to 0.8055) but maintains acceptable VIF values, indicating that each indicator uniquely contributes to the construct while maintaining adequate convergent validity.

Consequently, these results validate the quality of the measurement model, demonstrating that the indicators effectively capture their respective constructs through high external loadings. At the same time, they maintain acceptable levels of independence through moderate VIFs, while contributing significantly and uniquely to the measurement of their constructs. Therefore, this psychometric robustness strengthens the reliability of the conclusions derived from the structural model and supports the validity of the theoretical relationships proposed in the study.

Finally, the results in Table 5 show a coherent and articulated model, all routes are statistically significant ($p<0.001$) and the high t-statistic confirms the robustness of the relationships (t between 4.61 and 41.95), which reinforces the structural validity of the proposed scheme (Hair et al., 2022). Digital marketing (DM) emerges as the driving force. Its most intense effect is observed on digital channels and media (DM → DMCM, β = 0.7499, strong), which indicates that strengthening global competencies in digital marketing directly facilitates the orchestration and strategic use of multichannel environments. Likewise, it has a high impact on digital entrepreneurship (DM → DE, β = 0.5805) and with moderate magnitude on the adoption of specific applications (DM → DMA, β = 0.4962), suggesting

Table 4. Analysis of external loads and collinearity of the measurement model

Construct	ADM	DMCM	DE	FOP	DM	ADBM	VIF
aplicmd01	0.8599						2.0011
aplicmd02	0.8721						1.9458
aplicmd03	0.8941						2.3439
canymedmd01		0.8511					2.0157
canymedmd02		0.9203					2.8531
canymedmd03		0.912					2.6671
empdig01			0.9018				2.4400
empdig02			0.8952				2.5636
empdig03			0.9209				3.1909
formpreslin01				0.8493			2.0406
formpreslin02				0.8834			2.1441
formpreslin03				0.8329			1.5647
mktdig0.					0.8055		1.1151
mktdig02					0.7693		2.7525
mktdig03					0.783		2.7921
modnegd01						0.838	2.0345
modnegd02						0.906	2.9885
modnegd03						0.874	2.4648
modnegd04						0.7872	1.8309

Source: own elaboration.

a sequence in which strategic capacity precedes and enhances technological integration.

Digital marketing applications play a role as a structural lever on alternative digital business models (DMA → MNDA, β = 0.6132, strong), confirming that the operationalization of concrete tools and solutions accelerates the diversification or reconfiguration of the model. However, their direct contribution to entrepreneurship is weak (DMA → DE, β = 0.2073), which qualifies the idea that "more tools" automatically equals "more entrepreneurship": a broad strategic base supported by global competencies (DM) is required. Digital entrepreneurship, in turn, strengthens online presence more intensely (DE → FOP, β = 0.5086, strong) than the transformation of alternative models (DE → ADBM, β = 0.2857, weak), noting that it first consolidates visibility and positioning before translating into structural innovations. In addition, digital channels and media moderately promote forms of online presence (DMCM → FOP, β = 0.4576), articulating a bridge between relational infrastructure and communicational projection.

Taken together, the hierarchy of coefficients suggests a progressive strategic flow: comprehensive digital marketing competencies → channel structuring and application adoption → entrepreneurship empowerment and expansion of online presence → gradual consolidation of alternative digital business models. This chain not only supports the hypotheses raised but offers a pragmatic narrative for managerial intervention: investing first in strategic (β = 0.7499, 0.5805) and key technological (β = 0.6132) capabilities then allows entrepreneurship and digital presence to be translated into sustainable business model innovations.

5. Discussion

The findings of the structural equation model in Table 5 shed light on the complex interrelationships between digital marketing and digital entrepreneurship in the modern entrepreneurial ecosystem. First, it is important to note that all the hypotheses put forward were confirmed, which underlines the robustness of the proposed model.

Regarding the relationship between digital marketing and digital entrepreneurship (H_1), a positive and strong connection is observed (β=0.5805, p<0.001). This result not only validates the initial hypothesis, but also supports the claims of Taiminen and Karjaluoto (2015) on the transformative role of digital marketing in business practices. Moreover, this strong correlation aligns with the perspective of Kraus et al. (2018) who argue that the synergy between digital marketing and entrepreneurship is redefining business models in the digital era. Therefore, it can be inferred that the mastery of digital marketing strategies is increasingly critical to the success of ventures in today's digital environment.

On the other hand, the strongest relationship in the model is between digital marketing and its channels and media (H_2), with a path coefficient of 0.7499 (p<0.001). This finding is particularly significant, as it corroborates the observations of Kannan and Li (2017) on how digital marketing is radically transforming communication and distribution channels in the business world, enabling companies to create personalized content tailored to individual consumer needs, improving customer engagement and loyalty (Kraus et al., 2018). Indeed, this strong correlation suggests that the effective selection and use of digital channels is a fundamental component of modern digital marketing.

Likewise, the relationship between digital marketing and its applications (H_3) shows a moderate positive correlation (β=0.4962, p<0.001). This result aligns with the research of Elia et al. (2020) who highlight how digital applications are reshaping marketing processes in the context of digital entrepreneurship.

Rizvanović et al. (2023) state that digital marketing has become an essential tool for digital startups and emerging businesses. This strategy has been developed to help entrepreneurs reach their customers effectively at a relatively low cost. However, the moderate intensity of this relationship could indicate that, while applications are

Table 5. Hypotheses and relationships between constructs

Hypothesis	Relation	Route Coefficient (β)	Statistics t	P Values	Strength of the relationship
H_1: Digital marketing has a positive effect on digital entrepreneurship	md -> ed	0.5805	13.6637	p<0.001	Strong positive relationship
H_2: Digital marketing has a positive effect on digital marketing channels and media	md -> cmd	0.7499	41.9541	p<0.001	Strong positive relationship
H_3: Digital Marketing Has a Positive Effect on Digital Marketing Applications	md -> amd	0.4962	13.4993	p<0.001	Moderate positive relationship
H_4: Digital entrepreneurship has a positive effect on alternative digital business models	ed -> mnda	0.2857	6.5932	p<0.001	Weak positive relationship
H_5: Digital entrepreneurship has a positive effect on the forms of online presence	ed -> fpl	0.5086	12.6058	p<0.001	Strong positive relationship
H_6: Digital marketing channels and media have a positive effect on online forms of presence	cmd -> fpl	0.4576	12.2981	p<0.001	Moderate positive relationship
H_7: Digital marketing applications have a positive effect on alternative digital business models	amd -> mnda	0.6132	17.8374	p<0.001	Strong positive relationship
H_8: Digital marketing applications have a positive effect on digital entrepreneurship	amd -> ed	0.2073	4.6116	p<0.001	Weak positive relationship

Source: own elaboration.

important, they are not the only determining factor in the effectiveness of digital marketing.

As far as digital entrepreneurship is concerned, two interesting relationships are observed. On the one hand, its effect on alternative digital business models *(H_4)* is positive but weak (ß=0.2857, p<0.001). This finding, while confirming the hypothesis, suggests that the relationship between digital entrepreneurship and business model innovation is more complex than initially thought. As pointed out by Wang et al. (2024), while digital technologies generally encourage entrepreneurship, financial risks and certain aspects of ICT can negatively affect digital entrepreneurship. On the other hand, the influence of digital entrepreneurship on forms of online presence (H5) is more pronounced, showing a strong positive relationship (ß=0.5086, p<0.001). This result reinforces the importance of digital marketing for digital entrepreneurship in Peru. This relevance is supported by studies suggesting that social networks such as Instagram, Twitter, LinkedIn, and Facebook (Fayvishenko et al., 2025) are key to the success of entrepreneurial ventures (Emini & Merovci, 2021). Consequently, it can be argued that digital entrepreneurs are increasingly aware of the need to establish and maintain a strong and strategic online presence.

Additionally, the relationship between digital marketing channels and forms of online presence *(H_6)* shows a moderate positive correlation (ß=0.4576, p<0.001). This finding is aligned with the studies of Taiminen and Karjaluoto (2015) on the adoption of digital channels in small and medium-sized firms. However, the moderate intensity of this relationship suggests that while digital channels are important for online presence, other factors also play a significant role in determining how firms present themselves in the digital environment.

Therefore, it can be said that, search engine marketing delivers targeted content and advertisements efficiently and economically (Erdmann et al., 2022). Mazzoli (2020) emphasizes the importance of social media marketing and SEM for effective digital strategies. Dwivedi et al. (2022) point out that the use of digital marketing tools has improved the perception of online shopping, benefiting e-commerce. Chaparro-Peláez et al. (2022) demonstrate the superiority of segmented emails, although more research is needed on optimal segmentation criteria.

When it comes to social media, Instagram with collaborative and visually dynamic posts is particularly effective for maintaining a strong online presence (Cordeiro et al., 2025); likewise Facebook is effective for disseminating detailed information and encouraging community interactions, although it may not be as visually dynamic as Instagram. (Fayvishenko et al., 2025). Meanwhile, TikTok achieves the highest engagement rates due to its interactive content and appeal to a younger audience (Fayvishenko et al., 2025). These platforms allow you to publish content and monitor engagement, improving communication with your target audience. Furthermore, Bhandari & Bansal (2019) highlight that most startups have a web and social media presence, attributing the rapid growth of social media marketing to its low cost compared to traditional marketing.

On the other hand, the strong positive relationship between digital marketing applications and alternative digital business models *(H_7)*, with a coefficient of 0.6132 (p<0.001), is particularly interesting. This result strongly supports the claims made by Kraus et al. (2018) on how digital applications are facilitating the creation of new business models by streamlining processes, reducing costs, and improving productivity. However, there is a lack of understanding and resources to implement digital transformation (Wolf et al., 2018). In fact, this finding suggests that companies that adopt and effectively use digital marketing applications are better positioned to innovate in their business models and adapt to the changing digital landscape.

Finally, the relationship between digital marketing applications and digital entrepreneurship *(H_8)*, although positive, is relatively weak (ß=0.2073, p<0.001). This result, while confirming the hypothesis, indicates that digital marketing applications alone are not a determining factor in the success of digital entrepreneurship. Therefore, it can be inferred that digital entrepreneurship is a multifaceted phenomenon that depends on a variety of factors beyond digital marketing tools.

6. Conclusions

The results of this research reveal significant findings about the interrelationships between the variables studied. First, there is evidence of a positive and significant relationship between digital marketing and entrepreneurship, demonstrating the fundamental importance of digital strategies in contemporary entrepreneurial success, leveraging various technologies and platforms to optimize business operations, customer interaction, and market reach.

Notably, the strongest influence is observed in the relationship between digital marketing and channels and media, followed by the impact of digital marketing applications on alternative digital business models. These correlations underscore the importance and relevance of selecting and optimizing digital channels, which requires a clear strategy, optimized online channels, a solid technological architecture, and learning best practices, as well as the effective implementation of marketing applications in business model innovation.

In terms of online presence, the study reveals a significant influence of both digital entrepreneurship and digital marketing channels and media. Additionally, digital marketing shows a moderate impact in its applications, suggesting the need for a comprehensive approach that goes beyond the mere adoption of digital tools, highlighting that digital entrepreneurship must include in its marketing strategies the identification of niche markets, the use of data analysis, and the promotion of a strong online presence.

It is particularly relevant to note that some weaker, although statistically significant, relationships were identified, such as the effect of digital entrepreneurship on alternative digital business models and the impact of digital marketing applications on digital entrepreneurship.

These more moderate correlations suggest the existence of additional mediating factors that deserve further exploration in future research.

A significant finding is the model's high explanatory power for forms of online presence. This result validates the robustness of the proposed model and its ability to capture key factors that influence the digital presence of startups, such as search engine optimization, social media marketing, and the creation of relevant and engaging content that can capture users' attention and enhance brand image.

Likewise, this research provides solid empirical evidence on the interconnection between digital marketing and entrepreneurship in the Peruvian context. The results emphasize the need for entrepreneurs to develop comprehensive digital competencies, from mastery of marketing tools to innovation in business models.

However, it is also highlighted that success in digital entrepreneurship requires a holistic approach that goes beyond technical skills, considering broader contextual and strategic factors.

Finally, in practical terms, the study concludes that the most fertile starting point for strengthening digital entrepreneurship in Peru is not the dispersed accumulation of tools, but the deliberate construction of strategic competencies that allow choosing, articulating, and taking real advantage of digital channels and media.

On this basis, the recommendation is to promote comprehensive programs that combine applied training (strategy, brand narrative, analytics, and innovation), personalized support, progressive access to technological solutions and financing schemes linked to clear transformation plans.

At the same time, public policies can enhance the systemic effect by promoting inclusive connectivity, nationally valid digital skills certifications, university-business networks and experimentation laboratories to prototype business models

Conflict of interest

The authors declare that there are no conflicts of interest in the preparation and submission of this article. No personal, financial, or professional interests have been identified that could influence the objectivity and impartiality of the research presented. In addition, no financing or support has been received from third parties that could generate conflicts of interest.

Data Availability Statement

The data used in this study are available for consultation and verification, if it is considered necessary and ethical. Authors undertake to provide access to original data and research materials to those who request it, to promote transparency and reproducibility of results.

Ethical approval

This research is carried out in compliance with the Code of Research Ethics of the San Ignacio de Loyola University. This code sets out clear guidelines to ensure integrity and ethics in research. For studies that do not involve data manipulation, as well as those that do not involve the participation of people or animals, the guidelines established in said code are complied with, however no resolution of approval of the research is issued. In this way, it ensures that all research practices respect fundamental ethical principles, promoting transparency and responsibility in the management of information

https://usil.edu.pe/sites/default/files/2021-11/2017-etica-para-la-investigacion-usil.pdf

Declaration of informed consent of the participants

The study participants provided their informed consent for the use of the data obtained through the applied survey. This process ensured that respondents understood the nature of the study, as well as the purpose and handling of their personal information. Confidentiality conditions and ethical use of the data were ensured, allowing for a responsible and respectful analysis of the opinions and experiences shared.

Funding Statement

The work did not receive specific funding or sponsorship from any public agency, commercial or non-profit organization.

Statement on the Use of AI

The authors declare that they used generative artificial intelligence (AI) tools solely as support in the process of writing the manuscript. The Monica AI platform was used for writing suggestions, organizing ideas, and editing style. Similarly, Scopus AI was used to map reliable sources of information. All content was subsequently reviewed, validated, and edited by the authors, who assume full responsibility for the accuracy, originality, and validity of the work presented.

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