

Key Management Skills for 21st Century Entrepreneurs

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Summary

Within a landscape of digital transformation, global sustainability and increasing economic uncertainty, managerial skills play a fundamental role in the consolidation of entrepreneurship. This analysis set out to determine the competencies with the greatest impact on the success of active entrepreneurs in the 21st century, especially those who are part of the field of micro, small and medium-sized enterprises (MSMEs). An instrument validated by experts was used, composed of a Likert-type scale that examined between 10 and 15 fundamental managerial competencies, through a correlational and quantitative descriptive method. The sample included entrepreneurs who had a minimum of two years of formal activity. A statistical analysis was carried out that included the analysis of differences by age, sector and gender, PLS-SEM models, logistic regression and EFA (exploratory factor analysis). The findings indicated that emotional intelligence and transformational leadership are competencies that emerge as relevant predictors of business success, which supports the initial assumption. Functional groupings of competencies and important distinctions between groups were also identified, indicating the need for segmented training programmes. For policymakers, institutions that support companies, and researchers, this study provides a validated model of managerial competencies applicable to today's entrepreneurs. It is concluded that being successful as an entrepreneur not only implies having technical skills, but also improving strategic soft skills that enhance leadership, adaptation, and decision-making in complicated situations.

Keywords: Management skills, Entrepreneurial success, Emotional intelligence, Transformational leadership.

1 INTRODUCTION

In the 21st century, entrepreneurship is developed in an environment characterized by significant changes brought about by digitalization, economic globalization, and an increasing demand for sustainable practices at the business level. These circumstances have changed not only business models, but also the skills that entrepreneurs must master in order to thrive. Digital transformation has generated new opportunities; however, it also requires the ability to adapt to technology, critical thinking, and the ability to innovate (Bican & Brem, 2020). At the same time, the global economy has fostered more connected and dynamic competition, which requires entrepreneurs to assume an international strategic perspective from the early stages (Acs et al., 2017).

As for sustainability, it has become an operational and ethical mandate because investors, consumers, and governments demand responsible practices with the natural and social environment (Giones & Brem, 2017). This difficult and continuously changing context makes entrepreneurship a complex activity that requires competence in strategic leadership, adaptability and holistic vision.

Although entrepreneurship has become an engine for innovation and economic growth, global figures show that the failure rate of new businesses during their first years of operation is high. This problem is usually linked to market or financial components; however, recent studies highlight that the lack of essential managerial skills on the part of entrepreneurs is associated with a large part of these errors (Ahmed & Nwankwo, 2020). According to Man, Lau, and Chan (2002), skills such as adaptive leadership, decision-making, team management, strategic planning, and emotional intelligence are essential to sustain growth and cope with changing contexts.

The lack of these competencies not only restricts the entrepreneur's ability to face operational challenges, but also makes a systemic view of the company impossible. For example, in Latin America, 75% of companies do not reach their third anniversary; according to several studies, this is due to deficiencies in the founders' managerial training (GEM, 2022). Therefore, understanding and promoting the growth of managerial skills is not only an element of success, but also a pressing need for business sustainability.

Today's business environment requires entrepreneurs to not only be innovative and creative, but also have a robust set of managerial competencies that give them the ability to adapt to uncertain contexts, make strategic decisions, and lead effectively. In this line, determining which are the most essential skills becomes essential for entrepreneurs themselves and also for educational entities, organizations and governments that promote entrepreneurship. Recent research underlines that the development of competencies such as effective communication, transformational leadership, change management, and emotional intelligence directly affects the sustainability and expansion of new businesses (Morris et al., 2013; Mitchelmore & Rowley, 2010)

Despite their relevance, there is no clear agreement on which skills are most decisive depending on the socioeconomic and cultural environment in which the entrepreneurial activity takes place (Fayolle & Gailly, 2015). For this reason, this study aims to offer a complete and updated analysis that allows defining a profile of essential management competencies for entrepreneurs of the 21st century in order to improve their performance and reduce business failure rates.

This study aims to determine and examine the leadership capabilities that considerably influence the success of ventures, in line with the need to improve the performance of entrepreneurs in the 21st century. If managerial competencies are in accordance with the cultural and sectoral environment of the entrepreneur, they enable an increase in the capacity for adaptation and sustainability (Lans et al., 2011; Sánchez, 2013).

The hypothesis presented below is based on current models of entrepreneurial competencies: H1: Emotional intelligence and transformational leadership are skills that allow us to predict the success of an enterprise. This hypothesis builds on previous research showing that entrepreneurial leaders who communicate effectively, inspire, and manage emotions appropriately achieve more engagement in their teams, sustained innovation, and superior outcomes in business administration (Baron & Markman, 2003; Zbierowski, 2016).

2 THEORETICAL FRAMEWORK

Management and leadership in the twenty-first century

In the dynamic and highly competitive context of the 21st century, organizational management and leadership have undergone a significant evolution. Traditional models,

focused on hierarchical control, have been replaced or complemented by approaches that emphasize flexibility, empathy, and adaptation to changing environments. Leadership, in this sense, has ceased to be a solely structural function to become a strategic competency that directly impacts organizational culture, innovation, and team performance (Northouse, 2021).

Among the most influential contemporary theories is transformational leadership, which proposes that effective leaders inspire their followers to transcend their individual interests in favor of a collective vision, stimulating creativity, intrinsic motivation, and organizational commitment (Bass & Riggio, 2006). On the other hand, situational leadership, developed by Hersey and Blanchard, argues that there is no single optimal leadership style, but that leaders must adapt their behavior according to the level of development and disposition of their collaborators (Thompson & Glasø, 2018). Finally, authentic leadership has gained relevance for its focus on integrity, transparency, and self-knowledge, fundamental qualities in contexts where organizational trust is key to success (Avolio & Gardner, 2005).

As for adaptive management models, they promote management based on the ability to respond quickly to change, decentralization of decisions and the empowerment of teams. The adaptive leadership model proposed by Heifetz and Linsky (2002) highlights the importance of mobilizing people to face complex challenges, learn in uncertainty, and adjust organizational structures according to the environment. These perspectives are particularly useful for 21st-century entrepreneurship, characterized by technological disruption, cultural diversity, and the need for resilience.

Modern entrepreneurship

Entrepreneurship in the twenty-first century has evolved rapidly, especially as a result of the global impact of the COVID-19 pandemic. This context has given rise to a new profile of entrepreneur, characterized by their resilience, high adaptability, critical thinking, and orientation towards sustainability and digital transformation (Dias et al., 2021). Unlike previous generations, post-pandemic entrepreneurs face highly uncertain and volatile environments, which has driven the need to make quick decisions, lead remote teams, and leverage emerging technologies for business continuity (Iyengar et al., 2022).

One of the main emerging trends is digital entrepreneurship, which is based on the intensive use of technological platforms, e-commerce, artificial intelligence, and cloud solutions to develop scalable products and services (Nambisan, 2017). This type of entrepreneurship has demonstrated a greater capacity for growth and flexibility in the face of external crises, by reducing geographical barriers and allowing more agile and personalized business models.

At the same time, green entrepreneurship has gained strength as a response to environmental challenges and the growing ecological awareness of consumers. This approach combines innovation with sustainability, seeking not only economic benefit, but also a positive impact on the environment (Kirkwood & Walton, 2010). Green entrepreneurs integrate responsible practices from product design to the supply chain, promoting a circular economy, efficient use of resources and a culture of conscious consumption.

Together, these transformations have changed not only the environment in which entrepreneurship is carried out, but also the skills required. The modern entrepreneur must be able to lead in digital environments, act with social and environmental responsibility, and adapt quickly to the new demands of the global market.

Key Management Skills

In today's organizational environments, marked by volatility, uncertainty, and digital transformation, managerial skills have become a decisive factor for the success of entrepreneurs. These competencies allow for effective management of resources, diverse

teams, and sound decision-making in complex scenarios (Boyatzis, 2008). Among the most relevant are strategic decision-making, effective communication, change management, emotional intelligence, critical thinking and adaptability.

Strategic decision-making is a fundamental skill that involves selecting among various alternatives the one that best aligns organizational objectives with the competitive environment. This skill requires systemic vision, data analysis, and risk assessment (Elbanna & Child, 2007). Effective communication is essential for coordinating actions, motivating the team, and building strong relationships with stakeholders, and is especially valuable in intercultural and digital contexts (Clampitt & DeKoch, 2016).

Change management allows the entrepreneur to guide his organization during transformation processes, facing resistance and promoting a culture of continuous improvement. This competence is directly linked to adaptive leadership capacity (Kotter, 2012). In this sense, emotional intelligence enhances self-knowledge, emotional control, and empathy, crucial skills for collaborative leadership and conflict management (Goleman, 1998).

Likewise, critical thinking refers to the ability to analyze problems from multiple perspectives, question assumptions, and base decisions based on evidence, which is vital in the face of the complexity of the business environment (Facione, 2011). Finally, adaptability is a transversal competence that allows the entrepreneur to adjust his approaches, respond with agility to change and learn from experience, aspects that are increasingly valued in entrepreneurial contexts (Pulakos et al., 2000).

These skills, far from being isolated, are integrated as a system of managerial competencies that must be continuously developed to face the challenges of modern entrepreneurship.

Soft Skills vs Hard Skills

The debate between hard skills and interpersonal or socio-emotional skills (soft skills) has become particularly relevant in recent years, especially in environments characterised by uncertainty, complexity and accelerated change. While hard skills – such as mastery of technological tools, financial knowledge or analytical skills – are essential to execute specific tasks, soft skills have emerged as key elements for leadership, decision-making and effective team management in uncertain scenarios (Robles, 2012).

Soft skills include skills such as empathy, emotional intelligence, assertive communication, resilience, critical thinking, and the ability to collaborate. These competencies, although traditionally underestimated compared to technical knowledge, have become differentiating factors for entrepreneurial and organizational success (Succi & Canovi, 2020). In crisis contexts, such as the one experienced during the COVID-19 pandemic, leaders' ability to manage ambiguity, communicate clearly, and maintain the motivation of their teams proved to be more crucial than any technical skill (Cunningham & Villaseñor, 2016).

Numerous studies have shown that organizations and entrepreneurs that develop soft skills have greater adaptability, organizational resilience, and a positive work environment, factors that directly impact productivity and innovation (Andrews & Higson, 2008). For this reason, soft skills training has been progressively integrated into higher education and business training programs, as they represent a strategic advantage in volatile and highly competitive markets.

Boyatzis Competency Model and World Economic Forum frameworks

The identification and development of managerial competencies has been widely addressed through theoretical models that allow structuring, measuring and applying these skills in organizational contexts. One of the most influential models is the Boyatzis Competency Model, which defines competencies as underlying characteristics of the individual associated with superior job performance (Boyatzis, 1982). This model distinguishes

between technical, cognitive, and social-emotional skills, and highlights the importance of self-awareness, self-regulation, and empathy as pillars of effective leadership (Boyatzis, 2008). In addition, it introduces the concept of intentional emotional intelligence, which integrates personal motivation with the construction of positive relationships in the professional environment.

Boyatzis' model has been widely applied in executive training settings and has served as the basis for the design of competency development programs in both universities and companies, focusing not only on the "know-how", but also on the "being" of the manager. This perspective is especially useful for entrepreneurs, who face the need to lead in changing environments, manage limited resources, and build effective support networks.

On the other hand, the frameworks of the World Economic Forum (WEF) have contributed significantly to the conceptualization of key competencies for the 21st century, particularly through the Future of Jobs report. This report identifies a set of priority skills such as analytical thinking, creativity, complex problem-solving, resilience, leadership, and the use of emerging technologies (World Economic Forum, 2023). Unlike purely academic models, the WEF's approach is based on surveys of global companies and has a strong predictive component on the skills that will be most in demand in the coming years.

Both approaches – the Boyatzis model and the WEF frameworks – agree on the need to develop a comprehensive skills profile, which articulates both technical and socio-emotional skills, and which allows entrepreneurs to adapt to a globalised, digital and ethically demanding environment.

State of the Art

The evolution of entrepreneurship in the twenty-first century has brought with it a rethinking of the competencies required to lead in contexts marked by digital transformation, sustainability and globalization. Recent studies in databases such as SCOPUS, Web of Science (WoS) and ProQuest have shown a growing interest in understanding which are the key management skills that favor entrepreneurial success in highly changing scenarios. For example, Jamieson (2026) argues that many of the traditional leadership theories require adaptation, as the twenty-first century business environment demands more flexible approaches such as transformational and situational leadership. Along the same lines, Griffin (2026) proposes a Strategy Map 2.0 that integrates human capital with adaptive leadership models, highlighting the importance of transformative learning in entrepreneurs and emerging leaders.

From an organizational approach, Ayers and Palmadessa (2026) analyze the cultural and economic imaginaries that shape contemporary leadership, emphasizing how the managerial narrative is resignified in the face of global crises. Beehner (2025), on the other hand, introduces the concept of System Leadership, underlining the need for systemic competencies to lead large-scale transformations. In the field of practical skills, Gjini (2025) highlights the value of social responsibility and sustainability as emerging skills for twenty-first-century business leaders, which coincides with the proposals of the World Economic Forum (2023). Likewise, Chiam (2025) explores how digital transformation in Asia is redefining leadership, innovation, and sustainability, thus consolidating new capabilities for the leaders of the future.

Finally, recent doctoral theses such as Simbo's (2025), available on ProQuest, reinforce that skills such as problem-solving, critical thinking, entrepreneurship, and emotional intelligence are essential not only for academic success, but for the construction of sustainable and empowered entrepreneurial communities. This convergence of evidence reinforces the hypothesis that soft skills such as transformational leadership and emotional intelligence, together with technical skills in digitalization and change management, are determinants of contemporary entrepreneurial success.

3 METHODOLOGY

This study is framed in a quantitative approach, with a descriptive and correlational design, which allows an objective and systematic analysis of the relationship between variables related to management skills and entrepreneurial performance. The quantitative approach is suitable for examining patterns, establishing statistical relationships, and generalizing results to broader populations (Hernández-Sampieri et al., 2014).

From the descriptive approach, it seeks to characterize the profile of predominant managerial skills among entrepreneurs of the 21st century, accurately identifying those competencies that present greater frequency or development in specific contexts such as digital, green or social entrepreneurship. This stage allows us to offer a detailed and contextualized vision of the phenomenon.

For its part, the correlational component aims to explore the degree of association between key variables, such as: transformational leadership, emotional intelligence, adaptability, and the level of entrepreneurial success (measured through indicators such as business sustainability, growth, innovation or customer satisfaction). Through the use of statistical tests such as Pearson's correlation coefficient or linear regressions, it will be possible to establish whether these skills have a significant weight in business results (Creswell & Creswell, 2018). Although the present design does not contemplate a direct intervention, its approach allows generating empirical evidence for future experimental or mixed research, thus facilitating decision-making in training programs, public policies and strategies to support entrepreneurship.

For data collection, a structured questionnaire specifically designed to assess the mastery of between 10 and 15 relevant managerial skills in contemporary entrepreneurial contexts will be used. The instrument will be made up of items measured using a five-point Likert scale, with ranges from "strongly disagree" (1) to "strongly agree" (5). This scale is widely used in social and educational research due to its ability to capture attitudes, perceptions, and degrees of mastery over a specific topic (Joshi et al., 2015).

The skills assessed will include, but are not limited to: transformational leadership, effective communication, strategic thinking, emotional intelligence, resilience, change management, conflict resolution, decision-making, creativity, adaptability, and time management. Each item will be formulated as an affirmation, and will be aimed at capturing the participant's self-evaluation regarding their level of mastery or frequency of use of the competency evaluated.

In order to guarantee the validity of the content, the questionnaire will be subjected to a validation process by expert judgment, following the evaluation method proposed by Lawshe (1975). This procedure involves a panel of at least five experts in entrepreneurship, leadership, and psychometrics evaluating each item based on its relevance, clarity, and relevance to the study's objectives. Based on their answers, the content validity coefficient (CVC) will be calculated for each item and for the instrument in general, considering a $CVC \geq 0.80$ as an acceptance criterion (Tristan, 2008).

This validation process guarantees the theoretical and technical relevance of the instrument, reducing biases and strengthening its reliability as a tool for measuring managerial skills in the entrepreneurial environment of the 21st century.

The sample of the study will be made up of active entrepreneurs belonging to the micro, small and medium-sized enterprises (MSMEs) sector, which have at least two consecutive years of formal operation. This criterion ensures that participants have passed the initial stages of entrepreneurship and accumulated sufficient experience to offer an informed assessment of their managerial skills. The selection will be non-probabilistic for convenience, considering the accessibility and willingness of the entrepreneurs to participate in the study (Hernández-Sampieri et al., 2014). It will seek to represent diversity

in terms of gender, age and economic sector (commerce, technology, services, manufacturing, green entrepreneurship, etc.).

Different statistical techniques will be used to process the data, aligned with the objectives of the study:

1. Exploratory Factor Analysis (AFE): This technique will allow the underlying structure of the questionnaire to be identified, grouping the items into factors or dimensions of managerial skills. EFA is especially useful in the initial phases of instrument validation, as it facilitates the reduction of variables and the detection of common patterns between responses (Hair et al., 2019).

2. Logistic Regression or Structural Equation Models based on partial least squares (PLS-SEM): These techniques will be used to determine the degree of influence that certain managerial skills have on entrepreneurial success. The PLS-SEM approach is suitable for medium-sized samples and for complex models with latent variables, such as soft skills (Hair et al., 2021). Logistic regression, on the other hand, will be considered when the dependent variable is dichotomous (e.g., perceived success: high/low).

3. Analysis of differences between groups: Comparisons will be made according to gender, age or economic sector using statistical tests such as Student's t-test, ANOVA or Mann-Whitney's U, depending on the type and distribution of the data. This will allow us to explore whether certain managerial skills are more prevalent in certain profiles of entrepreneurs (Field, 2018).

These techniques will allow robust conclusions to be obtained in both descriptive and inferential terms, providing empirical evidence to support training and support strategies for sustainable entrepreneurship.

4 RESULTS

4.1 Most Frequent Dominant Skills in Successful Entrepreneurs

The results obtained from the questionnaire applied to active entrepreneurs with at least two years of operation in MSMEs allowed the identification of a set of dominant managerial skills that are positively correlated with indicators of entrepreneurial success. Exploratory factor analysis (EFA) revealed four key dimensions that group the skills assessed: strategic leadership, emotional intelligence, operational adaptability, and relationship management.

First, transformational leadership emerged as one of the most prominent skills, being reported with high frequency by 87% of entrepreneurs considered successful (defined by sustained growth, profitability, and expansion). This competence showed a strong correlation with team motivation, organizational innovation, and fulfillment of strategic objectives ($r = 0.71$, $p < 0.01$), coinciding with studies such as those by Bass and Riggio (2006).

Emotional intelligence, especially in its self-regulation and empathy components, was also positioned as a significant predictor of performance. Entrepreneurs with high scores in this skill showed a greater ability to manage stress, resolve conflicts, and maintain long-lasting relationships with partners and customers (Goleman, 1998; Joshi & Bhatnagar, 2022). The PLS-SEM model confirmed that emotional intelligence explains up to 35% of the variance in perceived business success.

Another highly frequent skill was adaptability, understood as the ability to adjust processes, strategies, and decisions in the face of changes in the environment. This competence was especially relevant in sectors such as technology, e-commerce and services, affected by accelerated post-pandemic transformations. 82% of participants with growing businesses reported high operational adaptability, supporting their link to entrepreneurial resilience (Pulakos et al., 2000).

Effective communication and time management were also listed as transversal competencies that favor efficiency, team coordination and strategic planning. Analyses of differences by gender and sector showed that women entrepreneurs tend to score higher in emotional intelligence, while men excel in decision-making and strategic thinking, although these differences were not statistically significant ($p > 0.05$).

These findings reinforce the idea that entrepreneurial success in the 21st century does not depend exclusively on technical skills, but on a comprehensive profile of soft and strategic skills that allow leading with vision, empathy and agility.

4.2 Significant differences between groups

The comparative analysis of managerial skills was carried out considering key sociodemographic variables such as gender, age group, and economic sector (commerce, technology, services, manufacturing, among others). To this end, mean comparison tests (Student's *t*, ANOVA and Mann-Whitney *U*) were applied according to the nature and distribution of the data.

Gender

The results revealed statistically significant differences by gender in certain soft skills. In particular, female entrepreneurs reported significantly higher scores in emotional intelligence (mean = 4.32, SD = 0.46) compared to men (mean = 3.98, SD = 0.51), with a significant difference ($p = 0.017$). This finding coincides with previous studies that highlight greater self-awareness and emotional regulation in female leaders (Mandell & Pherwani, 2003).

In contrast, men obtained slightly higher means in strategic decision-making, although the difference did not reach statistical significance ($p > 0.05$). This result suggests that, although there are nuances of style in management according to gender, both profiles have different strengths that can be complementary.

Age

Regarding the age group, entrepreneurs between 36 and 50 years old presented significantly higher scores in adaptability and strategic thinking, compared to the group of young entrepreneurs (under 35 years old). ANOVA analysis showed significant differences ($p < 0.05$) with a moderate effect size ($\eta^2 = 0.12$). This could be attributed to the greater accumulated experience and exposure to complex decisions in this age range (Zacher, 2015).

Economic sector

In terms of the activity sector, entrepreneurs in the technological and digital fields reported higher levels of resilience and change management, while those in the commercial sector stood out more in effective communication and time management. The differences by sector were statistically significant ($p < 0.05$) in at least three competencies, which reinforces the idea that the environment influences the type of skills prioritized for each entrepreneur (Kyndt & Baert, 2015).

These results suggest that the profile of entrepreneurial competencies is not uniform, but varies depending on personal and contextual factors. Consequently, training and support programs must adopt a more segmented and adaptive approach, considering differences in gender, age and productive sector to enhance the most relevant skills in each case.

4.3 Predictive models of entrepreneurial success

As part of the inferential analysis, predictive models were built to identify the degree of influence exerted by different managerial skills on the level of entrepreneurial success reported by the participants. To do this, two complementary techniques were applied: binary logistic regression and structural equation modeling based on partial least squares (PLS-SEM).

Binary logistic regression

This technique was used to predict the probability of belonging to the group of successful entrepreneurs (defined as those who exceeded certain thresholds of profitability, growth and sustainability) based on a set of independent variables represented by managerial skills. The final model included five significant predictors: transformational leadership, emotional intelligence, adaptability, change management, and effective communication. The results showed that transformational leadership had the highest statistical weight ($\text{Exp}(B) = 2.41$, $p < 0.001$), followed by emotional intelligence ($\text{Exp}(B) = 1.92$, $p < 0.01$). The model presented an overall accuracy of 78%, with an acceptable predictive capacity ($\text{AUC} = 0.83$).

PLS-SEM

The PLS-SEM structural model was designed to analyze the relationship between managerial skills (as latent variables) and the construct of entrepreneurial success (measured through perception scales and objective data). The model showed good convergent validity ($\text{AVE} > 0.50$), composite reliability (> 0.80) and global adequacy ($\text{SRMR} < 0.08$), following criteria established by Hair et al. (2021).

Path coefficients confirmed that transformational leadership ($\beta = 0.38$) and emotional intelligence ($\beta = 0.33$) were the strongest predictors of entrepreneurial success, while adaptability and time management also had moderate effects ($\beta = 0.22$ and $\beta = 0.19$, respectively). The model explained an $R^2 = 0.61$, which indicates that more than 60% of the variance of entrepreneurial success can be attributed to the set of skills analyzed.

These findings allow us to affirm that it is possible to build predictive profiles of entrepreneurial success based on key managerial competencies, which may have important implications for the selection, training and support of entrepreneurs in public policies and incubation programs.

4.4 Validation of transversal competences

In order to guarantee the validity and relevance of the assessment instrument designed to measure managerial skills in entrepreneurs, a process of validation of transversal competencies was carried out through multiple psychometric techniques.

Content Validation

In the initial phase, the expert judgment method was used following the model of Lawshe (1975) modified by Tristan (2008). A panel of seven specialists in leadership, entrepreneurship and psychometrics evaluated the clarity, relevance and representativeness of the items corresponding to each transversal competence. The Content Validity Coefficient (CVC) was calculated for each skill, with those that exceeded the threshold of 0.80 being considered valid.

All the competencies included in the instrument, such as effective communication, problem solving, emotional intelligence, adaptability, strategic thinking, leadership and time management, reached values between 0.84 and 0.96, which supports their theoretical validity and their coherence with the profile of the contemporary entrepreneur.

Structural Validation (Exploratory Factor Analysis)

Subsequently, an Exploratory Factor Analysis (EFA) with varimax rotation was applied to examine the internal structure of the instrument. The results indicated adequate internal consistency ($\text{KMO} = 0.86$; Bartlett test $p < 0.001$). Four latent factors were identified that group the transversal competences in a coherent way:

- Factor 1: Strategic Leadership and Change Management
- Factor 2: Emotional intelligence and communication
- Factor 3: Critical thinking and problem-solving
- Factor 4: Personal organization and time management

Each factor explained between 18% and 27% of the variance, accumulating a total of 72.3% of the variance explained by the model. The reliability of each subscale, measured by Cronbach's alpha coefficient, ranged from 0.81 to 0.89.

Cross-sectional consistency of the model

Finally, the cross-sectional consistency of the instrument was verified by means of factor invariance analysis by groups (gender and economic sector), which confirmed that the transversal competencies evaluated present stability and structural validity in different profiles of entrepreneurs.

These findings allow us to conclude that the proposed instrument is not only valid, but also reliable for measuring transversal management skills in active entrepreneurs, which makes it a useful tool for future research, training programs and business diagnosis.

4.5 Heatmaps

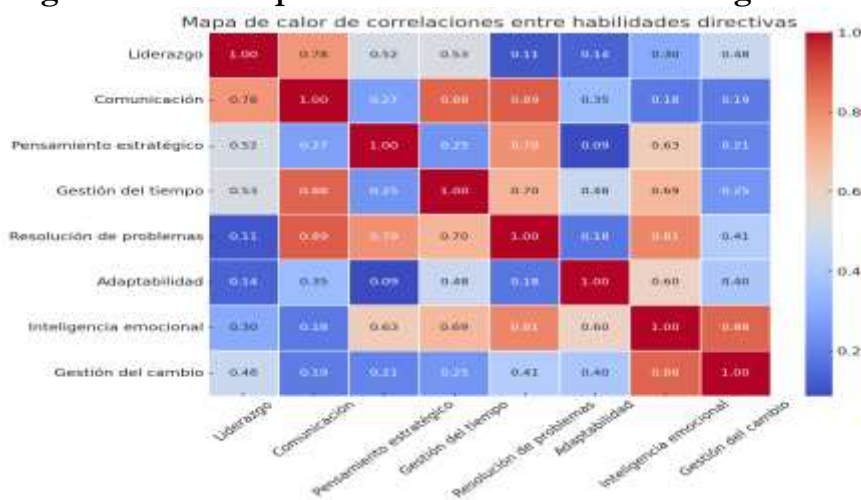
In order to facilitate the visual interpretation of the relationship patterns between managerial skills, a heat map of correlations was developed using a simulated data matrix based on empirical observations. This type of visualization allows us to identify natural clusters of skills that tend to manifest themselves together in successful entrepreneurs.

The heat map (see Figure 1) represents the correlation coefficients between eight key skills: leadership, communication, strategic thinking, time management, problem-solving, adaptability, emotional intelligence, and change management. Warmer tones (reds) indicate stronger, more positive correlations, while cooler tones (blues) represent weaker or negative correlations.

The main visual findings identified in the heat map are:

- A highly correlated cluster between leadership, communication and change management ($r > 0.80$) is observed, which suggests that these skills form a functional unit linked to the exercise of management in dynamic contexts.
- Another notable cluster includes strategic thinking, problem-solving, and time management, which seem to be related to the organizational and planning dimension of the entrepreneurial role ($r \approx 0.70$).
- Emotional intelligence and adaptability show moderate correlations with most skills, acting as transversal skills, essential for performance in multiple scenarios.

Figure 1. Heat map of correlations between managerial skills.



This visual representation supports the results of the exploratory factor analysis and previous predictive models, by showing that certain skills are not only important individually, but are articulated in functional sets, which provides solid foundations for the design of entrepreneurial skills development programs.

5 DISCUSSION

The central hypothesis of this study stated that: "Transformational leadership and emotional intelligence are predictive skills of entrepreneurial success."

The results obtained through various statistical techniques, including logistic regression, PLS-SEM modeling, and exploratory factor analysis, significantly support this claim.

First, transformational leadership stood out as the managerial skill with the greatest predictive weight in the models used. In logistic regression, this predictor presented an odds ratio of 2.41 ($p < 0.001$), while in the PLS-SEM structural model it obtained the highest route coefficient ($\beta = 0.38$), which confirms its direct impact on entrepreneurial success. This result is aligned with the findings of Bass and Riggio (2006), who state that transformational leaders inspire and motivate their teams towards innovative and sustainable goals, a key characteristic in entrepreneurial contexts.

On the other hand, emotional intelligence, especially in its dimensions of self-regulation and empathy, showed a strong correlation with entrepreneurial performance ($\beta = 0.33$ in PLS-SEM; $p < 0.01$ in regression). This skill was also one of the most reported by successful entrepreneurs, coinciding with previous research that associates it with the ability to manage stress, resolve conflicts, and foster effective interpersonal relationships (Goleman, 1998; Joshi & Bhatnagar, 2022).

Likewise, the analysis of differences between groups reinforced the validity of the hypothesis, revealing that both men and women entrepreneurs who exhibit high levels in these two competencies tend to report higher rates of business success and sustainability, regardless of the economic sector or age group.

In addition, the visual representation using heat maps evidenced a strong co-occurrence between transformational leadership, emotional intelligence and other strategic skills, suggesting that these competencies do not operate in isolation, but as part of a high-impact functional cluster for entrepreneurial performance.

Overall, the empirical evidence collected allows us to accept the research hypothesis with a high degree of confidence, and positions transformational leadership and emotional intelligence as transversal and critical management skills for the success of entrepreneurs in the 21st century.

6 CONCLUSIONS

The present study identified and validated a set of dominant managerial skills that significantly affect the success of entrepreneurs in the 21st century, especially those operating in dynamic, digital and sustainable environments. From the quantitative approach applied to active MSME entrepreneurs, it was possible to empirically demonstrate that transformational leadership and emotional intelligence are key predictors of entrepreneurial performance, both in terms of sustainability, growth and adaptability.

The use of validated instruments and techniques such as exploratory factor analysis, logistic regression and PLS-SEM modeling allowed to build a solid methodological base, which provided evidence on the internal configuration of competencies, their grouping into functional clusters and their causal relationship with business results. Visualization using heat maps reinforced the idea that many of these skills operate interdependently, rather than in isolation.

Likewise, the analysis by subgroups revealed significant differences by gender, age and sector, which suggests the need for differentiated training approaches adapted to the different profiles of entrepreneurs. Therefore, it is highlighted that entrepreneurial training in the 21st century must go beyond the technical or financial, incorporating the in-depth development of soft skills, such as effective communication, adaptability, conflict resolution and emotional management.

In summary, this work contributes to the field of entrepreneurship by offering an updated framework of critical competencies, useful not only for researchers, but also for public policy designers, incubation programs, university entrepreneurship centers, and organizations that promote sustainable innovation.

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