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INSTITUTIONAL DRIVERS AND BARRIERS TO SME GROWTH IN RURAL SAUDI ARABIA: ALIHNING ENTREPRENEURSHIP WITH VISION 2030

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Abstract

Small and Medium Enterprises (SMEs) are essential to Saudi Arabia's economic diversification agenda under Vision 2030. While institutional reforms and government initiatives have significantly improved the entrepreneurial ecosystem, the benefits remain unevenly distributed across regions. Rural areas, in particular, continue to face limited access to finance, weak infrastructure, and entrenched socio-cultural constraints. However, little is known about how national institutional reforms interact with informal rural systems to shape entrepreneurship outcomes in Saudi Arabia. This paper examines the institutional drivers and barriers that shape SME growth in rural Saudi Arabia, focusing on the alignment between national reforms and local realities. Grounded in Institutional Theory (North, 1990; Scott, 1995) and enriched by insights from Social Capital and Human Capital Theories, this study develops a conceptual model that explains how formal and informal institutions jointly influence entrepreneurial behaviour and firm performance. The model highlights the role of regulative, normative, and cognitive pillars as determinants of rural SME development and proposes pathways for institutional adaptation under Vision 2030. The paper contributes theoretically by extending institutional analysis to a non-Western rural context and practically by offering policy implications for inclusive regional development. Although conceptual in nature, the framework provides a foundation for future empirical testing to assess the relationships proposed and inform evidence-based policymaking.

Keywords: Institutional Theory, SMEs, Rural Entrepreneurship, Vision 2030, Saudi Arabia

1. Introduction

Small and Medium Enterprises (SMEs) are widely acknowledged as the backbone of economic development and job creation across the globe (Beck & Demirgüç-Kunt, 2006; World Bank, 2022; OECD, 2023). In both advanced and developing economies, SMEs contribute substantially to GDP, innovation, and employment diversification (OECD, 2023). In Saudi Arabia, SMEs play a pivotal role in achieving the ambitions of Vision 2030, which seeks to transform the Saudi Arabia into a diversified and innovation-driven economy that is less dependent on oil revenues (Saudi Vision 2030, 2016; Algarny, 2016; Almawishir, 2018). Through institutional reforms and targeted programmes, such as the establishment of the General Authority for Small and Medium Enterprises (Monsha'at), the Saudi government has sought to strengthen the entrepreneurial ecosystem and promote sustainable business growth (Algarny, 2016; Saudi Vision 2030, 2016; Monsha'at, 2022). However, despite these nationwide efforts, significant disparities persist between urban and rural areas.

However, despite nationwide institutional reforms, significant disparities persist between urban and rural areas. Most SMEs are concentrated in major metropolitan regions such as Riyadh, Jeddah, and Dammam, whereas rural provinces continue to experience slower business creation and limited institutional support (Almawishir, 2018; Alarifi et al., 2019; Alshebami & Seraj, 2022; KSA Regional Context Report, 2022). These disparities suggest that national-level institutional reforms may not uniformly reach or benefit entrepreneurs operating in less developed localities. Rural SMEs frequently face complex institutional barriers, including limited access to finance, weak infrastructure, bureaucratic inefficiencies, and deeply embedded social and cultural constraints (Almawishir, 2018; Alqahtani & Arrowsmith, 2021). Understanding how institutions defined as the formal and informal “rules of the game” that govern economic and social interactions shape rural SME growth is therefore crucial (North, 1990; Scott, 1995).

Institutional arrangements determine how entrepreneurs perceive opportunities, mobilise resources, and build legitimacy. Formal institutions include laws, regulations, and policy frameworks, while informal institutions comprise norms, traditions, and cognitive beliefs that influence entrepreneurial behaviour. In rural Saudi Arabia, both sets of institutions coexist and interact in distinctive ways, producing a dynamic tension between modernisation efforts and long-standing socio-cultural norms. While the literature on entrepreneurship in Saudi Arabia has expanded considerably in the past decade, it remains predominantly urban-centric (Alarifi et al., 2019; Algarny, 2016). Few studies have investigated the institutional dimensions of rural entrepreneurship or how national reforms align with local realities.

As a result, there is limited theoretical understanding of how institutional drivers and barriers influence SME performance in rural Saudi contexts and how Vision 2030 can be

effectively localised. This study aims to address this gap by developing a conceptual model that links institutional drivers and barriers to rural SME growth within the framework of Vision 2030. Specifically, the paper seeks to:

Examine how formal and informal institutions shape the entrepreneurial environment in rural Saudi Arabia. Then, identify key institutional drivers and barriers influencing SME growth, and Theorise how Vision 2030's institutional reforms interact with these dynamics. By integrating Institutional Theory (North, 1990; Scott, 1995) with complementary insights from Social Capital Theory (Putnam, 1993) and Human Capital Theory (Becker, 1964), the paper offers a multi-dimensional understanding of entrepreneurship in rural settings. This theoretical integration not only contributes to the international literature on institutional entrepreneurship but also informs policymakers about how to tailor national strategies to regional contexts. While institutional reforms in Saudi Arabia have been widely discussed, limited attention has been given to how these reforms operate within rural contexts where informal norms and resource constraints differ significantly from urban settings.

Despite the growing literature on entrepreneurship in Saudi Arabia, a clear research gap remains regarding how national institutional reforms interact with rural informal systems and influence SME growth. Previous studies have primarily examined urban entrepreneurship ecosystems, providing limited insights into how institutional conditions in rural contexts shape business development and sustainability. Addressing this gap, the present study explores the institutional drivers and barriers influencing SME growth in rural Saudi Arabia, aligning these dynamics with the objectives of Vision 2030. The remainder of this paper is structured as follows: Section 2 reviews the literature on SMEs, rural development, and institutional perspectives in the Saudi context. Section 3 presents the theoretical framework underpinning the study. Section 4 provides a conceptual discussion linking Vision 2030 reforms with institutional realities in rural areas. Section 5 concludes with theoretical and policy implications and proposes directions for future empirical research.

2. Literature Review

2.1 SMEs and Economic Development

SMEs have long been recognised as fundamental to economic growth, innovation, and employment generation across both developed and developing economies (Beck & Demirgüç-Kunt, 2006; Almawishir, 2018; World Bank, 2022; OECD, 2023). Their flexibility, adaptability, and potential for local innovation enable them to drive inclusive development and reduce regional disparities (Algarny, 2016; Almawishir, 2018). In the Middle East and North Africa (MENA) region, SMEs account for more than 90% of

businesses and provide nearly two-thirds of private-sector employment (OECD, 2023). However, their growth trajectories are often constrained by institutional, financial, and structural barriers that limit their capacity to scale and innovate (Ahlstrom & Ding, 2014). In Saudi Arabia, the government's Vision 2030 explicitly identifies SMEs as key agents of transformation towards a diversified, innovation-led economy (Saudi Vision 2030, 2016; Almawishir, 2018; Monsha'at, 2022).

The establishment of the General Authority for Small and Medium Enterprises (Monsha'at) in 2016 marked a turning point in institutionalising entrepreneurship policy (Alarifi et al., 2019; Monsha'at, 2022). Monsha'at has introduced initiatives in finance, incubation, export readiness, and digital transformation to stimulate SME growth nationwide (Monsha'at, 2022). Despite these achievements, empirical evidence shows that SME development remains geographically uneven, with concentration in urban centres and weak penetration in rural areas (Alarifi et al., 2019; Alshebami & Seraj, 2022). These disparities suggest that structural and institutional reforms, though well-designed at the national level, are not fully localised in rural contexts. Thus, a growing body of research calls for deeper exploration of institutional mechanisms that shape entrepreneurial outcomes beyond the metropolitan core (Algarny, 2016; Almawishir, 2018).

2.2 Institutional Perspectives on Entrepreneurship

Institutional Theory provides a powerful analytical lens for understanding how environmental structures formal and informal shape entrepreneurial behaviour (North, 1990; Scott, 1995; Bruton et al., 2010). Institutions define the “rules of the game” that guide economic interactions, influencing opportunity recognition, legitimacy, and access to resources. Formal institutions include government regulations, property rights, and financial systems, which establish the enabling or constraining frameworks for business operations (North, 1990). Informal institutions, on the other hand, comprise norms, cultural beliefs, and cognitive schemas that shape attitudes towards entrepreneurship and risk-taking (Scott, 1995). In many developing contexts, informal norms often hold greater sway than formal structures, resulting in complex institutional dualities that affect enterprise performance (Bruton et al., 2010). In the Saudi context, the interplay between formal and informal institutions is particularly salient. Formal institutions have undergone rapid reform under Vision 2030 introducing new regulatory frameworks, funding mechanisms, and support programmes (Saudi Vision 2030, 2016; Monsha'at, 2022). However, informal norms rooted in social trust, gender expectations, and tribal affiliations continue to influence entrepreneurial intentions and outcomes (Alqahtani & Arrowsmith, 2021; Alshebami & Seraj, 2022).

Prior research on Saudi entrepreneurship has often emphasised policy and regulation

(Alarifi et al., 2019), While underexploring how social and cognitive institutions mediate these policy impacts in rural contexts. This theoretical gap motivates the integration of Social Capital Theory (Putnam, 1993) and Human Capital Theory (Becker, 1964) to complement Institutional Theory and explain how institutional structures interact with individual and community-level capacities.

2.3 Rural Entrepreneurship and Institutional Challenges in Saudi Arabia

Rural entrepreneurship research highlights the role of local institutions, social ties, and community embeddedness in shaping entrepreneurial outcomes (Korsgaard et al., 2015; Pato & Teixeira, 2016). In many rural areas, entrepreneurship is not driven by innovation or opportunity but rather by necessity and local resource utilisation. Therefore, institutional factors such as access to finance, infrastructure, market linkages, and education play decisive roles in determining success. In Saudi Arabia, rural regions exhibit distinct institutional characteristics (KSA Regional Context Report, 2022). These areas are rich in human and natural resources but often constrained by limited financial services, inadequate digital infrastructure, and strong social norms discouraging entrepreneurial risk-taking (Almawishir, 2018; Alshebami & Seraj, 2022). The rural institutional environment is thus characterised by regulative deficiencies (e.g., centralised funding processes), normative constraints (e.g., gender expectations and social hierarchy), and cognitive limitations (e.g., low trust in institutions).

While Vision 2030 has introduced multiple initiatives to enhance rural economic participation, evidence suggests that many programmes still reflect an urban bias, focusing on metropolitan hubs where institutional capacities and networks are already established (Algarny, 2016; Alarifi et al., 2019). This discrepancy underscores the need for a more context-sensitive understanding of institutional adaptation in rural economies. The literature also highlights the potential of social capital trust, reciprocity, and network density to counterbalance institutional voids (Putnam, 1993). In rural Saudi communities, social capital can serve as an informal mechanism of support and resource exchange, compensating for weak formal structures. However, excessive reliance on kinship-based networks can also restrict innovation and limit external collaboration (Alqahtani & Arrowsmith, 2021).

Similarly, human capital skills, education, and entrepreneurial experience remain unevenly distributed across rural regions, constraining the ability of entrepreneurs to adapt to market dynamics (Becker, 1964; Almawishir, 2018). Strengthening both social and human capital within rural communities is thus essential to enhance institutional effectiveness and ensure that Vision 2030's objectives reach all regions equitably.

2.4 Summary of Literature Gaps

In summary, the existing literature provides valuable insights into SME policy and entrepreneurship in Saudi Arabia but remains urban-centric, policy-heavy, and institutionally fragmented. Three main gaps emerge:

Limited rural focus: Most studies analyse entrepreneurship within major cities, overlooking the institutional realities of rural Saudi regions. Moreover, weak theoretical integration: Few studies combine Institutional, Social Capital, and Human Capital theories to explain how multi-level institutional factors interact to shape rural SME outcomes. Also, Lack of Vision 2030 alignment analysis: Research has yet to systematically examine how national reforms align or misalign with local institutional environments. Addressing these gaps, the next section develops a theoretical framework that integrates these perspectives to explain the institutional drivers and barriers to SME growth in rural Saudi Arabia within the broader context of Vision 2030.

3. Theoretical Framework

3.1 Institutional Theory as the Core Lens

Institutional theory provides a robust foundation for analysing the environmental structures that shape entrepreneurial behaviour and firm performance. It conceptualises institutions as the “rules of the game” that regulate social and economic interactions (North, 1990). These institutions comprising formal regulations, informal norms, and shared cognitive frameworks define how individuals and organisations perceive opportunities, acquire legitimacy, and mobilise resources (Scott, 1995). In entrepreneurship research, Institutional Theory explains why similar policies yield different outcomes across contexts (Bruton et al., 2010). In Saudi Arabia, for instance, despite comprehensive reforms and government support programmes, the uneven performance of SMEs across urban and rural areas underscores the importance of institutional conditions beyond policy design. Institutions not only provide incentives and constraints but also shape cognitive perceptions of entrepreneurship, influencing what is deemed acceptable, legitimate, or feasible within a given community (Alqahtani & Arrowsmith, 2021).

Scott (1995) identifies three interdependent institutional pillars regulative, normative, and cognitive each influencing entrepreneurship in distinct but interconnected ways:

- 1)- The regulative pillar refers to formal rules, policies, and enforcement mechanisms that establish the legal and administrative framework for business activity.
- 2)- The normative pillar involves social values, norms, and cultural expectations that influence entrepreneurial legitimacy and behaviour.

3)- The cognitive pillar concerns the shared mental models and belief systems that shape how individuals interpret entrepreneurial opportunities and risks.

In rural Saudi Arabia, these three pillars interact dynamically. Formal institutions (e.g., Monsha'at, financial regulations) set the structural parameters for enterprise creation, while informal institutions rooted in tribal affiliations, religion, and local customs shape the normative and cognitive climate for entrepreneurship. This interaction creates what North (1990) terms institutional path dependency, where historical norms and informal practices continue to influence outcomes even amid rapid formal reform.

3.2 Integrating Social Capital and Human Capital Theories

While Institutional Theory explains macro-level structures, it must be complemented with micro-level perspectives that account for how entrepreneurs act within those structures. Social Capital Theory (Putnam, 1993) and Human Capital Theory (Becker, 1964) offer such complementary insights. Social Capital Theory emphasises the value of social networks, trust, and reciprocity in facilitating resource exchange and collective action. In rural settings, where formal institutions are often weak, social capital compensates by providing informal mechanisms for cooperation, information flow, and mutual support (Putnam, 1993; Anderson & Jack, 2002). In Saudi Arabia's rural communities, kinship ties and tribal networks are central to entrepreneurial processes. They can foster trust and resource mobilisation but may also reinforce exclusivity and limit openness to innovation (Alqahtani & Arrowsmith, 2021).

Human Capital Theory focuses on the skills, education, and experiences that enhance individual productivity and entrepreneurial capacity (Becker, 1964). The theory posits that investment in education and training increases the ability to identify and exploit business opportunities. In rural Saudi Arabia, however, low levels of business training, financial literacy, and exposure to entrepreneurial role models restrict the effective utilisation of human capital (Almawishir, 2018; KSA Regional Context Report, 2022). By integrating these theories, the framework captures both structural (institutional) and agentic (individual/community) dimensions of entrepreneurship. Institutions set the rules, while social and human capital determine how effectively individuals and groups navigate those rules.

3.3 Conceptual Integration: Institutional Drivers and Barriers

The proposed conceptual framework positions Institutional Theory as the overarching lens and Social and Human Capital Theories as mediating perspectives that explain how institutions influence SME growth in rural Saudi Arabia.

Institutional Drivers:

- 1)- Regulative drivers include supportive policies, accessible financing mechanisms, and decentralised governance initiatives under Vision 2030 (Monsha'at, 2022).
- 2)- Normative drivers involve shifting societal attitudes towards entrepreneurship, including increased female participation and community acceptance of entrepreneurial careers (Alshebami & Seraj, 2022).
- 3)- Cognitive drivers emerge through educational reforms and national awareness campaigns promoting innovation and entrepreneurship (Alarifi et al., 2019).

Institutional Barriers:

Regulative barriers include bureaucratic complexity, limited rural financial institutions, and centralised decision-making (KSA Regional Context Report, 2022). Normative barriers stem from conservative gender roles, risk aversion, and community pressure favouring stable employment over self-employment (Alqahtani & Arrowsmith, 2021). Cognitive barriers involve low institutional trust and limited exposure to successful entrepreneurial models (Almawishir, 2018). These drivers and barriers interact through the mediating effects of social and human capital. High levels of social capital trust, cooperation, and networking can offset weak formal institutions by enabling access to informal finance, mentorship, and market information. Similarly, enhanced human capital through education and training strengthens entrepreneurs' ability to exploit institutional opportunities and mitigate barriers.

3.4 The Proposed Conceptual Model

The conceptual model developed in this study posits that formal and informal institutions jointly shape the entrepreneurial environment in rural Saudi Arabia. The framework proposes that:

Institutional Pillars (regulative, normative, cognitive) → directly influence SME growth outcomes;

Social Capital → mediates the relationship by facilitating trust, cooperation, and resource sharing;

Human Capital → moderates the impact of institutional conditions by enhancing entrepreneurs' capability to navigate systemic barriers.

In this model, the alignment (or misalignment) between Vision 2030's national institutional reforms and local rural institutions shapes the effectiveness of policy implementation. A well-aligned institutional ecosystem fosters inclusivity and innovation, while misalignment perpetuates regional disparities and institutional voids.

3.5 Theoretical Propositions for Future Empirical Testing

Based on the conceptual integration, the following propositions are advanced for future empirical research:

- 1: Formal institutional reforms under Vision 2030 positively influence SME growth in rural areas when supported by local institutional capacity.
- 2: Informal institutions such as social norms and trust mediate the relationship between formal reforms and entrepreneurial outcomes.
- 3: Social capital strengthens the positive impact of formal institutions by facilitating information exchange and collective learning.
- 4: Human capital enhances entrepreneurs' ability to adapt to institutional reforms, thereby improving firm performance.
- 5: Misalignment between national institutional frameworks and rural informal institutions constrains the effectiveness of entrepreneurship policies.

These propositions provide a theoretical foundation for future empirical studies aiming to test the relationships among institutional structures, social and human capital, and SME performance in rural Saudi Arabia.

4. Conceptual Discussion

4.1 Institutional Transformation under Vision 2030

Saudi Arabia's Vision 2030 represents one of the most ambitious institutional transformations in the Middle East, seeking to shift the economy from oil dependency toward a diversified, knowledge-based model (Saudi Vision, 2016). The Vision's implementation has triggered major regulatory reforms, public and private partnerships, and the establishment of new institutional bodies such as Monsha'at and the National Development Fund to strengthen the entrepreneurial ecosystem. These top-down initiatives aim to create a more enabling environment for SMEs through simplified licensing, financial inclusion, and business incubators (Monsha'at, 2022).

However, institutional change is inherently complex. As North (1990) notes, formal reforms do not automatically alter informal practices or cognitive patterns. In the Saudi context, despite visible progress in urban centres, rural areas continue to experience weak institutional absorption. The persistence of informal norms such as limited risk tolerance, reliance on personal networks, and gendered labour divisions illustrates how institutional inertia can constrain the diffusion of reforms (Alqahtani & Arrowsmith, 2021; Alshebami & Seraj, 2022). This misalignment between national-level policies and local institutional realities results in what Scott (1995) calls "institutional inconsistency," where regulative change outpaces normative and cognitive adaptation.

4.2 Regulative Dynamics: Centralisation and Local Constraints

Vision 2030 has generated significant regulative drivers for entrepreneurship, including financial reforms, SME credit guarantees, and innovation funding (Saudi Vision 2030, 2016; Monsha'at, 2022; Alarifi et al., 2019). These mechanisms often remain centralised within major cities, limiting rural accessibility (KSA Regional Context Report, 2022). Entrepreneurs in remote areas face longer approval times, fewer financial intermediaries, and inconsistent enforcement of commercial regulations. This regulatory centralisation reflects what Bruton et al. (2010) describe as institutional voids gaps in the formal mechanisms that support entrepreneurship. Such voids create uncertainty, discourage investment, and compel entrepreneurs to rely on informal arrangements. For example, many rural business owners prefer informal credit from family or tribal networks over formal banking channels, citing procedural barriers and lack of trust (Almawishir, 2018). Thus, while Vision 2030 promotes financial inclusivity, its impact is mediated by how local institutional infrastructure translates national policies into practice (Alarifi et al., 2019).

4.3 Normative and Cognitive Dimensions: The Social Logic of Entrepreneurship

The success of institutional reform depends not only on regulations but also on changes in social values and shared beliefs. In rural Saudi Arabia, entrepreneurship remains embedded within local traditions and collective identities. Community expectations, family obligations, and gender norms often shape perceptions of what constitutes legitimate economic behaviour (Alqahtani & Arrowsmith, 2021). Vision 2030 initiatives, such as women's economic empowerment and youth entrepreneurship programmes, aim to reshape these norms. Yet, normative transformation is gradual. Social acceptance of entrepreneurship as a career path is rising, particularly among younger generations, but older community structures continue to prioritise stability and public-sector employment. The tension between modernisation and social continuity defines much of the normative landscape in rural areas. Cognitively, entrepreneurial orientation is also constrained by limited exposure to successful role models, weak entrepreneurial education, and fragmented knowledge networks (Alarifi et al., 2019). This results in a cognitive gap where entrepreneurship is perceived as risky or elitist, rather than as a viable pathway to socioeconomic mobility. Such cognitive barriers slow the diffusion of Vision 2030's entrepreneurial ethos and require targeted interventions in education, mentorship, and community engagement.

4.4 The Interplay of Formal and Informal Institutions

A critical insight from Institutional Theory is that formal and informal institutions are interdependent, not mutually exclusive. In Saudi Arabia's rural context, informal

institutions particularly kinship, trust, and community networks can either complement or undermine formal policies. When aligned, these networks facilitate resource sharing, market access, and compliance. When misaligned, they perpetuate exclusivity and resistance to change. For example, social capital rooted in strong local ties can help small entrepreneurs overcome limited financial access through informal credit and cooperative arrangements (Putnam, 1993).

However, excessive reliance on close networks can restrict external partnerships and reinforce homogeneity, limiting innovation and scalability. Thus, policymakers must balance the benefits of embedded social structures with the need to cultivate openness and diversity within rural entrepreneurship ecosystems. Human capital further mediates this interplay. Entrepreneurs with higher education, managerial skills, and digital literacy are more capable of leveraging formal institutional opportunities while navigating informal constraints (Becker, 1964). This highlights the importance of tailored capacity-building initiatives that enhance rural entrepreneurs' absorptive capacity and adaptability to reform.

4.5 Aligning Vision 2030 with Local Institutional Realities

The success of Vision 2030 depends on its institutional localisation translating national policy aspirations into effective local practices. This requires recognising that institutional reforms cannot be uniformly implemented across regions with differing historical, cultural, and economic trajectories. To achieve alignment, several conceptual implications arise from this framework:

Decentralised governance, empowering regional development agencies to design locally relevant SME programmes reduces regulatory bottlenecks.

Contextually grounded entrepreneurship policies enhance legitimacy and effectiveness by aligning with Saudi Arabia's institutional and cultural norms (Algarny, 2016; Alarifi et al., 2019). Integrating social capital—through community networks and trust-based relationships facilitates knowledge exchange, mentorship, and collective participation in entrepreneurship (Almawishir, 2018; Alshebami & Seraj, 2022). Human capital investment, especially in entrepreneurship education and digital skills, strengthens institutional adaptability and supports regional economic diversification (Akinwale et al., 2020; Ajayi-Nifise et al., 2024). Finally, coordination among Monsha'at, financial institutions, and local authorities is essential for coherent and equitable policy implementation, ensuring effective progress toward Vision 2030 goals (Mansour, 2020; Alqahtani & Arrowsmith, 2021). Together, these elements—contextualisation, social capital, human capital, and institutional coordination—form a comprehensive framework for fostering a sustainable and inclusive entrepreneurship ecosystem in Saudi Arabia.

These propositions emphasise that institutional transformation is not merely a top-down process of regulation but a multidimensional negotiation between formal and informal systems (Algarny, 2016; Alqahtani & Arrowsmith, 2021; Alvesson, Hallett, & Spicer, 2019). In rural Saudi Arabia, sustainable SME growth depends on bridging this institutional divide by aligning the regulative intent of Vision 2030 with the normative and cognitive realities of local communities (Almawishir, 2018; Mansour, 2020; Alshebami & Seraj, 2022; Alarifi, Robson, & Kromidha, 2019).

4.6 Toward an Inclusive Institutional Ecosystem

Ultimately, this discussion underscores that institutional reform is most effective when it fosters inclusive ecosystems that integrate both national ambitions and local capacities (Algarny, 2016; Almawishir, 2018; Alarifi, Robson, & Kromidha, 2019). For Vision 2030 to realise its full potential, it must embrace diversity in institutional contexts viewing rural regions not as peripheral but as strategic contributors to national development (Mansour, 2020; Alqahtani & Arrowsmith, 2021). The conceptual model proposed in this paper offers a framework for understanding how rural institutional ecosystems can evolve through the interaction of policy design, social trust, and human capability (Audretsch et al., 2021; Alshebami & Seraj, 2022). It also provides a foundation for future empirical research to test how these dynamics unfold across different rural regions of Saudi Arabia (Akinwale et al., 2020; Ajayi-Nifise et al., 2024). By situating rural entrepreneurship within the broader institutional transformation agenda, this discussion contributes to a more nuanced understanding of how structural reforms, social norms, and individual capacities intersect to shape inclusive economic growth (Alvesson et al., 2019; Alahmari & Alkulaib, 2024).

5. Conclusion and Implications

This paper set out to explore the institutional drivers and barriers influencing the growth of SMEs in rural Saudi Arabia within the framework of Vision 2030 (Algarny, 2016; Mansour, 2020). By adopting Institutional Theory as the primary analytical lens and incorporating Social Capital and Human Capital perspectives, the study developed a conceptual model that captures how formal and informal institutions jointly shape entrepreneurial dynamics (Almawishir, 2018; Alqahtani & Arrowsmith, 2021; Audretsch et al., 2021). The discussion has shown that although Saudi Arabia's institutional reforms have established a strong national framework for entrepreneurship, their effects remain uneven across regions due to persistent normative and cognitive barriers embedded in rural contexts (Alarifi et al., 2019; Alshebami & Seraj, 2022). The findings underscore that institutional transformation is multidimensional. While formal reforms such as the creation of Monsha'at, streamlined business regulations, and new financial programmes

represent crucial steps toward economic diversification, they must be complemented by deeper engagement with the social and cognitive structures that define rural communities (Alvesson et al., 2019; Akinwale et al., 2020; Ajayi-Nifise et al., 2024).

Institutional effectiveness depends not only on the rules of the game but also on the degree to which these rules resonate with local beliefs, trust systems, and human capacities (Arabiyat et al., 2019; Balzano et al., 2025). From a theoretical standpoint, the paper contributes to entrepreneurship literature in three key ways. First, it extends Institutional Theory to a non-Western, rural setting, demonstrating that institutional effects are context-dependent and shaped by cultural embeddedness (Zhai & Su, 2019; Thakur, 2023; Almawishir, 2018). Second, it integrates multiple theoretical lenses linking Institutional, Social Capital, and Human Capital theories to provide a holistic understanding of how structural and agency-level factors interact in shaping SME growth (Ahmad, 2012; Mansour, 2020; Rafiki, 2020). Third, it introduces a framework for analysing institutional alignment under national reform agendas, offering a basis for future empirical testing in emerging economies (Ahmad, 2012; Algarny, 2016; Zhai & Su, 2019).

From a practical perspective, the study provides several policy implications relevant to policymakers, development agencies, and entrepreneurship support organisations (Arabiyat et al., 2019; Thakur, 2023; Balzano et al., 2025):

- 1)- Decentralising SME support: Empowering regional offices of Monsha'at and local development agencies to design context-specific programmes can address the unique institutional challenges of rural regions.
- 2)- Strengthening local finance ecosystems: Establishing community-based financial institutions and microcredit schemes would reduce the urban bias in access to finance.
- 3)- Investing in education and capacity-building: Enhancing entrepreneurial education, digital skills, and managerial training can build the human capital required to sustain SME competitiveness.
- 4)- Leveraging social capital: Policymakers should harness local trust networks and community organisations to disseminate knowledge, promote collaboration, and enhance programme legitimacy.
- 5)- Promoting institutional coherence: Coordination among government ministries, financial bodies, and regional authorities is critical to ensure that reforms at the national level are effectively implemented at the local level.

While this paper remains conceptual, its framework offers clear directions for future empirical research. Quantitative studies could test the proposed propositions by examining the relationships between institutional pillars, social and human capital, and SME performance across different rural regions. Qualitative approaches such as case

studies or interviews with rural entrepreneurs could further illuminate how institutional alignment unfolds in practice. In conclusion, achieving inclusive rural development under Vision 2030 requires moving beyond top-down reform to embrace institutional pluralism recognising the interdependence of formal policies and informal local dynamics (Zhai & Su, 2019; Thakur, 2023; Balzano et al., 2025). Rural entrepreneurs are not merely recipients of reform but active participants whose social and human capital can drive institutional adaptation (Almawishir, 2018; Rafiki, 2020; Mansour, 2020). Aligning national aspirations with local realities will be essential to unlocking the full potential of Saudi Arabia's rural economy and achieving sustainable, broad-based growth (Algarny, 2016; Arabiyat et al., 2019; Alqahtani & Arrowsmith, 2021).

6. Limitations and Future Research Directions

As a conceptual paper, this study is inherently limited by its lack of empirical validation. The proposed framework is based on theoretical synthesis and secondary evidence rather than field data, which constrains the ability to generalise its propositions. Furthermore, institutional contexts are dynamic and regionally diverse, meaning that the model may not capture the full complexity of rural entrepreneurship across all parts of Saudi Arabia. Future research should empirically test the theoretical propositions advanced in this study through mixed-method designs. Quantitative surveys could measure the relationships between institutional pillars, social and human capital, and SME performance, while qualitative interviews or case studies could provide deeper insight into the lived experiences of rural entrepreneurs. Comparative studies across regions and time periods would also help evaluate how institutional reforms under Vision 2030 evolve and interact with local contexts. Such research would not only validate the conceptual framework but also refine policy interventions for inclusive and sustainable rural development.

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STUDENT'S MOTIVATIONAL FACTORS IN EXTRACURRICULAR TRAINING FOR ENTREPRENEURIAL COMPETENCE IN PRIMARY EDUCATION DEGREE, AND THEIR LEVEL OF KNOWLEDGE.

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Abstract

Entrepreneurial competence is a fundamental aspect of initial teacher training. In instances where it is not sufficiently embedded within the Primary Education degree curricula, it is often offered through extracurricular programs. This is the case at the University of Deusto. This study presents the factors that have motivated students to participate, as well as the foundational knowledge they have acquired throughout the program. While the ongoing implementation of such programs is considered crucial, the results suggest a favorable disposition among participants towards their continuation.

Keywords: entrepreneurial education; Primary Education Degree; extracurricular training; motivation.

Entrepreneurial competence (EC) is one of the eight key competences (European Union, 2006) defined as the ability to act on opportunities and ideas to create value (social, cultural or economic) for others (McCallum et al., 2018). This competence is included throughout compulsory education in Spain through the Organic Law 3/2020 LOMLOE (Head of State, 2020). Thus, it is clear that Primary Education degree pre-service teachers have to develop EC as part of the exit profile and integrate the competence in their teaching practice. However, Primary Education degree is regulated by Order ECI/3857/2007, of 27 December 2007, which qualifies for the profession of Primary Education teacher (Ministry of Education and Science, 2007). Among the requirements, this order does not explicitly mention EC, but it highlights innovation, planning and collaborative work, competences of the European framework EntreComp (Bacigalupo et al., 2016).

In an increasingly volatile, uncertain, complex and ambiguous environment, extracurricular courses are essential to complement formal training and to develop key competences that are not always addressed in depth in university curricula. Only in this way will ‘universities fulfil their function of adapting degree programmes to social demands, responding to the appropriate socio-occupational insertion of their graduates’ (Romero-García and Suárez-Ortega, 2024, p. 147).

Intrinsic motivation is necessary to participate in extracurricular university activities, and to reinforce meaningful learning (Chapman et al., 2023). In a systematic review conducted by Díaz-Iso et al. (2020) after analysing 50 articles, they mainly highlight the complementary value of extracurricular activities for employability and professional development.

In the context of the University of Deusto, in the 2024-2025 academic year, an extracurricular programme was offered to students in the 1st and 3rd year of Primary Education Degree to develop EC. In order to assess the future viability of similar programmes and the knowledge acquired, the following objectives were set:

O1: to analyse the factors that motivate students to participate in extracurricular programmes on EC.

O2: to analyse the basic knowledge that students have acquired about EC during an extracurricular programme.

The following 16 questions were designed and sent to all participants by Google Forms:

1. What motivated you to sign up for the programme?
2. Have you participated in any programme/subject in which EC is specifically addressed within or outside the University of Deusto? If your response is affirmative, please specify below the programme(s) in which you have participated.
3. As a future professional of education (teacher), do you consider it necessary to receive training in entrepreneurial competence?
4. Which modalities would you prefer for receiving this training? (You may select as many options as you deem appropriate)
5. In which language would you like to receive this training?
6. What kind of training would you prefer to receive? (You may select as many options as you deem appropriate)
7. Select the type of training activity that you believe best aligns with your preferences (you may select as many options as you deem appropriate)
8. How many hours per session of your free time would you be willing to dedicate to this training (excluding visits to educational centres)?
9. How many days per month would you be willing to commit to this training?
10. Would you be willing to pay for such training? If so, please specify the amount you would be willing to invest.
11. Regarding your participation, would you be inclined to continue engaging in similar programs, provided they align with your availability?

12. Would you recommend this type of training to your colleagues?
13. Are you aware that entrepreneurial competence is one of the key competences to be developed in Primary Education students??
14. Are you aware that entrepreneurial competence is one of the key competences promoted by the University of Deusto?
15. Are you familiar with the European framework for entrepreneurial competence, EntreComp?
16. Please list the EntreComp competences you are familiar with within the framework.

With regard to the first objective, to analyse the factors that motivate students to participate in extracurricular EC programmes, among the motivational factors, training (66.6%) and being a different opportunity (33.3%) stand out. To a lesser extent, participants mention the final gratification and sharing a learning space with their peer group.

All participants admit the importance of EC for their professional future, and would recommend this type of training to other students. Moreover, 25% have previously participated in similar programmes, 25% prefer face-to-face training, and the remaining 75% prefer blended learning. Concerning the language, half of the participants prefer Spanish and Basque (33.3% Spanish, and 16.7% Basque). Finally, 66.7% prefer this type of training to be included in the degree syllabus, and 75% prefer it to be offered as an extracurricular subject with credit recognition.

With regard to the working methodology used in this type of training, all the participants agree in visiting key entrepreneurial centres, highlighting talks with experts (91.7%), visits by professionals from the entrepreneurial world (75%), and participating in entrepreneurial events (75%). To a lesser extent, workshops (50%), participation in research projects (33.3%), coffee-talks (25%), preparation of Final Degree Projects on entrepreneurship (16.7%), and master classes (8.3%) are mentioned.

In terms of duration of the programme, 66.7% prefer 1-2 hours per session and the rest of the participants prefer 2-3 hours. In addition, 75% are willing to commit between 1-4 days per month, and the rest between 5-8 days per month. Only one participant would be willing to pay for this type of training.

With regard to the second objective, to analyse the basic knowledge that the students have acquired about EC, all the participants consider EC as a key factor both in the European context and the University of Deusto, and are aware of EntreComp (91.7%). In this sense, the EntreComp competences that students clearly identify at the end of the programme are, in order of priority, the following: cooperation (teamwork), creativity, motivation and perseverance, mobilising resources, planning and management, and vision of the future. It is striking that competences such as ethical and sustainable thinking, valuing ideas, and learning through experience, together with risk-taking, are the least mentioned.

In conclusion, on the one hand, although this type of programme seems to be of interest to students, it is important to recognise them through credits and, above all, to integrate

them into the syllabus. On the other hand, it is necessary to maintain these kinds of programmes throughout their training, and to promote enhanced student engagement in both design and development of programmes.

One limitation of the study is the small sample size of participants, which makes the results non-generalisable. However, the data from this study may be useful for modifying educational policies and primary education curricula, since, as mentioned previously, students show interest in entrepreneurial competence for their personal and professional future. In this regard, teacher training in entrepreneurship could be encouraged and policies designed to promote entrepreneurial culture, among others.

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MOVING SUSTAINABILITY FORWARD: STRATEGIC ROADMAP FOR AGALEUS

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Abstract

Sustainability has become a central pillar for business development in the 21st century, as companies are expected to combine economic success with social responsibility and care for the environment (Sulich et al., 2025). This has become even more urgent as the prevailing linear economic model – focused on extraction, production and disposal – has led to resource depletion and environmental degradation (Briones-Peñalver et al., 2021). Therefore, the transition towards a circular economy is increasingly recognized as a key strategy to preserve natural capital, reduce consumption of finite resources and minimize waste generation (Lakshmi et al., 2025). This transition is not merely an operational adjustment, but a structural and cultural change in organizations, redefining product design, supply chain management and ultimately business models (Kirchherr, Reike, & Hekkert, 2017) in industries such as the waste management industry.

In this context, an organization that embraces sustainability not only seeks to generate social and economic value from its actions, but also commits to the development of future generations (Cámara Madrid, 2024). Companies are becoming more aware of the benefits offered by the circular economy and have started to understand the value it can create for themselves and their stakeholders (Arroyave et al., 2025).

Within this framework, Agaleus, a pioneering environmental group in the Basque Country with more than 35 years of experience in recycling and environmental services, serves as a practical example of how sustainability can be transformed into a growth driver. According to the CEO of Agaleus in 2022, the group has spent more than three decades promoting what society now calls the circular economy. Agaleus helps the Basque industrial sector meet environmental standards and sustainability goals, thus becoming more innovative and competitive (Spri, 2022).

In short, the study aims to propose a strategic growth plan for Agaleus, illustrating how circular economy principles can support business expansion while maintaining environmental responsibility. The project focuses on analyzing its current situation, identifying opportunities for diversification and expansion in the waste management industry, and designing lines of action that integrate sustainability into the core of its business strategy.

The business model of the group is closely linked to the principles of the circular economy, as it is committed to transforming waste into resources. The efficient waste management and recovery reduces raw material consumption and pollutant emissions, thereby contributing to the conservation of the environment. Agaleus is positioned as a leader in comprehensive waste transformation and recovery services, supporting the industrial sector on its path towards greater sustainability and reduced environmental impact. In addition, its proximity to the companies it serves also reduces the emissions generated during waste transport (Agaleus, 2024).

All in all, the strategic growth plan for Agaleus aims to identify key areas for expansion and growth, such as incorporating innovative waste management technologies, the planned construction of a new waste management and valorization plant, and developing new circular services. The case of Agaleus illustrates how a local group can become a benchmark in the transition to a circular economy and serve as inspiration for other organizations seeking to grow responsibly. This reinforces the idea that business growth and environmental commitment are not incompatible concepts, but rather dimensions, that, when properly integrated, reinforce each other (Geissdoerfer et al., 2017).

Keywords: sustainability; circular economy; waste management, business growth, environmental responsibility

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EMPLOYMENT OR BUSINESS: WHAT SLOVAK YOUNG ADULTS PREFER AS THEIR FUTURE CAREER?

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Abstract

No preference can be precisely quantified when assessing young people's ideas about their future lives. Moreover, self-reported survey data may not fully capture the complexity of decision-making processes. In such situations, it is difficult to create a test that measures preference based on an action. To circumvent this problem, the knowledge of behavioral economics can be used. Behavioral economics focuses on individuals with limited rationality, revealing what really influences their decisions and actions. Behavioral science suggests that people are more humane and less homo economicus and thus that their decision-making is also influenced by emotions and intuition (Persky, 1995; Sunstein et al., 1998; Kahneman, 2003; Thaler, 2017; Grimmelikhuisen, 2017). A person's decision-making is influenced by two systems of thinking, according to which he evaluates the situations in which he finds himself (Cole et al., 2025). In psychology, they are named as System 1 and System 2. Thaler and Sunstein (2009) assigned key characteristics to these systems, for the sake of this paper, the System 1 is relevant. System 1 is a fast thinking system - an automatic system. A person makes decisions based on experience, is quick and instinctive, follows innate skills.

Based on the knowledge of behavioral economy and System 1, this paper uses a unique pictorial survey (which is more objective and circumvents the problem of self-reported survey data) to explore the employment preferences of Slovak young adults, examining their inclination to work domestically or abroad, as well as their attitudes toward entrepreneurship. Quantitative research builds on an online pictorial survey of 283 students aged 17–26, the analysis uses descriptive statistics and binary logistic regression to identify key determinants influencing career-related decisions. Findings show that approximately 40% of respondents prefer working abroad, primarily due to limited career opportunities, poor prospects for professional growth, and a perceived lack of valuable experience in Slovakia. Students who doubt they will find a job in their field of study are more than twice as likely to seek employment abroad, while low wages were not identified as a major factor. The Mann-Whitney tests unveiled significant differences regarding socioeconomic background (economic status, family background, gender), e.g. students from wealthier families are less inclined to leave the country. The study further

examines preferences for entrepreneurship, revealing that students from entrepreneurial families are significantly more likely to consider starting a business. Another important aspect is the gender – female respondents desire to have a middle level job, sometimes in management and sometimes in administrative work such as accounting even if the pay is quite low. Despite gender equality, she does not expect to be the bread winner. This is in line with other studies (Parry & Urwin, 2011; Oliveira & Cordeiro, 2025) who claimed that compensation is more important for men than for women, which is consistent with prevailing gender roles in society, wherein men perceive themselves as providers.

Only a small share of female respondents expressed a desire to start a business and become a female entrepreneur. It is no surprise, considering the results of Eurofound (2024), stating that youth entrepreneurship has been declining over the long term, despite efforts by EU- and national-level policymakers to encourage it. Data also shows that young women are less often self-employed than young men, which is consistent with the findings of recent research reports; self-employed women are, however, more vulnerable to decreasing incomes and working hours during crises than self-employed men (GEM, 2023).

This study contributes to the ongoing debate on careers, generations, and youth by highlighting job preferences and differences related to individual characteristics, including gender related specifics.

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Keywords: behavioral economics; youth preferences; entrepreneurship; Slovakia

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GREEN PUBLIC PROCUREMENT: ARE SLOVAK FIRMS READY?

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Abstract

This paper deals with the issue of green public procurement as a modern and optional tool of environmental policy. Given that public procurement accounts for 13% to 20% of global GDP, it is not surprising that nations are now seeking methods to use public procurement procedures not only as an efficient public purchasing tool but also as a tool for sustainable development and a catalyst for innovation in both the public and private sectors (Lember et al., 2014, Zipperer, 2019). Alkadry et al. (2019) pointed out that by integrating social, economic, and environmental considerations into its procedures, sustainable public procurement can be a crucial instrument for accomplishing the overall sustainability of human development. One particular element of sustainable public procurement is green public procurement (Brammer and Walker, 2011; Grandia et al., 2020). Dimand et al (2023) stated that green public procurement (GPP) is specific in the sense that more than 40% of the total carbon footprint of organizations is associated with procurement, which shows that green procurement practices are a crucial factor in responding to climate change and other environmental challenges.

The legal basis for GPP in Slovakia is Act No. 343/2015 Coll. on Public Procurement. The Public Procurement Act (PPA) allows Slovak contracting authorities to take environmental aspects of a contract into account at all stages of public procurement. GPP is still primarily a voluntary instrument in Slovakia. Although the 2022 amendment to the PPA introduced an obligation to apply an environmental perspective, this obligation is not universal. Environmental consideration is defined in Article 10(7), which imposes the obligation to take environmental and social considerations into account on contracting authorities that have launched or carried out at least ten public procurements, excluding low-value contracts, in a calendar year. The Slovak Government Resolution No 541/2022 also created a partial obligation to apply GPP tools in public tenders for the construction or reconstruction of civil engineering works. The obligation applies only to the State and

mandates the use of GPP tools with an emphasis on environmental aspects for construction works with a financial limit exceeding € 30,000. Outside these obligations, the use of GPP remains at the discretion of the contracting authority itself.

The main aim of this paper is to identify the state of application of environmental aspects in public procurement in Slovakia with an emphasis on the factors which influence the implementation of green public procurement, especially the readiness of Slovak firms to comply with environmental criteria. The research uses secondary data from the Public Procurement Office of the Slovak Republic on all green public contracts for 2023 and 2024 and data which are published in the tender documents of 40 selected contracts in the conditions of municipalities in Slovakia for the year 2024.

In 2023, 10,319 public procurements were carried out, with only 482 of them being assessed as green public procurement, i.e. only 4.67% were so-called green contracts. In 2024, a significant decrease in the absolute number of public procurements can be identified at first glance. Only 6,622 public procurements were carried out, which shows a decrease of 35.83% compared to 2023. This decrease is most likely related to legislative changes that significantly increased the financial limit for the application of public procurement procedures from €10,000 to €50,000. Of the absolute number of public procurements in 2024, only 429 green contracts were identified (6.48%).

Analysis of 40 randomly selected contracts showed that green elements appear in individual tender documents both in the form of environmental criteria (Energy efficiency, Recyclability of materials, Life Cycle Assessment, CO₂ reduction, Restriction of hazardous substances use) and in the technical specifications in the description of the subject of the contract. Technical specifications can be described as mandatory requirements for a specific subject of the contract, which means that they define the minimum environmental properties of a product, service or construction work that the offer must contain to be evaluated as acceptable. These can be guaranteed by ecolabels, e.g. EnergyStar. Out of the 40 analyzed contract, only 6 identified quality assurance requirements through ecolabels.

These data were triangulated in interviews with stakeholders (procurers, academic experts on public procurement and a representative from the Public Procurement Office of the Slovak republic). All responses uniformly suggest that the core GPP barrier in the conditions of Slovakia is the administrative character of the procurement process, and especially of its control. Procuring entities are reluctant to bear the risk of involving control bodies and the extra work involved in using more complex evaluation/qualification/performance criteria.

The results point to the problem of a formal implementation of the green public procurement principles in the conditions of municipalities in Slovakia. These findings are further linked to the practice of Slovak firm to innovate and comply with the evaluation criteria of green public procurement (Lundberg & Marklund, 2013; Ma et al., 2021; Schäfer et al., 2024; Deschamps et al., 2025).

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Keywords: green public procurement; environmental criteria; evaluation criteria; Slovakia

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MULTILEVEL ENTREPRENEURSHIP RESEARCH OF STUDENTS: CASE OF VYTAUTAS MAGNUS UNIVERSITY AGRICULTURE ACADEMY

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Abstract

New knowledge and skills are needed to ensure the long-term sustainability of agriculture. Other factors such as climate change, rapid scientific and technological progress, the globalisation of business, the world's growing demand for safe and clean food, and an ageing population are also driving the need for new entrepreneurial competences in the creation and management of agribusiness. The European Commission (2018) notes that entrepreneurial competences are considered as one of the key competences for the 21st century. Traditional models of agribusiness development, which were sufficient in the 20th century, will no longer suffice (Verma & Shrivastava, 2021). Entrepreneurial competences comprise a set of knowledge, skills, values and motivations (Salun et al., 2020; Franceschelli et al., 2018). Entrepreneurial competencies enable an individual to successfully create original, valuable products or services in response to market demands and sustainable business development objectives. Businessmen are distinguished by their ability to materialise ideas, create value, solve problems, implement plans, discover the most appropriate ways to start, develop and complete projects, manage interpersonal relationships and the transformation of the organisation itself (Jaridim, 2021). Entrepreneurial competences can be developed through various forms of learning. Researchers (Rok & Kulik, 2021; McCaffery, 2018) point out that entrepreneurial knowledge and skills are strengthened not only through academic learning, but especially through the practical application of the acquired knowledge. This allows theoretical knowledge to be extracted and translated into actionable solutions. Mentoring, various simulations and practical training play an important role in the development, shaping and strengthening of entrepreneurial competences. This gives students the opportunity to test and verify the knowledge and skills acquired at the university in real-life situations. Continuous professional development, seminars, creative projects and cooperation with

entrepreneurs also contribute to the development and improvement of these skills. Research on vocational and entrepreneurial skills and their needs can help to determine what kind of entrepreneurial knowledge and skills are needed in the socio-economic, natural and geo-political context of the times, and how best to develop these entrepreneurial competences (Baron & Tang, 2011). Such research provides a framework for more effectively addressing the challenges and opportunities presented by the changing business environment.

The main research questions were: what entrepreneurial competences are needed for future agricultural workers? Do students studying in specialised study programmes in agriculture, engineering and forestry acquire sufficient entrepreneurial and managerial knowledge and skills during their university studies?

The aim of this study was to investigate the opinion of the students of Vytautas Magnus University Academy of Agriculture, Lithuania (further in the text VMU AA) on the knowledge and skills of entrepreneurship and the need to strengthen these knowledge and skills. The case of VMU AA was chosen for the empirical study.

In order to achieve the objective of the study, the empirical research was conducted in several stages: 1) content analysis of the networks of the first (Bachelor) and second (Master) cycle study programmes at the VMU AA, which are not related to business, management, finance, social sciences. 2) Questionnaire survey of VMU AA students. 3) Semi-structured interviews with business representatives working in the agricultural and related sectors.

According the first stage, the content of 22 degree programme grids at the Faculties of Agronomy, Engineering and Forestry and Ecology was analysed. For each study programme, business and entrepreneurship-related subjects were searched for in terms of number, status (compulsory or elective) and ECTS credits. The following keywords were used to analyse the study programme grids: business, business planning and management, project management, entrepreneurship, business development, entrepreneurship, innovation.

According to the second stage, the questionnaire included three blocks of questions: a) demographic characteristics of the respondents; b) a group of questions about the respondents' work experience, entrepreneurial knowledge and skills acquired during their studies; c) a group of questions about the respondents' attitudes towards the need for strengthening entrepreneurial knowledge and skills. The questionnaire survey was carried out between January and March 2025 via e-mails. The principles of voluntary participation in the study and anonymity allowed for a wide coverage of the study. A total of 225 students took part in the survey: 110 from the Faculty of Agronomy, 50 from the Faculty of Engineering and 65 from the Faculty of Forestry and Ecology.

In the third stage semi-structured interviews with business representatives working in the agricultural and related sectors were done. This stage of the research allowed to reveal the employers' attitudes towards the entrepreneurial competences acquired/possessed by students, highlighting the problematic aspects related to the object of the research. The

informants were representatives of agriculture or the businesses serving it, who participated in the international agricultural exhibition "Ką pasėsi...2025", which is organised annually at the VMU AA. The number of informants was 29.

The analysis of 22 study programmes' grids revealed 14 different study subjects that are more or less related to the development of students' entrepreneurial competences, such as "Management of Agricultural Business Projects", "Innovative Product Development", "Management of Forestry Business", "Entrepreneurship and Innovation", "Entrepreneurship in Environmental Protection", "Marketing and Business of Forest Resources", "Business Planning and Evaluation", "Management of Investment Projects" etc. Most (9) subjects are compulsory, others (5) are optional.

The analysis of the study programme grids shows that there are relatively few study subjects dedicated to the development of students' entrepreneurial competences. The fact that students acquire little entrepreneurial knowledge and skills during their studies is confirmed by the results of the student questionnaire survey. Only 2% of respondents rated their entrepreneurial knowledge and skills as very good, 13% rated them as good, 51% as average, 19% as poor, and 15% as having no entrepreneurial knowledge and skills at all. It can be concluded that respondents were quite self-critical in their assessment of their entrepreneurial knowledge and skills, with the majority of respondents believing that they have some basic knowledge and skills, but often lacking systematic knowledge and/or practical application skills.

The results of the survey showed that students have knowledge and skills in generating business ideas, market analysis and business plans. 58% of the respondents indicated that they had no experience of being employed or running their own/family business/farm. 16% of respondents indicated that they had done it on their own or had attended training outside the university in order to develop entrepreneurial competences. These results reflect students' personal initiatives to develop entrepreneurial competences. The results of the survey support the need for an additional, informal or integrated entrepreneurship enhancement programme.

The majority of respondents indicated that they would like to learn and/or strengthen their existing entrepreneurial competences in the near future or in the future. The students surveyed indicated that they would strengthen their knowledge and skills in the areas of new business creation, business development, marketing, investment and financial management, innovation, process management.

Equally, respondents would like to develop and strengthen general entrepreneurial competences such as decision-making, time, stress, conflict management, teamwork, leadership, motivation building.

In the opinion of business representatives, in a dynamic, competitive business environment, not only job/position-specific knowledge and skills are important, but also creativity, independence, critical thinking, teamwork, motivation, continuous improvement, flexibility, quick learning to work with the latest technologies (especially IoT).

The results of the interviews showed that employers value most the competences of young people new to the labour market that lead to their autonomy, decision-making and ability to contribute effectively to the team's performance. According to the informants, the knowledge and competences acquired by students at university are only partly in line with the changing needs of the labour market, there is still a serious lack of practical skills among graduates, and universities often lack flexibility, but this is not due to the reluctance of the universities or the administrations of their departments, but rather due to formal (legal) issues.

The interviews also revealed that businesses are open to cooperation with HEIs, by hosting students for internships, providing them with incentive grants, and engaging them in research projects. The study revealed that there is a gap between the entrepreneurial competences possessed by the students of VMU Academy of Agriculture and their own and employers' expectations. Therefore, it is very important to pay more attention to strengthening the content of study programmes by including more compulsory subjects in study programmes, which would enable the development of students' entrepreneurial competences. It is also important to select appropriate and more varied study methods and to encourage closer cooperation between students from different study programmes.

There are a number of initiatives to strengthen student entrepreneurship at VMU, so it is important to choose appropriate channels for disseminating information about the activities and to encourage students' motivation and involvement in them.

The results of research allow universities and other educational institutions to review their curricula and content and to provide learners with the knowledge and skills that will enable them to be competitive in the labour market and/or to successfully develop their own businesses.

Keywords: agribusiness, entrepreneurship, entrepreneurial competences.

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INNOVATIVE ACTIVITY OF ENTREPRENEURS ACROSS CULTURES

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Abstract

Frequently studied dimensions of national culture in the context of entrepreneurship are individualism-collectivism, uncertainty avoidance, power-distance, and masculinity-femininity (Hofstede, 1980). These four dimensions and their expected associations with levels of entrepreneurship have been extensively covered in the literature (e.g., Herbig, 1994; Hofstede, 1980; Shane, 1992). Since his original study, Hofstede has identified two other cultural dimensions - indulgence and long-term orientation (Hofstede et al., 2010). Little research, however, has examined the impact that these dimensions exert upon the economic behaviors of entrepreneurs. To advance our understanding of the degree to which national culture shapes entrepreneurial endeavors, we explore the relationship between the national cultural dimensions of indulgence and long-term orientation and innovative activity. Additionally, in line with previous studies that repeatedly showed the importance of individualism and power distance to innovation, we examine the relationship between these two dimensions and innovative activity.

Past research examining the degree to which culture influences country-level innovative activities has examined only a narrow, singular view of innovation using measures of index scores (Rinne et al., 2012) and patents (Shane, 1992). These efforts do not fully represent or measure innovation in its complexity across different types and dimensions (e.g., Danneels & Kleinschmidt, 2001). As such, we are limited in what we know regarding the relationship between national culture and innovation. This matters because the levels of different types of innovation have varying effects on firm level performance and national economic output. Our study contributes to the literature by examining under

researched cultural variables (e.g., indulgence and long-distance orientation) as well as investigating the impact culture has upon a more complete view of different types of innovation.

In our study, innovation is defined as the level of newness within a product (Danneels & Kleinschmidt, 2001). We examine three types varying by degree of newness: imitation (no innovation), incremental, and radical (Johannessen et al., 2001). Imitation refers to products or services neither new to a market nor involving new technology or processes—a copy of what already exists. Incremental innovation entails improvements, additive changes, or introducing an existing product to a new market. Radical innovation involves products or services entirely new, both technically and to markets.

Hypothesis

We base our hypothesis in literature as to the relationship, whether positive or negative or neutral, between Hofstede's cultural variables (individualism, power distance, indulgence, long term orientation) and the three types of innovation in our study (imitation, incremental, and radical innovation). We have a total of 12 hypotheses:

Hypothesis 1: Individualism is negatively related to imitation innovation in society

Hypothesis 2: Individualism is positively related to incremental innovation in society

Hypothesis 3: Individualism is positively related to radical innovation in society

Hypothesis 4: Power distance is negatively related to imitation innovation in society

Hypothesis 5: Power distance is negatively related to incremental innovation in society

Hypothesis 6: Power distance is negatively related to radical innovation in society

Hypothesis 7: Indulgence is not related to imitation innovation in society

Hypothesis 8: Indulgence is positively related to incremental innovation in society

Hypothesis 9: Indulgence is positively related to radical innovation in Society

Hypothesis 10: Long term orientation is negatively related to imitation innovation

Hypothesis 11: Long term orientation is negatively related to incremental innovation

Hypothesis 12 Long term orientation is negatively related to radical innovation

Data and Coding

To examine the influence national culture exerts upon the innovative behaviors of entrepreneurs we analyzed data from 59 countries. The data was drawn from the Global Entrepreneurship Monitor (GEM) survey which is an annual survey given to a random sample of 2,000 adults (18-64 years of age) within a country to determine a country's level of entrepreneurial and innovative activity. To measure our dependent variable, we calculated different types of innovation present within a country by combining the responses from a country's entrepreneurs to three questions on the annual GEM survey. The questions asked entrepreneurs to evaluate the degree of newness manifest in their products or services. The three questions and the response categories for each question are listed in Table 1. Across the three items, responses were coded into three innovation

levels: imitation (no newness), incremental (some technical or market newness, e.g., added features or improvements), and radical (new to the world or to a market). Adapting Koellinger (2008), we used three levels rather than two to separate incremental from radical forms, supported by survey distinctions between ‘brand new’ and ‘somewhat new’ offerings. Coding details appear in Table 2.

Table 1. GEM Survey Questions to Nascent Entrepreneurs regarding Innovation of New Products and Services

Survey question	Response categories
T – “Were the technologies or procedures required for this product or service generally available more than a year ago?”	T1 – Yes T2 – No
C- “Will all, some, or none of your potential customers consider this product or service new and unfamiliar?”	C1 – All C2 – Some C3 – None will consider this new and unfamiliar
M – “Right now, are there many, few, or no other businesses offering the same products or services to your potential customers?”	M1 – Many business competitors M2 – Few business competitors M3 – No business competitors

Note: Table based on table presented in Koellinger (2008)

Table 2. Dependent Innovative Activity Types of Nascent Entrepreneurs

Innovative activity	Definition of types created from survey responses presented in table 2
Imitation	T1, C3, M1
Incremental innovation	(T1, C2,M2); (T1, C2, M3); (T1, C1, M2); (T1, C1, M3); (T2, C2, M2); (T2, C2, M3); (T2, C1, M2); (T2, C1, M3)
Radical innovation	T2, C1, M3

Methods

Hypotheses were examined using the Mixed Linear Model analysis in SPSS. Because our innovation type data is longitudinal (e.g., innovation data is nested within countries), OLS regression models do not accurately estimate model coefficients due to the violations of non-correlation of errors (Hofman, 1997). A Mixed Linear Model in SPSS supports modeling data as multi-level. The hypotheses in this study were examined using a two-level model. The level 1 model examines the effect covariates have upon innovation by estimating a regression equation for each country encompassing an intercept as well as a slope parameter for each covariate included in the model. The average slope parameters for the covariates represent the level 1 main effects. The hypotheses are solely examined in the level 2 analysis where the level 2 main effects are analyzed by including the country cultural variables as predictors of the intercept. This intercept model assesses the extent

to which innovation variance can be explained by cultural variables.

Results

Table 3 shows the results of our analysis and Table 4 lists which of our hypothesis were supported. Eight out of 12 hypothesis were supported.

Table 3. Mixed Linear Model Analysis Fixed Effects Model of Country Culture and Innovation

Variable	Dependent Variable: Innovativeness Types								
	Imitation (N=16,900)			Incremental (N = 21,161)			Radical (N = 974)		
	Est.	SE	ρ	Est.	SE	ρ	Est.	SE	ρ
Intercept	-.300	1.62	.86	1.68	1.69	.32	-.287	1.42	.84
GDP (log)	.223	.07	.00	.265	.07	.00	.040	.06	.53
Efficiency Economy dummy	-.050	.32	.88	.024	.35	.95	.220	.27	.42
Innovation Economy dummy	-.576	.36	.12	-.300	.39	-.77	.350	.31	.26
Power Distance	-.016	.00	.01	-.011	.01	.10	-.004	.01	.41
Indulgence	.000	.00	.86	.002	.00	.66	.007	.00	.04
Individualism	-.015	.00	.01	-.008	.01	.18	-.003	.00	.49
Long Term Orientation	-.009	.00	.06	-.016	.00	.00	-.008	.00	.05
Masculinity	.002	.01	.64	-.006	.01	.29	-.001	.00	.67
Uncertainty Avoidance	-.005	.00	.28	.002	.00	.74	.003	.00	.50

Table 4. Results of Hypothesis

Hypothesis 1, 4, 5, 7, 9, 10, 11, 12	Supported
Hypothesis 2, 3, 6, 8	Not supported

Implications

The study contributes to our understanding of the relationship between each of the different types of innovation -imitation, incremental, and radical – and the different dimensions of culture. This is especially important for the cultural dimensions of indulgence and long-term orientation which because of their novelty have been studied less frequently. The study also helps explain how different types of innovation can be affected differently by the same cultural dimension. Policymakers and managers can use these insights to help craft national/organizational policies based on the national culture and the type of innovation that is valued and prevalent in society.

Keywords: National culture; Innovative activity; Innovation types; Mixed linear model

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AGRONEGOCIO FAMILIAR Y DESARROLLO SOSTENIBLE: EL EMPRENDIMIENTO COMO VÍA TRANSFORMADORA REGIONAL

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Resumen

El agronegocio familiar representa una de las formas más arraigadas de producción en las zonas rurales, siendo no solo un sustento económico para miles de familias, sino también un componente esencial para la seguridad alimentaria y la preservación del entorno. En un contexto donde los desafíos del cambio climático, la migración y el envejecimiento del campo amenazan la sostenibilidad del sector, el emprendimiento emerge como una vía transformadora capaz de dinamizar las economías locales, generar valor agregado y fomentar la permanencia de las nuevas generaciones en el territorio. Estudiar la relación entre agronegocio familiar y desarrollo sostenible permite visibilizar cómo, mediante la innovación y el impulso emprendedor, es posible construir modelos productivos más justos, resilientes y sustentables, que contribuyan al bienestar regional sin comprometer los recursos del futuro.

En consideración a lo anterior, el objetivo de este estudio es identificar el papel del agronegocio familiar como motor de desarrollo sostenible en las regiones rurales, destacando el emprendimiento como una estrategia clave para la transformación económica, social y ambiental de las comunidades locales. Para lo cual se identifican las características del agronegocio familiar y su impacto en las economías regionales relacionadas con los principios del desarrollo sostenible pueden integrarse en los modelos de agronegocio familiar mediante un estudio de los casos de emprendimientos rurales exitosos que hayan generado cambios positivos en su entorno.

De acuerdo con el Informe Regional sobre Desarrollo Humano para América Latina y el Caribe 2025 (PNUD, 2025) tras décadas de avances sostenidos, el desarrollo humano en la región de América Latina y el Caribe (ALC) ha comenzado a desacelerarse, siendo un punto de inflexión crítico la pandemia del COVID-19, revelando la profundidad de sus vulnerabilidades estructurales (PNUD, 2025).

En el impulso de un nuevo modelo de desarrollo basado en la sostenibilidad enfocados al cumplimiento de los Objetivos de Desarrollo Sostenible (ODS) para el 2030, se presenta la oportunidad de potencializar a la región al emplear su ecosistema emprendedor, integrado por la cultura, la biodiversidad de los países de América Latina con el fin de enfrentar los desafíos sociales y ambientales urgentes.

Desde un enfoque socioeconómico, un elemento que rodea el ecosistema emprendedor es la familia; la cual ocupa un lugar importante en Latinoamérica como respaldo estructural (Pitre et al., 2024); en este contexto, la familia es conceptualizada como un ente social con características internas particulares que deciden su funcionamiento concreto, además de transmitir de generación en generación el patrimonio familiar, entre otros factores (Vázquez, 2024; Rodríguez, et al. 2014).

Al ser un ente que genera respaldo y apoyo moral, la familia es una potencial opción para crear una fuente de ingresos; un emprendimiento familiar consiste en la asociación de dos o más personas con vínculos de parentesco que deciden reunir esfuerzos para crear una fuente de ingresos. El emprendimiento en la actualidad ha llegado a ser un pilar fundamental para el desarrollo económico y local de un país, ya que potencializa el tejido empresarial interno o endógeno de un territorio o localidad. A su vez, esta actividad impulsa al mejoramiento de la calidad de vida de la población generando un desarrollo sostenible, ya que este se da en virtud de un crecimiento, ya sea económico, tecnológico y, por uso, manejo y explotación de los recursos (Vivas, et al 2021).

La agricultura familiar está íntimamente vinculados al escenario configurado a nivel regional (SAGARPA, 2012), desde los estudios rurales que caracterizan la especificidad que evidencian las unidades familiares en el marco del capitalismo, derivando en el entorno de grupos sociales (Gómez et al., 2017),

En este contexto, más de 16,5 millones de explotaciones agrícolas a lo largo de América Latina, más de la mitad -un 56%- se encuentran en América del Sur; el 35 % en América Central y México; y el 9% en el Caribe (UNRIC, 2024). Representando el 23 % de las tierras agrícolas **en manos de agricultores familiares** empleando 60 millones de mujeres y hombres trabajan en la agricultura familiar (UNRIC, 2024). En México el marco Institucional para el segmento de agricultura familiar se integra de la Política de desarrollo del sector rural y pesquero en México está supeditada a la Ley de Desarrollo Rural Sustentable (LDRS), a la Ley General de Desarrollo Forestal Sustentable (LGDFS) y a la Ley General de Pesca y Acuicultura Sustentables (LGPAS), todas éstas reglamentarias del Artículo 27 constitucional. A nivel de las acciones que emprende la SAGARPA (2012), se presenta en los siguientes párrafos las leyes y planes que enmarcan el desarrollo de la agricultura familiar en México.

El concepto de las familias agrícolas, se definen como grupos sociales caracterizados por la acumulación del capital (Archetti y Stölen, 1975; Bartolomé, 1975). Jan Douwe Van Der Ploeg propone características básicas de la Agricultura Familiar de las cuales destacan: el control familiar sobre los principales recursos, la proporción de fuerza de trabajo (Van Der Ploeg, 2013), aunado a las características anteriores, los principios del emprendimiento se desarrollarán mediante comportamientos y patrones institucionales

derivando en agronegocios familiares.

Este dualismo de familia y agricultura genera los agronegocios, los cuales se definen como actividades económicas implementadas en el medio rural, que guardan relación con el uso y aprovechamiento de los recursos naturales agropecuarios, para el desarrollo de productos específicos orientados a las necesidades del consumidor final, por medio de la producción primaria, procesamiento, transformación, almacenamiento, distribución y comercialización, generando utilidades económicas en forma de ganancia para aquellos que emprenden estas actividades (Ceroni, 2017; Rodríguez, 2010; Gómez et al., 2008).

El crecimiento de los agronegocios aportar al cumplimiento de los Objetivos de Desarrollo Sostenible (ODS) para el 2030; además traen consigo cambios en los mercados, sistemas productivos y relaciones entre agentes, priorizando la innovación, sostenibilidad y el desarrollo desde un enfoque local y global (ONU, 2023). Es así como, el objetivo de este estudio fue identificar el papel del agronegocio familiar como motor de desarrollo sostenible en las regiones rurales, destacando el emprendimiento como una estrategia clave para la transformación económica, social y ambiental de las comunidades locales. El estudio se encuentra en la fase de revisión de literatura, con el propósito de analizar y sistematizar la información teórica y empírica existente relacionada con el papel del agronegocio familiar como motor de desarrollo sostenible en contextos rurales. Para ello, se sigue un enfoque cualitativo y exploratorio, orientado a la identificación, análisis y categorización de los principales aportes académicos, marcos conceptuales y estudios de caso desarrollados en torno a tres ejes temáticos: el agronegocio familiar y sus características socioeconómicas, el emprendimiento rural como estrategia de transformación y sostenibilidad y las dimensiones del desarrollo sostenible (económica, social y ambiental) vinculadas a la actividad agroproductiva.

Se obtuvieron como resultados socioeconómicos los siguientes:

En la región norte, aunque las unidades familiares pueden alcanzar mayor escala, se enfrentan retos de mercado y clima que requieren emprendimientos para valor agregado. En el Bajío/Centro, la conectividad favorece que las explotaciones familiares aprovechen cadenas de valor, aunque necesitan consolidarse como negocios emprendedores sólidos. En el sur-sureste, el agronegocio familiar cumple un rol social muy fuerte y cultural, lo que puede facilitar estrategias de emprendimiento comunitario, pero la infraestructura debe fortalecerse.

En las zonas semiáridas/altiplano, la diversificación + emprendimiento pueden ser la palanca para que la agricultura familiar pase de subsistencia a motor de desarrollo sostenible (SADER, 2024; INEGI, 2023).

Dentro de las estrategias identificadas en agronegocios en México destacan:

1. Alianzas estratégicas y coordinación. Muchas empresas del campo se fusionan o coordinan con otros actores para fortalecer capacidades productivas y logísticas, para generar economías de escala, y acceder a innovación, financiamiento (Chapingo, 2019).
2. Innovación en producto, proceso, organización y valor agregado. Los productores han

agregado valor al producto, diferenciado su oferta (por calidad, sabor, origen, cultura) para acceder a nichos de mercado más sensibles al valor cultural y nutricional (Patiño, et al 2022; López-Torres, 2021; Reyes, 2020).

3. Canales de comercialización diferenciados y relación con los consumidores. Se encontró que muchas de ellas enfocan sus estrategias en canales de venta (mercados locales, ferias, ventas directas) y en mantener una relación cercana con los consumidores (Patiño, et al 2022).

4. Planes de negocio para productores marginados. Se han usado planes de negocio como herramienta para vincular productores en condiciones de pobreza o marginación con el mercado, identificando oportunidades de negocio, estructura de costos, mejora de competitividad (Salinas-Cruz, 2017).

5. Intraemprendimiento Tipo Clúster. Los factores que han influido tanto en la supervivencia de los agronegocios familiares como en el desarrollo regional son intraemprendimiento en la dinámica familiar actuando como un catalizador para la supervivencia de las empresas familiares en el mercado (Chua et al, 2011; Camisón, et al 2016).

El emprendimiento rural se muestra como palanca para transformar unidades familiares hacia modelos más sostenibles y rentables; políticas públicas recientes y programas de fomento, generando un desarrollo sostenible, que se muestra en tres dimensiones: Económica: generan ingresos y empleo local.

Social: preservan saberes, generan cohesión comunitaria y contribuyen a nutrición local. Ambiental: pueden incluir prácticas sostenibles o, en otros casos, enfrentar retos, iniciativas públicas y programas sectoriales intentan fortalecer aspectos productivos y ambientales (SADER, 2023).

Palabras clave: Agronegocio familiar, Desarrollo Sostenible y Emprendimiento

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CULTURAL PATTERNS OF EMOTIONAL REGULATION IN FAMILY BUSINESS SYSTEMS: INSIGHTS FROM MEDITERRANEAN AND CONFUCIAN CONTEXTS

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Abstract

Family businesses are emotionally dense organizations in which professional roles and family ties are deeply intertwined. Unlike non-family firms, where organizational and emotional domains may be more clearly separated, family enterprises are embedded in generational bonds, collective identity, and shared history (Bowen, 1978; Kerr & Bowen, 1988). These features make them particularly sensitive to periods of pressure such as succession, intergenerational transition, or structural crisis. In such contexts, emotional intensity may escalate, with significant consequences for both organizational resilience and relational stability. The present study investigates how emotional regulation operates in family business systems under pressure and tension, emphasizing the cultural variations that shape these processes. Building on Bowen's theory of differentiation of self, the analysis explores the ability of individuals to remain emotionally autonomous while maintaining relational connections (Bowen, 1978). By comparing Mediterranean (Italy) and Confucian (South Korea) contexts, the study examines how cultural norms surrounding closeness, hierarchy, and emotional expression influence emotional regulation in family enterprises.

The central research questions are:

RQ1: How do cultural expectations regarding emotional expression and relational closeness shape regulation strategies in family businesses?

RQ2: What role does differentiation of self play in mediating emotional tension during transitions?

RQ3: How do Mediterranean and Confucian families differ in their use of emotional fusion and emotional cutoff as adaptive strategies?

The study draws on Bowen's family systems theory (Bowen, 1978), which conceptualizes the family as an emotional unit governed by interdependence, anxiety regulation, and transgenerational transmission. The core construct, *differentiation of self*, describes the individual's ability to maintain clarity of thought and emotional balance while staying connected to the family system. High differentiation allows members to regulate emotions effectively, while low differentiation leads to dysfunctional responses such as emotional fusion (over-involvement and blurred boundaries) or emotional cutoff (withdrawal and detachment) (Kerr & Bowen, 1988; Knerr & Bartle-Haring, 2010). However, emotional regulation cannot be understood outside cultural contexts. Cross-cultural psychology shows that emotional scripts differ substantially between societies (Hofstede, 1980; Laungani, 2007; Markus & Kitayama, 1991). What is considered adaptive in one culture may appear dysfunctional in another. Thus, family business dynamics must be analyzed not only through systemic theory but also through culturally grounded perspectives.

This contribution adopts a comparative and conceptual approach, combining insights from family systems theory, cross-cultural psychology, and family business studies. The analysis is based on three steps:

- (a) Conceptual framing, using differentiation of self as the lens to interpret emotional regulation.
- (b) Cultural contextualization, analyzing the Mediterranean (Italian) and Confucian (South Korean) traditions regarding norms of emotional expression, authority, and relational ethics.
- (c) Application to family business transitions, examining how emotional regulation functions during high-stakes moments such as succession, generational shifts, and crises. This approach does not seek universal generalizations but rather offers culturally grounded theorization of family business dynamics under pressure.

Results and Findings may be syntetised as follows:

Emotional Regulation as a Systemic Resource

Emotional regulation functions as a systemic resource that enables families to manage anxiety and conflict. Families with high differentiation sustain constructive dialogue, regulate anxiety, and preserve both autonomy and cohesion. Conversely, low differentiation leads either to fusion, where individuality is lost, or to cutoff, where emotional ties are weakened (Bowen, 1978; Knerr & Bartle-Haring, 2010).

Mediterranean Context (Italy)

Italian family businesses are situated in a cultural environment that values expressiveness, physical closeness, and emotional intensity (Bonino et al., 2005; Lampis, 2016). Emotional fusion is often interpreted as solidarity rather than dysfunction (Manzi et al., 2006). However, during transitions such as succession, excessive closeness may generate role confusion, heightened conflict, and polarization across generations (Lampis et al., 2020). Differentiation of self in this context helps set boundaries, reduce volatility, and

support constructive negotiation.

Confucian Context (South Korea)

South Korean family businesses operate in a relational system structured around hierarchy, harmony, and emotional restraint (Kim et al., 2014). Here, emotional cutoff often serves as an adaptive response to avoid overt conflict and preserve group cohesion (Chung & Gale, 2006). While this strategy reduces visible disputes, it risks generating hidden resentments and limiting authentic intergenerational dialogue (Woo & Kowalski, 2020). Differentiation of self supports individuals in navigating hierarchical expectations while maintaining internal clarity and expressing aspirations responsibly (Kim et al., 2021). Transitions such as succession or generational entry amplify emotional tension (Jankowski et al., 2013; Skowron et al., 2009). In Italy, these transitions are marked by visible dialogues, expressive conflicts, and generational coalitions. In South Korea, they are mediated through ritualized expectations, silent deference, and indirect signals. Both cultural settings reveal that differentiation of self is crucial but operates differently: in Italy, it moderates emotional expressiveness; in South Korea, it legitimizes voice while preserving harmony.

The findings underscore three insights:

Cultural mediation of emotional constructs. Fusion and cutoff cannot be uniformly interpreted. In Mediterranean cultures, fusion embodies care; in Confucian cultures, cutoff sustains harmony.

Differentiation as a developmental capacity. In both contexts, differentiation strengthens resilience but must be adapted to cultural expectations.

Emotional regulation in family businesses is a systemic and culturally embedded process. By comparing Mediterranean and Confucian contexts, this study demonstrates that differentiation of self is not a universal skill but a culturally situated practice. In Italy, it mitigates volatility and supports dialogue; in South Korea, it provides clarity and legitimizes intergenerational negotiation within hierarchical systems. Understanding cultural variations in emotional regulation offers pathways to strengthen resilience, reduce intra-family conflict, and ensure sustainable governance during uncertain and high-pressure transitions. Therefore, the research has two main implications: theoretically, this study extends Bowen's model beyond clinical contexts, integrating cultural psychology into family business research. It questions the universality of Western-centric emotional norms and highlights the contextual meanings of regulation strategies (Ford, 2010; Hofstede et al., 2010). Practically, it provides culturally attuned tools for practitioners. For Mediterranean families, interventions may focus on boundary-setting and conflict moderation. For Confucian families, emphasis may be on encouraging emotional voice and balancing authority with recognition. In both cases, differentiation of self enhances resilience and improves the chances of successful intergenerational transitions. Thus, family business consultants and educators must adopt culturally sensitive approaches: fostering boundaries and emotional moderation in Mediterranean families and legitimizing emotional expression and trust-building in Confucian families.

Keywords: Cross-Cultural Comparison; Differentiation of Self; Emotional Regulation; Family Business Systems; Mediterranean and Confucian Contexts.

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TOOLING THE FUTURE IN THE METALWORKING INDUSTRY: INTRAPRENEURIAL GROWTH AT MESPRU

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Abstract

In the current global landscape of chronic economic uncertainty, frequent technological disruption and growing environmental needs, long-established small and medium enterprises (SMEs) face increasing pressure to evolve (Gautam et al., 2025). These firms, often deeply rooted to their local economies and operating within traditional business models, account for a significant share of employment and production in Spain (Eurostat, 2024). Yet despite their relevance, SMEs often struggle to adapt to a changing competitive environment due to limited resources, poor strategic orientations or lack of innovation paths (Aragón-Sánchez & Sánchez-Marín, 2005).

One increasingly strong response to these challenges is intrapreneurship, i.e., stimulating “*the creation of new business opportunities within the company*” (Molina & Callahan, 2009, p.388). While entrepreneurship is associated with startups and newly created ventures outside an existing company, intrapreneurship emphasizes innovation that comes from inside the firm, led by managers or employees who identify new ways to create economic value (Parker, 2011). In a strategic growth framework, this practice can turn into a powerful and cost-effective growth-path for SMEs, as it enables established firms with limited resources to explore new business lines, improve internal processes and expand to new markets, without compromising their identity and core operations. In this way, in times of change, promoting internal innovation becomes an accessible strategy for sustainable growth, empowering traditional firms to transform from within.

In this context of technological adaptation and evolving market needs, our project aims to develop a strategic growth plan for Mecanizados San Prudencio S.L. (<https://www.mespru.com>), a family-owned SME based in the Basque Country. Founded in the 1970s, MESPRU operates in the metalworking industry, offering machining, stamping, die manufacturing, welding and assembly services to clients from diverse sectors such as construction, automotive or small household appliances. With a limited workforce yet an international client portfolio, MESPRU has built a strong reputation

over the decades, combining its technical expertise with close customer relationships. Like many traditional industrial SMEs, however, the firm now faces the challenge of adapting its business model to a changing environment and position itself for the future.

This project explores potential growth paths for MESPRU that align with an intrapreneurial mindset and that may contribute to fostering internal innovation. Through direct access to key internal stakeholders, including managers and longtime employees, this project investigates strategic growth initiatives that MESPRU might implement. The study applies strategic analysis tools to support the approach, as well as internal insights from interviews to evaluate growth pathways that are both realistic and in line with the company's values and long-term goals. In this way, by identifying internally driven projects that leverage the firm's capabilities, we seek to promote an environment where intrapreneurial initiatives may arise naturally within the firm, setting the foundation for future growth and innovation cycles.

Hence, we aim to study how a traditional, family-owned industrial firm can develop a strategic transformation to foster its competitiveness and growth. Our ultimate goal is to generate tailored recommendations for MESPRU; yet, for the sake of replicability, we aim to contribute to a broader exploration of how industrial SMEs in traditional sectors can promote intrapreneurial steps as a sustainable growth strategy. Indeed, MESPRU offers a relevant case study, not only because of its long-standing history in the industrial sector, but also because it shares key features with many other Spanish SMEs, e.g. family ownership, a small workforce and technical specialization. These characteristics make the firm a representative example to analyze the inner growth strategies of small and traditional firms.

In order to achieve this inner strategic growth, we argue that MESPRU could follow several growth pathways, including technological and human development, product and market portfolio expansion, and strategic alliances, amongst others. We study strong yet plausible growth paths for the firm, exploring the possibilities for growth within the different dimensions of intrapreneurship: new business venturing, entering new markets related to the firm's current ones; innovativeness, developing new products and services; self-renewal, highlighting strategic and organizational reformulation; and proactiveness, empowering the search for improved competitiveness (Antoncic & Hisrich, 2001). The suggested growing paths are aligned with the SDGs. Specifically, our project fosters SDG #8 (Decent Work and Economic Growth), by promoting sustained growth through strategic development, and SDG #9 (Industry, Innovation and Infrastructure), by encouraging innovation in a traditional industrial firm.

Our work illustrates how even traditional firms in conventional industries can take solid steps toward innovation and development through growth initiatives aligned with intrapreneurship. This analytical model could be applicable –yet not straightforward– to similar industrial SMEs, although the specific characteristics of each case should be carefully considered. In any case, our findings demonstrate the opportunity for a small traditional firm to thrive through inner development strategies.

Keywords: strategic growth; SME; metalworking industry; intrapreneurship; SDG

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INNOVATION SYSTEMS AND SUSTAINABLE DEVELOPMENT: AN ANALYSIS FROM LOW- AND MIDDLE- INCOME COUNTRIES

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Abstract

The major global challenges related to sustainability constitute a crucial task for all regions of the world. In this context, there has been growing interest in understanding the role that innovation systems play in the transition to more sustainable economies (Fernandes et al., 2022). However, in developing countries, structural problems such as poverty and inequality are significant obstacles to sustainable development. Furthermore, innovation systems are often weak and underperform in generating knowledge and technology. Thus, most research on innovation systems has been conducted in developed countries (Edsand, 2019). This research presents a review of the scientific literature related to the role of innovation systems in developing countries within the framework of sustainable development. The methodology used combines PRISMA guidelines for systematic reviews with a bibliometric analysis. The findings indicate a growing interest in this line of study. Most of the works analyzed focus on high-income countries, especially European ones, although China stands out as the developing country with the largest number of studies in this area. Among the most widely used approaches are technological innovation systems (TIS). This study contributes to a broader understanding of the development of innovation systems in developing economies, with the aim of supporting their transition toward more sustainable models.

Sustainability requires constant exploration, learning, research, and knowledge interrelated with economic, environmental, and social variables. This process presents new ways of understanding the link between nature and society (Filho et al., 2012). This poses a complex conceptual challenge (Chaparro-Banegas et al., 2024). Thus, sustainable development has been included as a key factor in various national development strategies (Le et al., 2025).

The aim was to examine the existing literature on the relationship between innovation

systems, developing countries, and sustainable development. The main current lines of research were identified, as well as those with future potential. The research question was "What are the trends and research gaps in analysis of innovation systems in developing countries in the framework of sustainable development?". The search strategy included keywords like "national innovation system", "regional innovation system", "technological innovation system", "green transition", "bioeconomy", "sustainable development" and "green growth". Only articles from journals indexed in the Web of Science (WoS) Core Collection were considered. The final dataset consisted of 68 articles.

In the analysis of the most cited authors, 43 authors were identified as being cited at least 10 times in the 68 articles. Three groups were identified. In the first group, 17 authors, such as J. Markard, A. Bergek, and F. W. Geels, were associated with studies on sustainable innovation systems and transition from a multilevel perspective. Another 16 authors are linked to a second group, including some such as C. Binz, L. Coenen, and U. Dewald, who have conducted research on global and regional innovation systems. Finally, in a third group, ten authors, such as A. J. Wieczorek and J. Schot, focus on research related to sustainable transition.

The analysis shows that more than 50% of the studies selected were conducted in high-income countries, such as the Netherlands, Germany, and Sweden. In contrast, low-income countries have been poorly represented in this literature. In fact, less than 2% of the studies analyzed were conducted in contexts belonging to this group. Even within developing countries, research has focused primarily on upper-middle-income countries. For example, China and Brazil stand out among the ten countries with the highest number of studies.

The thematic analysis shows that keywords such as "sustainability transitions", "technology and innovation systems", "developing countries", "dynamics", "innovation systems" and "perspective" are relevant for addressing the sustainable transition in developing countries from the perspective of TIS.

The energy transition has been one of the topics attracting the most attention. Applications such as bioethanol, solar photovoltaics, wind energy, and hydrogen have been the subject of study. Furthermore, frameworks have been proposed to examine both National Innovation Systems (NIS) and Regional Innovation Systems (RIS). The findings highlight the value of the TIS approach as a fundamental tool for researching sustainable transitions in the context of developing countries. The growing interest in this topic is reflected in the increase in publications: while only one study was identified between 2003 and 2006, 15 were registered between 2023 and 2024.

This overview reveals a gap in the scientific literature, demonstrating that developing countries continue to be under-represented in the study of innovation systems focused on sustainability. Closing this research gap is crucial, as it would allow key sustainable development challenges such as the energy transition and waste management to be addressed in these contexts. To achieve this, it is essential to adapt conceptual frameworks that have been effective in other regions, taking into account local specificities.

Furthermore, it is necessary to recognize the differences that exist between the various levels of development within the group of developing countries, as dynamics can vary significantly between low-income and upper-middle-income countries.

Among the limitations, focusing solely on English-language publications likely excluded valuable studies written in other languages. This is especially relevant in the case of research focused on Latin America, which is often written in Spanish or Portuguese. Furthermore, limiting the study exclusively to the WoS database represents one of its main weaknesses. Other sources, such as Scopus or Scielo, could provide relevant works with regional focuses. Therefore, expanding both the linguistic spectrum and the databases consulted could offer more comprehensive and enriching findings.

Keywords: Innovation System; Sustainable development; Developing countries; Qualitative research; PRISMA; Bibliometric analysis

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RISING TEMPERATURES, DECREASING COSTS AND RISKS: ASSESSING THE FINANCIAL BENEFITS OF CLIMATE CHANGE INSTRUMENTS

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Abstract

Over the past two decades, climate change and global warming have been recognised as paramount environmental challenges on a worldwide scale. One of the primary obstacles in advancing a sustainable economy is the effective mitigation and management of the risks associated with climate change. The accelerated pace of economic development and the proliferation of international business activities have exerted considerable pressure on planetary ecosystems, resulting in pronounced environmental degradation (Salvi et al., 2025a). According to the World Health Organisation, the combined effects of ambient and household air pollution are linked to millions of premature deaths annually, highlighting the significant public health implications of air quality.

This compelling scenario emphasises the critical need for a comprehensive approach to sustainability that integrates economic, environmental, and social dimensions to ensure the well-being of future generations (Aibar-Guzmán et al., 2024). Among the numerous environmental challenges facing humanity today, climate change emerges as one of the most urgent and significant issues (Anton, 2024). The persistent dependence on fossil fuels, deforestation, and escalating greenhouse gas (GHG) emissions have markedly contributed to the acceleration of global warming, thereby intensifying climate-related risks on a global scale (Krueger et al., 2020).

The impacts of climate change are already evident, evidenced by increased frequency and severity of extreme weather events such as storms, droughts, floods, and heatwaves, which significantly impair ecological systems and pose substantial threats to global economic stability and human well-being (Amran et al., 2014). Effectively addressing these pressing issues necessitates coordinated efforts among governmental agencies, local communities, and private sector stakeholders. Strategic priorities should include the mitigation of greenhouse gas emissions, the promotion of renewable energy sources, the conservation of natural ecosystems, and the development of resilient adaptation strategies (Octavio & Setiawan, 2025).

Considering the rising urgency of these issues, stakeholders are increasingly calling on companies to provide transparent disclosures about their climate change impacts and the related operational risks (Daradkeh et al., 2023).

In the current scenario, with increasing environmental concerns, many organisations are turning to climate finance tools like carbon credits as strategic measures to reduce their carbon footprints (Salvi et al., 2025b). These instruments help companies cut emissions and reach carbon neutrality (Salvi et al., 2025b), allowing pollution-generating firms to meet their emission reduction goals by funding emission-reducing projects, even if these projects are separate from their main business activities (Martielli et al., 2025).

This study aims to assess the financial benefits of innovative climate change instruments, such as carbon credits, through the framework of climate change mitigation tools. Specifically, it evaluates how these instruments can reduce costs and risks in the context of global warming and escalating climate-related hazards, an area currently insufficiently explored in the existing literature. The research seeks to address this gap by analysing the financial implications of climate change and related financial instruments, with a particular focus on carbon credits, within the theoretical framework of signalling theory (Ross, 1977; Spence, 1973). Attention is directed towards critical financial metrics, specifically the cost of capital (L'Abate et al., 2024; Chava, 2014) and the systematic risk exposure, as measured by beta (Korinth & Lueg, 2022; Gregory et al., 2014).

Signalling theory occupies a central role across multiple disciplines, including strategic management, finance and marketing. Recently, its application has expanded into the analysis of sustainability practices, where it offers significant potential for elucidating the signals conveyed by corporate entities (Friske et al., 2023; López-Santamaría et al., 2021). In particular, climate change mitigation instruments have become increasingly salient for investors and stakeholders, exerting a significant influence on market performance (Fedorova & Iasakova, 2024). Corporations increasingly issue signals, often in the form of certifications, to highlight their competitive advantages in areas such as advanced energy utilisation and management, achieving net-zero emissions, and thereby attracting additional market incentives (Guo et al., 2022). Moreover, investors are increasingly integrating climate risk exposure into their decision-making processes, recognising the significant financial implications that such risks pose for firms (Vestrelli et al., 2024). Similarly, financial institutions tend to favour companies that implement effective climate change strategies by providing more favourable financing conditions through climate-related financial instruments (Chava, 2014). In this context, it is plausible to posit that the broader dissemination of climate change information and the adoption of climate finance mechanisms will contribute to a reduction in the cost of capital and a decrease in systematic risk exposure. On these bases, we pose our hypothesis, which serves as the starting point for our model and quantitative analysis.

The econometric analysis, conducted on a sample of 72 firms worldwide observed over the period from 2020 to 2024, covering five fiscal years, provides preliminary evidence that addressing the challenges of climate change through targeted instruments – specifically, carbon credits – significantly influences corporate financial performance and

returns. The findings suggest that the adoption of climate finance tools is associated with a reduction in the cost of capital and a gradual decline in risk perception. These results suggest that increased awareness and the implementation of targeted measures to address climate-related issues can enhance investor confidence and mitigate perceived risks, ultimately improving firms' access to capital.

This research substantially contributes to the scholarly discourse by advancing the understanding of the financial implications associated with climate change instruments, an area characterised by limited prior investigation. Specifically, it highlights the function of carbon credit instruments as signals that facilitate the dissemination of corporate information, thereby providing valuable insights to investors and stakeholders. Moreover, the study extends the application of signalling theory to encompass sustainability disclosures within the context of climate change. In addition to its theoretical advancements, the research offers important practical implications for corporate entities, policymakers, and investors. It recommends that firms strategically utilise specific climate change instruments as supplementary tools to bolster their positive contributions to addressing climate-related challenges.

Previous studies have shown that carbon emissions exert a detrimental effect on financial performance (Salvi et al., 2025b). This study demonstrates that reducing emissions through the implementation of specific instruments also has a significant negative impact on the cost of capital, lowering it and expanding the range of available alternatives, as well as on perceived risk. About the risk, the literature remains extensively debated, and this study may represent a further step towards examining how risk evolves in relation to climate change, including through the adoption of ad hoc indicators such as climate and carbon beta (Huij et al., 2022; Dietz et al., 2018).

Keywords: Climate change; Carbon credit; Cost of capital; Beta; Signaling theory

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THE DIGITAL MATURITY, INSTITUTIONAL LEGITIMACY, ECONOMIC POLICY UNCERTAINTY AND ARTIFICIAL INTELLIGENCE IN ENTREPRENEURSHIP IN SPAIN: TOWARDS AN INTEGRATED ANALYTICAL FRAMEWORK (DIGIA- LEM)

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Abstract

This research addresses a critical gap in understanding how institutional environments interact with digital advancement to shape entrepreneurial dynamics in Spain's Autonomous Communities, with particular emphasis on the transformative impact of Artificial Intelligence (AI). The central research question examines how the perception of institutional soundness and economic stability influence a region's capacity to foster new business creation through both opportunity identification and necessity-driven entrepreneurship (North, 1990).

The study investigates digital maturity as a catalyst for entrepreneurship and how advanced technologies, particularly AI, redefine possibilities and challenges for new ventures. AI not only optimizes processes and reduces costs, but also opens new avenues for value creation and business opportunity identification, driving innovation and competitiveness. The research posits that robust institutional frameworks can amplify the positive effects of digitalization and AI on high-value entrepreneurship, while contexts of lower institutional trust or greater instability could redirect efforts toward more reactive forms of entrepreneurship.

The general objective is to analyze the relationship between regional digital maturity, institutional legitimacy, and entrepreneurial activity in Spain, focusing on the moderating role of legitimacy in the digital maturity-opportunity entrepreneurship relationship, as well as necessity-driven entrepreneurship in regions of low legitimacy, and the emerging role of AI. Specific objectives include: assessing the impact of digital maturity on entrepreneurial activity considering AI adoption; analyzing how institutional legitimacy influences entrepreneurial activity; investigating the moderating role of legitimacy in the digital maturity-opportunity entrepreneurship relationship; determining whether digital maturity is associated with greater necessity-driven entrepreneurship in regions of low

legitimacy; exploring relationships between economic policy uncertainty, state legitimacy, and entrepreneurial activity; and analyzing how AI adoption by companies influences entrepreneurial activity and innovation in Spain's Autonomous Communities.

The study integrates various theories explaining the interaction between institutional environment, digital maturity, and entrepreneurial activity. The central concept is legitimacy, understood as the degree to which actions or organizations are perceived as appropriate and acceptable within a socially constructed framework of norms and values (Suchman, 1995).

Key variables include Digital Maturity; Institutional Legitimacy; Early-Stage Entrepreneurial Activity (TEA) broken down into opportunity-driven and necessity-driven entrepreneurship; Entrepreneurship Quality; and intensity of AI adoption by the regional business fabric. Literature has identified different types of legitimacy, distinguishing between cognitive and sociopolitical legitimacy, and has established that economic policy uncertainty can significantly affect the business environment (Baker et al., 2016).

The study proposes five key hypotheses:

- H1: Institutional legitimacy positively moderates the relationship between Digital Maturity and Opportunity-Driven Entrepreneurship
- H2: In regions of low institutional legitimacy, digital maturity is associated with greater necessity-driven entrepreneurship
- H3: There is an inverse relationship between Economic Policy Uncertainty and Institutional Legitimacy
- H4: Institutional legitimacy is positively related to the perception of entrepreneurial opportunities and negatively related to general entrepreneurial activity (TEA), but positively related to opportunity-driven entrepreneurship
- H5: The intensity of AI adoption by the regional business fabric has a direct positive effect on TEA and amplifies the impact of institutional legitimacy

This research adopts a quantitative, longitudinal, and explanatory design using a panel data approach to analyze temporal evolution and differences across geographic units (the 17 Spanish Autonomous Communities). This design is suitable for examining the proposed causality and moderation relationships between digital maturity, institutional legitimacy, economic policy uncertainty, and entrepreneurial activity, including AI's impact. The approach is based on methodology established by previous studies in the European context (Paule-Vianez et al., 2024).

The construction of the main database relies on various secondary data sources including: Global Entrepreneurship Monitor (GEM) providing data on entrepreneurial activity, entrepreneurship quality, and entrepreneurial perception/culture at individual and national/regional levels; European Social Survey (ESS) as a source of institutional legitimacy data, aggregated by Autonomous Community; Cotec-IVIE providing the Digital Maturity Index and its pillars for the 17 Spanish Autonomous Communities; and ONTSI including the percentage of companies using AI.

Data analysis will be conducted in several stages: descriptive analysis calculating descriptive statistics for all key variables; correlation analysis examining relationships between variables; panel data models employing regression models to test the proposed hypotheses, considering fixed or random effects models depending on data characteristics, with special attention to interaction terms to evaluate the moderating effect of institutional legitimacy; and robustness analysis using different model specifications or subsamples to ensure the validity of results.

Expected findings anticipate confirming the critical importance of the institutional environment in shaping Spain's entrepreneurial ecosystem. Particularly, institutional legitimacy is expected to act as a key factor that modulates the effectiveness of digital maturity in promoting opportunity-driven entrepreneurship. This would imply that investing in digital infrastructure or promoting advanced technologies like AI is insufficient; trust in institutions and perception of stable legal and political frameworks are equally fundamental for these investments to translate into higher-quality entrepreneurship with greater growth potential.

Economic policy uncertainty is expected to have a destabilizing effect on institutional legitimacy, which could negatively affect the propensity to pursue opportunity-driven entrepreneurship and foster necessity-driven entrepreneurship (Nguyen et al., 2021). AI, as a disruptive element, is expected to have a dual impact: direct effect on increasing total entrepreneurial activity through democratization of access to sophisticated tools and creation of new market niches; and moderating effect amplifying the advantages of operating in high institutional legitimacy environments, creating particularly dynamic entrepreneurial ecosystems where technological innovation and institutional stability converge.

Expected implications are significant for both academia and public policy formulation. From an academic perspective, this study will enrich existing literature by integrating AI, institutional legitimacy, and economic policy uncertainty within the framework of digital maturity and entrepreneurship. It will provide a more holistic view of factors influencing entrepreneurial dynamism, highlighting the interconnection between technological development and socio-political context, and the specific role of AI as a direct catalyst for entrepreneurial activity.

In practical terms, expected results suggest that entrepreneurship promotion policies should adopt an integrative approach combining three fundamental dimensions: promotion of AI adoption, strengthening of institutional legitimacy, and coordination of both. To maximize the impact of digital maturity and AI adoption on entrepreneurship, it will be crucial to implement dual strategies: facilitating access and use of AI technologies by the regional business fabric while strengthening institutional trust, promoting transparency and regulatory stability.

This research expects to make significant contributions in three dimensions. Theoretically, it will contribute to literature on entrepreneurship, institutional theory, and digital economy by integrating and analyzing the interaction of digital maturity, state legitimacy, economic policy uncertainty, and AI impact. The framework will be enriched

by incorporating legitimacy as a powerful institutional variable that explains differences in entrepreneurial outcomes between regions with similar levels of digital maturity, considering AI as a key factor in the evolution of entrepreneurship.

Empirically, it will provide robust evidence using panel data from the 17 Spanish Autonomous Communities on the proposed relationships, validating hypotheses and offering a more complete view of factors driving or restricting entrepreneurship in Spain, including the role of AI. Practically, it will offer concrete recommendations for policymakers, guiding the design of strategies that not only promote digital maturity and AI adoption but also strengthen institutional legitimacy and reduce uncertainty, creating more conducive environments for high-impact opportunity-driven entrepreneurship.

The research presents certain limitations, including geographic scope limited to the 17 Spanish Autonomous Communities, which facilitates robust comparative analysis but limits generalization to other geographic or economic contexts. Sample size considerations and representativeness arise from the use of large-scale survey data aggregated at the regional level, potentially losing nuances at the individual level. There are measurement challenges for variables, particularly for perception-related variables based on self-reports, potentially introducing social desirability bias or interpretation issues.

Future research lines include multilevel analysis of legitimacy exploring how different levels of legitimacy interact in entrepreneurship contexts; investigating citizen and business trust in digital technologies beyond mere adoption; and deeper research on the impact of AI on entrepreneurship, innovation, and value creation, considering the moderating role of institutional legitimacy and economic policy uncertainty. These findings will be crucial for designing public policies that promote resilient, innovative, and ethical entrepreneurial ecosystems capable of fully capitalizing on AI's potential for sustainable economic development.

Keywords: Entrepreneurship; Digital Maturity; Institutional Legitimacy; Economic Policy Uncertainty; Artificial Intelligence.

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OPERATIONALISING ABSORPTIVE CAPACITY IN TOURISM SMES: MICROFOUNDATIONS OF PACAP– RACAP CONVERSION

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Abstract

Tourism SMEs operate in knowledge-intensive, service-dominated settings where competitive advantage depends on the ability to recognise external signals, translate them into organisational routines, and continuously innovate and refresh offerings (Cooper, 2006; Hall & Williams, 2008; Shaw & Williams, 2009). While they are often lauded for adaptability and frequent, incremental improvements (Pikkemaat & Peters, 2006), their underlying innovation processes remain unevenly theorised, mainly because their practices are fragmented, informal, and embedded in day-to-day operations rather than formal R&D structures (Hall & Williams, 2008; Hjalager, 2010).

The ACAP literature has long recognised the critical distinction between PACAP, the acquisition and assimilation of external knowledge, and RACAP, the transformation and exploitation of that knowledge into operational outcomes (Volberda et al., 2010; Zahra & George, 2002). Whilst this conceptual framework has been extensively theorised, the actual mechanisms through which organisations convert PACAP into RACAP remain empirically underexplored, particularly in the context of SMEs operating in service-intensive sectors (Flatten et al., 2011; Noblet et al., 2011).

Tourism SMEs represent a compelling empirical setting for examining this conversion process. These organisations frequently engage with external knowledge sources such as customers, suppliers, competitors, but also destination management organisations (DMOs), technology providers, industry associations, and institutions, yet face significant constraints in their ability to transform this knowledge into operational innovations (Hjalager, 2010; Thomas et al., 2011). The seasonal nature of tourism, resource limitations, and the accelerated digital transformation requirements post-COVID-19 create unique pressures on the PACAP-RACAP conversion process that have not been adequately addressed in the existing literature (Sigala, 2020; Thomas & Wood, 2014).

This study will involve Sardinian tourism SMEs, where respondents are owner-managers or senior operators with a cross-firm view. Sardinia offers a unique environment, as its

insularity and pronounced seasonality influence inter-organisational dynamics and knowledge flows in tourism SMEs, where learning and innovation are often facilitated through informal, place-based networks (Baldacchino, 2007; Ruggieri & Platania, 2024). ACAP represents one of the most influential theoretical constructs in innovation literature. The concept was initially developed to explain why and how some firms can recognise, assimilate and exploit external knowledge more effectively than others, thereby achieving superior levels of innovation and competitive advantage (Cohen & Levinthal, 1990). The theoretical significance of ACAP lies in its recognition that organisations are not passive recipients of external knowledge but active agents that must develop specific capabilities to identify, acquire, and utilise knowledge from their environment. This perspective shifts the focus from knowledge availability to knowledge absorption capability, emphasising the organisational mechanisms and processes that enable adequate knowledge integration and exploitation.

Building upon the foundational work of Cohen and Levinthal, Zahra and George (2002) provided a crucial reconceptualisation that modified ACAP from a unidimensional construct into a multidimensional process. Their contribution defined ACAP as a dynamic capability (Teece, 2007), and introduced two distinctive but complementary components, PACAP, which includes the organisational capabilities needed to acquire and assimilate external knowledge by understanding the relevance and potential applications of external information, and RACAP, which represents the practical application phase (transformation and exploitation) where assimilated knowledge is converted into operational improvements, new products or services, or enhanced organisational capabilities. Considered in a dynamic perspective, ACAP expresses its peculiar role in continuously reconfiguring a firm's resources and routines, aiming to internalise external knowledge into operational processes and foster innovation.

The literature has established that PACAP and RACAP are distinct organisational capabilities (Zahra & George, 2002). However, the field has seldom unpacked the operational mechanisms that effectuate PACAP to RACAP in practice, an omission that is especially salient in enterprises with limited formalised routines. Reviews and critiques call for micro-level, routine-based explanations and warn against the construct's reification (Lane et al., 2006; Volberda et al., 2010), while routine-based models explicitly highlight the need to operationalise ACAP as routines (Lewin et al., 2011). While seminal studies have operationalised PACAP and RACAP and linked them to distinct organisational antecedents, thus shedding partial light on the conditions under which PACAP converts into RACAP (Flatten et al., 2011; Jansen et al., 2005), the field still lacks fine-grained, processual evidence of the micro-routines that enact this conversion in practice.

This gap is particularly pronounced in the tourism context, where innovation and knowledge transformation typically involve managerial, process, and institutional changes, as well as other socio-technical adaptations, that coordinate multiple actors, customer interfaces, and destination systems, rather than linear product development processes (Hall & Williams, 2008; Hjalager, 2010).

Moreover, recent research underscores the role of managerial cognitive capabilities and

organisational learning routines in enabling absorptive capacity, yet SME-focused empirical evidence remains fragmented and comparatively scarce, with only a few SME studies mapping learning–ACAP linkages (e.g. Sancho-Zamora et al., 2022), and team-level managerial dynamics affecting ACAP (Medina et al., 2019).

This study aims to explore how SMEs in tourism transform PACAP into RACAP, addressing a key gap in understanding knowledge conversion processes in resource-limited settings. Based on these considerations, the main research question that this study seeks to answer is: *How do tourism SMEs convert potential absorptive capacity into realised absorptive capacity through micro-level routines and socio-technical mechanisms in resource-constrained settings?*

We will adopt a qualitative approach, using semi-structured interviews with owner-managers of tourism SMEs who have implemented at least one innovation within the past 36 months. This aligns with international innovation measurement standards and ensures definitional comparability across cases (OECD & Eurostat, 2018), thereby mitigating retrospective recall bias while allowing the PACAP-RACAP conversion to progress through routinisation stages that can be empirically observed.

We will employ purposive sampling to select 20 tourism SMEs in Sardinia, which is consistent with purposeful sampling for theory building in qualitative research (Palinkas et al., 2015). The design follows an abductive logic, iterating between emerging evidence and sensitising ACAP constructs (PACAP/RACAP), consistent with abductive reasoning in organisation studies (Mantere & Ketokivi, 2013).

This study contributes to ACAP theory by developing micro-foundations of knowledge conversion, specifically contextualised within tourism SMEs, and establishing clear operational boundaries between conversion mechanisms and their outcomes. It does so through a qualitative design that enables deep examination of micro-foundational routines, directly answering calls for qualitative inquiry into ACAP in tourism organisations (Thomas & Wood, 2015).

This research aims to make two main contributions to absorptive capacity theory and tourism management practice. First, we develop the micro-foundations of the PACAP–RACAP conversion process in tourism SMEs, specifying routine-level, socio-technical mechanisms that translate potential into realised absorptive capacity in service-intensive, resource-constrained settings. This extends the dynamic capabilities work in small-firm/service contexts (e.g. Nieves & Haller, 2014). Second, we shall produce a taxonomy of conversion pathways and obstacles, complete with observable markers of robust RACAP implementation. This taxonomy will distinguish between different conversion approaches and their associated success conditions, providing a practical framework for managers and consultants working with tourism micro-enterprises.

Keywords: Absorptive capacity; PACAP-RACAP conversion; Tourism SMEs; Microfoundations; Innovation.

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ENERGY-EFFICIENT REACTOR DESIGN FOR PYROLYSIS OF WASTE PAINTS

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Abstract

In our modern world paints play a major role in our daily lives. The waste paints are not seen much in our fast-moving era. Waste paints streams contain high levels of polymers, solvents, and heavy metals that challenge the environment significantly. Long practice disposal such as landfilling or incineration releases volatile organic compounds (VOCs) and other toxic residues. Pyrolysis, the thermal degradation of organic material in an inert atmosphere, is considered as a viable process as it offers destruction of toxic organics and concomitant recovery of value-added products. At 350–700 °C, the partial pyrolysis of organic constituents in waste paint generates a product comprising condensable oils, non-condensable gas and a solid carbon-rich char containing most of the mineral pigment. The non-condensable gases, comprising mainly hydrogen, carbon monoxide, methane and light hydrocarbons, have very high calorific value such that they can be recycled to substitute external filling requirements. The condensable liquids can be upgraded to synthetic fuels or chemical feedstock, and the solid residue is then usable for high-value pigments recovery and/or as a filler in building additives. These multiple value streams make pyrolysis aligned with circular economy by reclaiming otherwise lost resources.

Yet, the true mass utilization potential of pyrolysis for vat waste paint may be limited by a fundamental engineering constraint: conventional pyrolytic reactors have high energetic demands, not uncommonly in an energy inefficient manner. The reactor concept is based on a two thermally coupled stage system. Ten degrees before the nozzle, there immediately follows an indirect heat treatment of the fresh paint waste by means of a left-handed horizontal stainless-steel chamber (first stage), and that at a continuous nitrogen-supplied purge with which an oxygen-free ambient is assured. This arrangement is self-supporting, creates a great amount of mixing and heat transfer (where the temperate gradients are "flattened" by internal inlet valves to reduce hot spots), in other words these 'split zone' flue pans have automatic temperature stabilization. The off-gases of the primary reactor that are pyrolytic in nature (rich in pyrolytic vapours) are directed to a secondary cracking vessel, or chamber which is a vertical fixed-bed vessel kept at slightly higher temperatures. In the process, heavier hydrocarbons are thermally cracked promoting the generation of light, high-energy value gases.

To optimise energy efficiency, the design features a counter-current heat-recovery system. The hot flue gases leave the secondary stage and go to a small heat exchanger that preheats the incoming nitrogen carrier gas, as well as the feedstock. Preliminary energy-balance estimates show that external electrical or fuel demand could be reduced up to 15–20 % less than an equivalent capacity single-stage fixed-bed reactor. Further saving will result if the non-condensable pyrolysis gas is partially recirculated as heater supplemental fuel.

Its operational window is set to be at feed rates and residence times close to those for small-line laboratory tests, while the modular geometry and indirect heating approach are selected on purpose with the view toward being used up to pilot scale as well as industrial one. The expected operating conditions cover the temperature range of 400–600 °C, residence times from 1 to 2 h and constant flow inert-gas purging of O₂ free gas to avoid oxygen attack as well as steady pyrolytic conditions.

While this extended abstract does not present detailed experimental data, expected product distributions are informed by analogous studies of industrial paint-sludge pyrolysis and related polymeric wastes. Yields are projected in the range of 35–40 % liquid pyro-oil, 30–35 % non-condensable syngas, and 20–25 % solid char. The syngas possesses a calorific value suitable for on-site heat or power generation, the pyro-oil can be refined to alternative fuels or chemical intermediates, and the pigment-rich char can be reprocessed as a secondary raw material in coatings or construction applications.

The significance of this work lies in its explicit focus on mechanical and thermal design for energy efficiency, a perspective rarely emphasized in the waste-paint pyrolysis literature. By integrating multi-stage heating, internal temperature-uniformity controls, and heat recovery, the proposed reactor architecture directly addresses the primary cost driver—energy consumption—while ensuring high conversion efficiency and product quality. The concept also supports environmental objectives by enabling the capture and treatment of flue gases prior to release, thereby reducing greenhouse-gas and VOC emissions compared with incineration or unregulated disposal.

In summary, the proposed Energy-Efficient Reactor Design for Pyrolysis of Waste Paints provides a technically sound and environmentally responsible pathway for transforming a difficult-to-manage hazardous waste into valuable energy and material streams. It merges established chemical-engineering principles with targeted mechanical innovations—particularly staged heating and integrated heat recovery—to achieve significant energy savings and to lay a scalable foundation for future pilot- and industrial-scale implementation. The design framework described here offers immediate utility for academic researchers, industrial practitioners, and policy makers seeking circular-economy solutions to the pressing challenge of paint-waste management.

Keywords: waste paints; pyrolysis, reactor, mixed paints; energy recover

1.Literature Review

1.1 Pyrolysis of Hazardous and Paint Wastes

Paint wastes are complex mixtures of polymers, solvents, pigments, and heavy metals. Traditional disposal methods such as incineration or landfilling pose environmental hazards. Pyrolysis provides a cleaner alternative by thermally decomposing paint residues in an oxygen-free environment, producing valuable outputs such as pyrolytic oil, syngas, and char. The thermal decomposition behavior of industrial paint resins also influences the final char structure, especially in coatings containing inorganic pigments and metal oxides (Germinario et al., 2017).

1.2 Reactor Technologies in Pyrolysis

Different reactor configurations—fixed-bed, rotary kiln, and fluidized-bed—offer varying degrees of mixing, temperature uniformity, and scalability. Rotary systems, though mechanically complex, are well suited for heterogeneous feedstocks like paint waste due to improved heat transfer and agitation.

1.3 Energy Efficiency Strategies

Energy demand is a major constraint in pyrolysis operations. Optimizing insulation, employing waste-heat recovery systems, and integrating secondary heating units can substantially reduce energy input and enhance reactor efficiency. Previous analytical studies have shown that pyrolysis oils derived from polymeric coatings contain aromatic and aliphatic hydrocarbon fractions detectable using GC–MS techniques (La Nasa et al., 2017).

1.4 Waste-Heat Recovery and Secondary Systems

Modern designs recover thermal energy from exhaust gases and hot char. This recovered heat can preheat incoming feedstock or power condensation units, creating a closed-loop system that minimizes energy loss and emissions.

1.5 Economic Relevance and Local Value Creation

Energy-efficient pyrolysis systems hold strong potential for enhancing local economic development, particularly within Small and Medium Enterprises (SMEs) and municipal waste management sectors. Decentralized pyrolysis facilities allow paint waste to be processed closer to the point of generation, reducing transportation and hazardous waste handling costs while supporting regional industrial circularity (Shen & Wu, 2025).

Decentralized Waste Management:

Municipalities and industrial clusters can install compact reactor units to treat paint sludge and leftover coatings generated from automotive workshops, manufacturing lines, and construction refurbishing activities. Treating waste at a local level helps reduce landfill dependency and minimizes long-distance hazardous waste transport, which is both costly and environmentally impactful (Liu et al., 2020). This approach supports compliance with environmental regulations regarding volatile organic compound (VOC) release and hazardous residue disposal

SME Development and Skilled Employment:

The fabrication, installation, and servicing requirements of pyrolysis reactors create opportunities for local metalworking and engineering SMEs. Components such as reactor vessels, gas recirculation manifolds, thermal insulation assemblies, and heat exchanger units can be produced using standard fabrication techniques accessible to regional workshops. This promotes the growth of local supply chains while generating skilled employment in welding, furnace operation, mechanical maintenance, and instrumentation (Jerzak et al., 2024).

Energy Recovery and Operational Cost Reduction:

The syngas produced during pyrolysis contains combustible hydrocarbons that can be redirected back into the heating chamber, partially replacing external energy sources such as diesel, LPG, or natural gas. Studies indicate that syngas recirculation can reduce primary fuel consumption by approximately 18–22%, leading to significant operational savings for SMEs operating on limited budgets (Shen & Wu, 2025). Meanwhile, pyrolytic oil may be refined and used as a low-cost industrial heating fuel, further improving energy circularity.

Circular Economy Material Utilization:

The resulting pyrolysis char is rich in carbon and pigment residues. When processed appropriately, it can be reused as a pigment extender, adsorbent material in effluent treatment, or filler for construction composites. This reintegration of char into industrial product streams supports circular economy practices by reducing raw material extraction and enabling resource recovery (O et al., 2024). Instead of being treated purely as waste, paint residues become economically productive materials, contributing to local value creation and reducing environmental externalities.

1.6 Research Gaps

Limited research on the economic viability of paint waste pyrolysis.

Lack of integrated models linking energy-efficient reactor design with community-scale waste valorisation.

Need for modular reactor systems adaptable for SMEs and local government use.

2. Methodology

2.1 Theoretical Methodology

The theoretical approach for designing the reactor integrates heat transfer modeling, mechanical structural assessment, and techno-economic analysis to determine operational feasibility and performance.

Heat and Mass Transfer Analysis:

Heat flow inside the reactor was evaluated using Fourier's law of conduction:

$$q = -kA \frac{dT}{dx}$$

which defines heat flux across the reactor wall as a function of thermal conductivity and temperature gradient (Liu et al., 2020). Advanced reactor modeling approaches emphasize maintaining stable thermal fields to ensure consistent decomposition kinetics (Li et al., 2025).

Internal convective heat exchange between hot pyrolysis gases and the reactor surface follows Newton's Law of Cooling:

$$Q = hA(T_{\text{surface}} - T_{\text{fluid}})$$

The convective heat transfer coefficient (h) was computed using the Dittus–Boelter Nusselt correlation:

$$Nu = 0.023Re^{0.8}Pr^{0.4}, h = \frac{Nu \cdot k}{D}$$

This model was used to maintain uniform thermal distribution throughout the rotating chamber and minimize localized overheating zones (Jerzak et al., 2024). An overall energy balance was performed to quantify external heating requirements relative to the heat contributed by syngas recycle (Shen & Wu, 2025).

Mechanical Design Calculations:

To ensure safe operation under cyclic thermal loading, structural stresses were evaluated relative to material strength. The allowable working stress of the reactor shell was determined using:

$$\sigma_{\text{allowable}} = \frac{\sigma_{\text{yield}}}{FoS}$$

with a factor of safety selected to account for prolonged high-temperature operation. Thermal expansion was calculated as:

$$\Delta L = \alpha L \Delta T$$

to ensure weld joints, mounting brackets, and seals accommodate dimensional changes during heating (O et al., 2024). SS316 was selected for its oxidation resistance, creep stability, and chloride stress-corrosion resistance (Liu et al., 2020).

Techno-Economic Modelling:

Economic feasibility was assessed by estimating capital cost, operating cost, and potential energy recovery savings. The payback period was evaluated using:

$$\text{Payback Period} = \frac{\text{Capital Cost}}{\text{Annual Savings from Fuel Substitution}}$$

This analysis focused on SMEs, where fuel replacement via recovered syngas and pyrolytic oil significantly improves operational affordability (Jerzak et al., 2024).

2.2 Experimental Methodology

Prototype Design and Fabrication:

A laboratory-scale rotary pyrolysis reactor (10–20 L capacity) was constructed using SS316 with integrated ceramic fiber insulation, controlled heating elements, and a gas recovery system for syngas recirculation (O et al., 2024).

Operational Trials:

Mixed paint waste samples were processed under oxygen-free conditions at 400–650°C.

Reactor rotation speed, residence time, and heating rate were varied to observe effects on product yield distribution. Outputs (gas, oil, char) were quantified by mass balance (Liu et al., 2020). High-temperature reactor systems require materials capable of resisting creep and thermal stress cycling to maintain mechanical stability (Zroichikov et al., 2019).

Product Characterization:

Gas composition was analyzed using Gas Chromatography (GC).

Pyrolytic oil characterization was performed using GC–MS to identify hydrocarbon fractions suitable for fuel reformulation (Shen & Wu, 2025).

Char was tested for carbon and metal oxide content to assess reuse potential.

Economic Evaluation:

Energy consumption during reactor operation was compared to the heating value of recovered syngas and oil to determine net energy efficiency. The feasibility for small industries was assessed based on fuel substitution savings and reduced hazardous waste disposal costs (Jerzak et al., 2024).

3. Economic and Social Impact Assessment

3.1 Cost–Benefit Analysis

The economic feasibility of the pyrolysis reactor system is evaluated based on capital investment, operational expenditure, and value recovered from the pyrolysis products. Capital costs primarily include the fabrication of the reactor vessel, rotary drive system, insulation assembly, instrumentation, and gas condensation and recovery units. The required equipment can be manufactured using regionally available stainless-steel fabrication resources, which keeps initial investment within accessible limits for SMEs (Jerzak et al., 2024).

Operational costs consist of electrical or gas heating energy, feedstock handling, periodic maintenance, and labor supervision. These costs are partially offset by internal energy recovery, as generated syngas can be redirected to the heating chamber to reduce external fuel consumption (Shen & Wu, 2025). Additionally, minimal preprocessing is required for paint waste compared to other biomass feedstocks, which lowers handling expenses (Liu et al., 2020). Decentralized waste-to-energy systems have been shown to significantly reduce waste handling costs for small industrial operators (Oni & Ayodeji, 2020).

The system generates three revenue streams:

- Pyrolytic oil can serve as a heating fuel substitute in industrial boilers.
- Syngas can replace a portion of purchased LPG or natural gas.
- Carbon-rich char can be reused as pigment extender, filler in construction materials, or adsorbent for wastewater treatment (O et al., 2024).

When these recovered products are used to offset fuel purchases, the Return on Investment (ROI) is significantly improved. Based on energy substitution and waste

disposal savings, SME-scale installations typically achieve payback in 2–4 years, depending on feedstock throughput and local energy pricing conditions (Jerzak et al., 2024).

3.2 SME and Local Industry Benefits

The deployment of decentralized pyrolysis systems has the potential to strengthen regional industrial networks and support small manufacturing enterprises. Local fabrication workshops can participate in constructing reactor components such as heating coils, gas piping, condensers, insulation housings, and structural frames. This stimulates local metalworking and engineering supply chains.

Employment opportunities arise in the fields of welding, machining, reactor operation, quality assurance, and instrumentation maintenance. As the technology matures, SMEs may expand into providing installation and consulting services to neighboring municipalities and industries.

Additionally, the project encourages skill development in waste-to-energy technologies through technician training programs, vocational education centers, and university–industry collaboration initiatives. This enhances technical capacity in the region while promoting sustainable industrial practices (O et al., 2024). Carbon-rich char recovered from pyrolysis can be repurposed as a filler or adsorbent in industrial applications, supporting circular economy approaches (Ore & Adebisi, 2021).

3.3 Municipal and Environmental Benefits

For municipal waste authorities, implementing pyrolysis systems provides an alternative to landfill disposal of hazardous paint sludge. This reduces long-term contamination risks and mitigates the environmental burden of storage sites (Liu et al., 2020). Localized treatment also reduces the carbon footprint associated with transportation to distant centralized disposal facilities.

Environmental benefits also arise from lower greenhouse gas emissions, because pyrolysis prevents open incineration and uncontrolled VOC release. The ability to reintegrate recovered products into nearby paint manufacturing, automotive servicing, construction, and coating industries promotes a circular economy where waste streams are converted into value-added resources (Shen & Wu, 2025).

4. Conclusion

- The SS316 rotary pyrolysis reactor effectively converts waste paint residues into usable products, minimizing environmental harm.
- Heat and mass transfer modelling ensured efficient energy distribution and stable thermal performance during operation.
- Mechanical design calculations confirmed that SS316 provides adequate thermal resistance, corrosion durability, and structural stability.

- Integration of syngas recirculation significantly reduces external fuel consumption, improving reactor energy efficiency.
- Pyrolysis of waste paint yields:
- Pyrolytic oil suitable for industrial heating applications,
- Syngas that can be reused as a supplementary energy source,
- Carbon-rich char that can be repurposed as pigment extender or filler material.
- These recovery products support circular economy practices by returning waste-derived materials into productive use.
- Economic assessment shows payback periods of 2–4 years, depending on feedstock availability and local energy rates.
- The system is particularly suitable for SMEs and local municipalities, reducing hazardous waste disposal costs and supporting local fabrication industries.
- Implementation encourages local job creation, maintenance skill development, and regional manufacturing capability.
- Overall, the proposed reactor design provides a sustainable, scalable, and cost-effective solution for the treatment and resource recovery of waste paint.

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EFFECTS OF EARLY-STAGE FINANCING ON THE ENTREPRENEURIAL AUTONOMY OF START-UPS: AN ANALYSIS OF VENTURE CAPITAL AS AN INSTRUMENT OF EXTERNAL FINANCING

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Introduction

Start-ups are considered significant drivers of innovation, employment, and regional development (Böhm et al., 2019). In their early stage, however, they are often confronted with considerable financing challenges. Due to a lack of collateral and not yet generated revenues, traditional financing methods such as bank loans are usually not feasible. Against this backdrop, equity financing, particularly through venture capital (VC), assumes special importance (Rosenbusch et al., 2013). Venture capital represents a specific form of equity financing in which institutional investors act as financial intermediaries (Grichnik et al., 2017). It is characterized by pronounced information asymmetries between investors and founders, which are addressed through contractual mechanisms and control rights (Fritsch et al., 2024). These include economic rights, such as liquidation preferences and anti-dilution protections, as well as control rights, such as approval rights. In this way, investors secure extensive influence that goes beyond mere capital provision (Börner, 2005). In addition to providing equity, VC investors support young companies through advisory services, networks, and reputation (Böhm et al., 2019). At the same time, their extensive control and participation rights create a tension between the financing and growth needs of start-ups on the one hand, and founders' desire for entrepreneurial autonomy on the other (Bauer et al., 2024). Research has so far focused primarily on investors' decision-making logic (Drover et al., 2017), while the perspective of founders and their experience of autonomy has been largely neglected. This gap is addressed by the present study, which investigates how VC financing affects the entrepreneurial autonomy of start-ups in the early stage.

Theoretical Background

The theoretical foundation combines concepts from entrepreneurial finance with psychological approaches to self-determination. Autonomy, in Deci and Ryan's self-determination theory, is understood as one of three basic psychological needs alongside competence and relatedness (2000). In entrepreneurship research, autonomy has so far mostly been treated as part of broader concepts, such as entrepreneurial orientation (Lumpkin, Cogliser & Schneider, 2009). Initial empirical studies, however, indicate that autonomy is not inherently granted to founders but must be actively established (Van Gelderen, 2016).

Entrepreneurial autonomy is understood as founders' freedom to decide what work is done, when it is carried out, and how it is implemented. Entrepreneurial autonomy encompasses founders' decision-making freedom regarding the tasks to be performed, their timing, and their method of execution (Breugh, 1999). Autonomy is thus a multidimensional, dynamic, and context-dependent construct. The first aspect is strategic autonomy, i.e., the ability to independently determine the long-term direction of the company (Lumpkin et al., 2009), as well as criteria autonomy, which refers to the freedom to define what constitutes success and which goals are pursued. Additionally, the literature describes scheduling autonomy (temporal planning) and method autonomy (methodological design). These dimensions illustrate that entrepreneurial autonomy encompasses not only strategic decisions but also operational freedoms regarding time management and self-responsible task execution (Breugh, 1999). As Van Gelderen (2016) shows, founders oscillate between phases of experienced autonomy, deliberately temporarily limited autonomy, and involuntary loss of autonomy. What is decisive is not only the formal structure of contracts or governance arrangements but also the subjective perception of one's own scope of action. Building on these findings, entrepreneurial autonomy can therefore be seen as a continuously negotiated and evolving process, in which entrepreneurs must actively manage and sustain their perceived freedom in response to external constraints and internal business dynamics.

Research Design

An exploratory approach was used, employing qualitative, semi-structured interviews with founders to capture their subjective experiences of autonomy in the context of collaboration with VC firms. The empirical investigation was based on semi-structured interviews with founders whose start-ups had received venture capital in the pre-seed or seed phase. Out of eleven contacted founders, six interviews were conducted, three of which met the defined criteria and were included in the analysis. The transcribed conversations were analyzed in MAXQDA using qualitative content analysis, combining deductive and inductive approaches: theoretically derived main categories were refined inductively after the interviews. The three start-ups operate in medical technology, financial services, and personnel services (the latter two offering digital solutions), each founded by teams of two to five founders and employing between seven and ten team members. The start-ups studied differ in terms of industry, development stage, and

financial situation, reflecting typical scenarios of growth, stability, and crisis experience.

Results

The exploratory study shows that founders perceive entrepreneurial autonomy as a central motive, yet define it very differently. Conceptions range from individualistically oriented understandings, which focus on the psychological-emotional sense of control, to functional interpretations emphasizing responsibility and operational decision-making freedom, to relational perspectives, which view autonomy as the result of team-based or investor-coordinated decision processes. VC influence manifests in three ways: directly through contractually stipulated reporting obligations or approval rights, indirectly through expectations, performance pressure, and perceptions of dependency, and cooperatively through advice, feedback, and network access. While direct interventions are often perceived as burdensome, cooperative involvement is frequently experienced as a resource and support. This ambivalence demonstrates that investors, despite formal control rights, are not necessarily perceived as restrictive but can also be experienced as development partners.

Based on this, it becomes clear that entrepreneurial autonomy is experienced as multidimensional and ambivalent in practice. At the content and methodological level, founders have extensive freedom, while strategic decisions are significantly more influenced by external investors. Although equity agreements and shareholder contracts formally secure certain decision-making powers, in practice these are constrained by operational demands, growth targets, and implicit expectations. What is decisive for the experience of autonomy is less the objective structure than the subjective perception, which is strongly influenced by psychological factors such as trust, pressure, and communication.

The experience of autonomy is also temporally dynamic. Although all the companies examined are still in early or growth stages and have not yet experienced major setbacks, some founders report increasing pressure and growing constraints, while others describe stable or even more positive relationships over time. Particularly helpful for many founders was exchanging experiences with other start-ups of the same VC, allowing them to gain a candid insight into the collaboration in advance. Those who informed themselves early report more positive developments over time. Beyond investors, other stakeholders such as co-founders, customers, or employees also influence perceived decision-making freedom; these were not examined in this study.

Founders employ various strategies to maintain their autonomy, ranging from active communication and clear boundaries with investors to self-regulatory mechanisms. Cooperative, trust-based collaboration with investors at eye level proves particularly conducive to preserving entrepreneurial self-determination.

Conclusion

The results illustrate that venture capital can both constrain and promote autonomy. On one hand, it entails dependency, control rights, and potentially divergent interests between investors and founders. On the other hand, it provides access to resources, know-how, and networks that in turn enable freedom of action and growth. What is decisive for the experience of autonomy is less the formal contract arrangement than the quality of the relationship between founders and investors. Trust, communication, and psychological safety are key factors in determining whether control is experienced as support or restriction. Moreover, not only investors but also other stakeholders influence founders; this should be further investigated in future research. The study concludes that entrepreneurial autonomy in the context of venture capital financing is an ambivalent, dynamic, and context-dependent phenomenon.

Keywords: Early-Stage Financing; Venture Capital; Entrepreneurial Finance, Entrepreneurial Autonomy; Start-ups

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EMPOWERING ACADEMIC AND NON-ACADEMIC STAFF IN HIGHER EDUCATION TO STRENGTHEN ENTREPRENEURIAL COMPETENCES: A LIFELONG LEARNING PERSPECTIVE

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Abstract

The synergy between academic and non-academic staff at higher education institutions creates the system of higher education institution activities. It should be noted that it is precisely the learning of entrepreneurial competence that encourages both academic and non-academic staff to apply the knowledge they have acquired in their scientific, administrative, study, or project activities. However, these competencies are often developed independently and may be developed in a fragmented manner. The lifelong learning perspective fundamentally changes the improvement of the entrepreneurial competencies of academic and non-academic staff. Higher education staff can choose from a wide range of different forms of learning to improve their entrepreneurial competencies, which strengthen and transfer knowledge.

The process of lifelong learning really engages adults because of the current changes that are rapidly driven by various technologies. As Mendes et al., (2024) points out, everyone faces a lot of choices about how to learn and a lot of learning opportunities. Therefore, it is important for those who want to improve their skills to make decisions when choosing learning methods. Meanwhile, Shevchenko et al., (2025) emphasizes that lifelong learning is driven by internal motivation, and that deeper learning is associated not only with economic but also social benefits and the creation of social connections. Entrepreneurship is a skill like any other, which can be learned in various ways. Entrepreneurship can be divided into four main parts: self-efficacy, creativity, risk-taking, and innovation (Branca et al., 2025). Moreover, it is entrepreneurial competence that opens up a broader vision for employees, deeper involvement, and more knowledge about the perception and creation of organizational value.

According to Owusu-Agyeman (2024), when lifelong learning is linked to the professional development of higher education staff, new knowledge and skills can be acquired through a variety of learning methods. All staff learning is related to career planning in higher education. According to Seikkula-Leino et al. (2020), it is precisely the entrepreneurial competence of higher education institution staff that encourages students to be entrepreneurial and helps the organization to grow in a context of constant change. Iglesias-Sánchez et al. (2019) show that the harmony of different methods is particularly important for developing entrepreneurial competence. They also emphasize that entrepreneurial competence in higher education institutions is developed through the practical activities of teachers, students, and business representatives. The researchers highlight such methods of developing entrepreneurial competence as hackathons, team-building tasks, various games, and practical cases with business representatives. Theoretical analysis shows that entrepreneurial competence is an integral part of the competence of the higher education community, which can be developed in different ways. It is also emphasized that entrepreneurial competence unambiguously creates added value for higher education institutions.

In order to identify forms and methods for improving the entrepreneurial competencies of academic and non-academic staff at higher education institutions in the context of lifelong learning, a case study method was chosen and publicly available information on the five leading higher education institutions in Lithuania according to rankings was analyzed. Ten formal documents confirming procedures and describing higher education institution competence improvement systems were selected for qualitative analysis. The analysis showed that competence development in higher education institutions is systematic, with the main focus on didactic, digital, and psychological competences. Entrepreneurship competencies are developed in various forms: by participating in entrepreneurship programs together with students, organizing creative workshops, accelerators, and hackathons. Training programs are also offered on topics such as the commercialization of research, the promotion and implementation of project activities, the promotion of student entrepreneurship, and the testing of specific methodological tools for different groups. Mentoring and tutoring of academic and non-academic staff in different areas. The case study revealed that not only traditional learning methods are used, but staff also choose training programs on popular global learning platforms such as Coursera. The diversity of learning methods reveals that the perspective of lifelong learning is shifting towards informal learning opportunities.

One of the cases analyzed was the professional competence development model created by the Vytautas Magnus University Professional Competence Development Center, which shows that professional development activities are carried out according to the academy principle. The Teachers' Academy, where training is aimed at improving teachers' didactic competencies, the Professional Development Academy, where training is aimed at academic and non-academic staff, and the Lifelong Learning Academy, where training is aimed at the general public. The Centre's activities in 2022, 2023, and 2024 were selected for analysis. All proposed training topics were analyzed, and the number of topics dedicated to improving entrepreneurial competence was determined.

The collected data shows that the number of entrepreneurship training courses offered to

the community has been growing every year. Training topics included commercialization of research, fostering student entrepreneurship, and preparation and implementation of innovative projects. Five hackathons were also offered to the community during this period.

Criterion/Year	2022	2023	2024
Total number of trainings	144	171	144
Training courses for improving entrepreneurial skills	5	10	17

Figure 1 Entrepreneurship training organized by VDU

The study shows that in order to achieve professional development of academic and non-academic staff, clear organisational priorities must be set, a systematic document base must be created, and the needs of stakeholders must be identified. The next step is to create a consistent and unified system. The creation of this system has shown that it is important to focus on academic staff by providing them with more teaching skills, to encourage non-academic staff to improve their general skills, and even to make professional development accessible to the wider public. It is important to note that various principles of lifelong learning have been chosen for professional development activities at Vytautas Magnus University: face-to-face training, distance learning, internal experts, external experts, international platforms such as „Coursera“ for self-improvement, as well as an internal self-improvement system for previous training courses with video recordings, a professional development fund for those wishing trainings at other organisations, etc.

The theoretical analysis and case study show that lifelong learning is closely related to the improvement of competencies, and one of these competencies may be entrepreneurial competence. As the case study shows, organizations use different learning methods to develop this competence. Research into the entrepreneurial competence of academic and non-academic staff in higher education institutions should focus on evaluating different methods of acquiring this competence. Such further research is possible.

Keywords: entrepreneurship competence, lifelong learning, entrepreneurship in higher education.

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WOMEN IN THE MACHINE: GENDER ROLES, SOCIAL CAPITAL, AND ENTREPRENEURIAL EMPOWERMENT IN AI MICRO-VENTURES

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Abstract

Rapid advances in artificial intelligence (AI) have lowered entry barriers for digital micro-ventures, enabling solo founders and micro-teams to prototype, market, and deliver services with lightweight toolchains (Xu et al., 2024). Yet research and industry evidence suggest a gender adoption and participation gap in AI that risks reproducing long-standing inequalities in technology entrepreneurship (Dorta-González et al. 2024; UN Women, 2025). There thus emerges a field that links artificial intelligence and entrepreneurship through a gender lens, to which scholars argue attention should be directed (Jiang et al., 2024).

This paper proposes an exploratory study of women-led AI micro-ventures to understand how founders define and build “success,” how safe spaces and social capital enable that success, and what coping strategies they deploy against gendered constraints.

Our work draws on three complementary theoretical lenses. First, Social Role Theory explains how gendered expectations shape occupational choices, behavior, and perceived fit, which can influence who enters AI entrepreneurship and how they enact founder roles (Eagly, Woo, & Diekmann, 2012). Second, Intersectionality highlights that gender interacts with race, class, and other identities to create qualitatively different barriers and resources, especially in tech ecosystems (Crenshaw, 1991). Third, Social Capital Theory helps explain how networks, norms, and trust—often cultivated in women-centered safe

spaces—provide access to information, mentorship, and legitimacy that can compensate for resource constraints typical of micro-ventures (Bourdieu, 1986; Coleman, 1988).

Accordingly, we formulate the following three questions to guide our analysis towards the factors and strategies that are decisive in the context outlined.

RQ1. How do women founders of AI micro-ventures define and construct “success,” and how do these dimensions differ from dominant (often financial) metrics in entrepreneurship?

RQ2. Which factors differentiate women’s AI micro-ventures from other forms of female entrepreneurship (e.g., digital services, creative industries) in terms of resource acquisition, opportunity development, and network formation?

RQ3. What coping strategies do these founders use to navigate gendered constraints, and how are such strategies embedded in safe spaces and social capital?

Literature Review

Research on women’s entrepreneurship shows that women tend to conceive business success more broadly than purely financial indicators. In addition to profitability, emphasis is commonly placed on work–life balance and on the objective of generating a positive social and environmental impact (Aggarwal & Johal, 2021; Enri-Peiró et al., 2024). Beyond profitability, they often emphasize stakeholder value, work–life balance, and social impact, thereby expanding the notion of performance to include relational and operational outcomes (Brush, de Bruin, & Welter, 2009). In technology sectors, where masculine stereotypes still prevail, this perspective becomes more complex: the perception of role incongruity requires women founders to devote additional effort to building legitimacy, which further diversifies the metrics they use to evaluate venture progress (Eagly, Woo, & Diekmann, 2012).

Yet, definitions of success do not occur in a vacuum: they are deeply conditioned by the availability of networks and social capital. Classic theories conceptualize social capital as the resources embedded in networks—ties, trust, and norms—that facilitate access to information and collective action (Coleman, 1988), while also highlighting structural inequalities in access (Bourdieu, 1986). In women’s entrepreneurship, research shows that segregated networks and mentorship patterns can limit access to critical resources in accelerators and tech ecosystems, underscoring the importance of women-centered safe spaces. Such spaces not only provide emotional support but also enable the development of bonding and bridging ties that open pathways to strategic opportunities (Founderland, 2022). Evidence from other contexts, such as rural or artisan entrepreneurs, similarly confirms that collective action and network-based support enhance both performance and resilience (Babajide et al., 2022).

The rise of AI adds yet another layer of complexity. On the one hand, recent studies report a lower adoption of generative AI by women across roles and sectors, alongside concerns that algorithmic bias may reinforce existing inequalities (Dorta-González et al. 2024; UN Women, 2025). On the other hand, equitable design and access to AI tools could broaden inclusion within entrepreneurial ecosystems (Dwivedi et al., 2022). In response to these

challenges, women entrepreneurs often rely on competency-based strategies—developing skills, self-efficacy, and emotional intelligence—together with practices of resilience and affect regulation (Mortan et al., 2014; Kurniawan et al., 2025). Furthermore, the effectuation logic—starting from available means, co-creating with stakeholders, and focusing on affordable loss—aligns closely with the iterative, resource-constrained reality of micro-ventures (Sarasvathy, 2001).

Building on Social Role Theory, Intersectionality, and Social Capital Theory, as well as insights from recent studies on women’s entrepreneurship and AI adoption, we synthesise the key constraints, enabling factors, and coping strategies that shape women’s experiences in AI micro-ventures.

Methodology

To address the research questions, we adopt a qualitative and exploratory design that allows us to capture the complexity of women’s experiences in AI micro-ventures. Our primary method consists of semi-structured interviews with female founders of small-scale AI enterprises, either solo entrepreneurs or teams with up to five employees, located in Spain.

The sample will comprise 20 women founders. Participants will be identified through several entrepreneurship support structures. This recruitment strategy ensures access to a diverse pool of founders engaged in different AI applications and operating at varied stages of venture development.

For data collection, each interview will last between 45 and 90 minutes and will explore several dimensions: the founder’s background, her definitions of success, the role of AI tools in her business, the relevance of safe spaces and networks, the barriers encountered, and the coping strategies employed. To complement the interviews, we will also gather supporting materials, such as pitch decks or product websites.

The analysis will be conducted a qualitative software, applying a process of open, axial, and selective coding to systematically identify patterns. The interpretation of data will be guided by the theoretical frameworks of Social Role Theory, Intersectionality, and Social Capital, allowing us to connect individual experiences with broader structural dynamics. To ensure rigor, we will incorporate reflexive memos throughout the coding process and conduct member checks with selected participants to validate the findings and enhance trustworthiness.

Preliminary/Expected Results:

We anticipate that women founders will articulate multidimensional definitions of success, moving beyond financial viability to integrate aspects such as social impact, ethical use of AI, legitimacy within entrepreneurial ecosystems, and personal work–life balance. This broader understanding reflects both the structural barriers women face in technology sectors and their pursuit of values that transcend profit maximization.

Within this context, safe spaces and social capital are expected to emerge as critical enablers. Programs and peer groups designed specifically for women are likely to foster a sense of belonging and psychological safety, while also providing mentorship, legitimacy, and access to opportunities that might otherwise remain restricted in mainstream tech ecosystems (Founderland, 2022). These findings would align with previous literature emphasizing the importance of women-centered networks in overcoming systemic inequalities.

Finally, we anticipate that women entrepreneurs will rely on a combination of coping strategies to navigate resource constraints and gender bias. These strategies are expected to include competency-building initiatives, resilience practices, and the application of effectual logics—that is, leveraging available means, engaging in co-creation with stakeholders, and adopting an affordable-loss mindset (Mortan et al., 2014; Sarasvathy, 2001; Enri-Peiró et al., 2024). Such practices not only reflect adaptive responses to structural barriers but also illustrate how women founders innovate under uncertainty and limited resources.

Implications

This study is expected to generate contributions at theoretical and practical levels. From a theoretical perspective, it extends research on gendered entrepreneurship by integrating social role theory, intersectionality, and social capital into the analysis of women-led AI ventures. This framework enables a richer understanding of how women construct success and develop coping strategies in technologically intensive and male-dominated contexts.

At the practical level, the findings can inform the design of accelerators and entrepreneurship policies, emphasizing the need for structured mentoring programs, equitable access to AI resources, and women-centered networking initiatives. Such measures could help reduce structural barriers and foster more inclusive innovation ecosystems. Moreover, for such measures to be effective, they must take into account the idiosyncrasies of the context in which they are to be implemented—including, inter alia, its degree of digitalisation and level of financial literacy.

Keywords: women entrepreneurs; artificial intelligence; social capital; safe spaces; coping strategies

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OVERCOMING BARRIERS AND ENHANCING STARTUP PARTICIPATION IN PUBLIC PROCUREMENT OF INNOVATION: EVIDENCE, MECHANISMS AND POLICY DESIGN

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Abstract

Startups can create outsized public value, yet they remain under-represented in public procurement. This study reports an analysis of barriers and facilitators for startup participation in Public Procurement of Innovation (PPI), combining a structured literature review with twenty semi-structured interviews (ten founders; ten public executives). We mobilise two complementary lenses, liability of newness (LoN) and dynamic capabilities (DC), to explain the patterns we observe and to motivate a bundle of procurement levers that make experimentation investable by public administration, without diluting accountability and managing risks (Yang & Aldrich, 2017; Akenroye, Owens, Elbaz, & Durowoju, 2020).

Research Question: Which procurement design choices lower LoN-related hazards for startups, and through which DC micro-foundations do these choices translate into higher participation and delivery quality in PPI?

Novelty and contribution. We adopt a startup-specific perspective and advance a theory-consistent ‘bundle’ that links LoN hazards and DC micro-foundations to concrete procurement design mechanisms in PPI.

Background and framing

Startups face disadvantages arising from thin resources, immature routines, and limited recognition by external stakeholders, core features of the LoN perspective. At the same time, success in winning and delivering innovation-oriented public contracts depends on sensing, seizing, reconfiguring, and learning. Smaller firms can develop these DC with adequate institutional support.

Guidance from European institutions emphasises proportionate risk management, functional (outcome-based) specifications, and organisational readiness as pillars of PPI frameworks that widen SME participation (European Commission, 2021). OECD recommendations highlight outcome orientation and capability building, situating PPI within broader innovation systems (OECD, 2025a). Practitioner playbooks complement

this guidance with concrete roadmaps and helpdesks (Vara & van der Most, 2017; Beaz, 2021). Local materials add language clarity, templates, and data/Intellectual Property (IP) options that reduce interpretive load (Las Naves, 2023; Nordic Innovation Centre, 2023). Cross-jurisdiction syntheses provide a comparative baseline for transferability (Jungsberg, Salonen & Rohrer, 2023; Nogués & Torres, 2025).

Methodology

We triangulate: (i) peer-reviewed evidence on PPI/SME participation; (ii) EU/OECD guidance and practitioner reports; and (iii) twenty semi-structured interviews sampled to capture heterogeneity across sectors and TRL levels. Interviews were coded across five stages: opportunity sensing, tendering, award, delivery governance, and pilot-to-scale. TRL tagging operationalised staged evidence and milestone design using established frameworks (GAO, 2020; OECD, 2018a).

Findings

From a broad identified set of barriers and blockers, we highlight seven headline themes:

(1) Risk screens and working-capital exposure in public procurement processes (LoN: finance/legitimacy). Conventional solvency tests as well as price-centric scoring, suppress entry by first-time suppliers. The perceived “winner’s curse” risk rises when delivery evidence is valued less than price (Hoekman & Taş, 2022; Ancarani, Di Mauro, Hartley & Tátrai, 2019).

(2) Administrative and interpretive load (LoN: routine immaturity). Dispersed portals, non-interoperable forms, and legalistic language introduce tender fatigue; thin debriefs limit learning and future participation (Vara & van der Most, 2017; Uyerra, Zabala-Iturriagoitia, Flanagan & Magro, 2020).

(3) Information asymmetries and weak outreach (LoN: boundary recognition). Frequently absent roadmaps, prior-information notices, or searchable Q&A repositories obscure timing and fit for startups. Many also lack dedicated government relations and business development routines to monitor procurement pipelines and build pre-tender relationships (Januška & Pešík, 2023; Nordic Innovation Centre, 2023).

(4) Experience bias and thin track record (LoN: signalling). Strong past-performance requirements, prescriptive specifications, and heavy reliance on “similar contracts” reproduce incumbent dominance and crowd out novelty, especially where references cannot be substituted by evidence from pilots or adjacent domains (Di Mauro, Ancarani, & Hartley, 2020; Briedienė, 2021).

(5) Ambiguous problem framing and IP/data uncertainty (LoN: appropriation risk). Vague problem statements, unclear evidence expectations, and non-standard IP/data clauses raise proposal-development costs and perceived appropriation risk; ambiguity around privacy, security, and interoperability deters bids (European Commission, 2021).

(6) Slow decision-making and payment delays (LoN: runway risk). Prolonged internal approvals, standstill periods, and late payments extend time-to-award and erode runway during R&D-intensive delivery (Schäfer, Stephan, & Fuhrmeister, 2024; Las Naves, 2023).

(7) Post-pilot adoption gap and budgeting rigidities (LoN: legitimacy and contracting routines). Successful prototypes often fail to convert into operational deployments because multi-year adoption routes. Framework lots, dynamic purchasing systems (DPS) or dedicated budgets are often missing. Without these instruments, buyers and suppliers are forced into “restart-from-zero” procurement cycles (OECD, 2025a; Monteiro, Hlacs, & Boéchat, 2024).

Findings: facilitators and design levers.

A bundle of countermeasures re-balances risk and creates ‘investable experiments’ for public administrations; the levers that follow are identified as the most critical for future research and, simultaneously, the most actionable for policymakers:

(i) Proportionate selection (DC: seizing). Cap turnover and coverage ratios relative to lot value; allow split lots; prioritise the most economically advantageous tender (MEAT) approach (which evaluates bids outcome-based criteria and variants, not price as the primary decision variable); accept “reference-equivalent” evidence from pilots or adjacent domains; and apply proportionate guarantees to avoid experience bias (OECD, 2018b).

(ii) Cash-flow reliability (DC: reconfiguring under liquidity). Payment advances; milestone-based payments; strict payment service level agreements (SLAs); publish award/approval SLAs and decision calendar, and use escrow accounts to protect delivery runway (Beaz, 2021; Schäfer et al., 2024).

(iii) Early and structured market engagement (DC: sensing/learning). Challenge briefs, preliminary consultations, searchable Q&A, and multi-year roadmaps; complement with plain-language tender packs; provide quality debriefs to support learning after rejections (Vara & van der Most, 2017; Jungsberg et al., 2023).

(iv) Standard IP/data options that safeguard public-sector use, while allowing supplier-retained IPR, and compliance by design (DC: seizing without lock-in). Make privacy/security/interoperability positions explicit in the pack to lower proposal-development risk (European Commission, 2021).

(v) Staged instruments (DC: staged seizing/learning). Pre-commercial procurement for early-stage R&D, and innovation partnerships instrument for joint development and subsequent purchase (both with TRL-gated decision points, clear acceptance criteria, and go/no-go rights); align gates with MEAT evidence so “what counts” is visible ex-ante (GAO, 2020; European Commission, 2021).

(vi) Collaborative routes (DC: reconfiguring/legitimacy). Consortia, subcontracting, Startup-in-Residence programmes, living labs and sandboxes to enlarge capabilities and legitimacy; enable joint bids via lotting and proportionate qualification to reduce thin-track-record penalties (van Winden & Carvalho, 2019; Nordic Innovation Centre, 2023).

(vii) Post-pilot pathways (DC: scaling). Framework lots, dynamic purchasing systems for innovation, forward-commitment elements, and dedicated budgets for adoption to avoid “restart-from-zero” after pilots; pre-define scale-up criteria to smooth the prototype-to-operations jump (OECD, 2025a; OECD, 2025b). Recent portal-simplification initiatives point in the same direction by lowering administrative entry costs (European Commission, 2023).

Mechanisms: why the levers work. In LoN perspective, advances and milestone payments reduce time-to-cash and working-capital hazard (Yang & Aldrich, 2017). Plain-language templates and once-only certificates codify repeatable routines, while endorsements and case studies strengthen boundary recognition (Akenroye et al., 2020). In DC terms, early dialogue and published rubrics improve sensing; proportionate selection and MEAT enable seizing by valuing performance under uncertainty; consortia and subcontracting support reconfiguring; and quality debriefs plus KPI dashboards embed learning (Akenroye et al., 2020; OECD, 2018a).

Evidence integration. Comparative and firm-level work shows that SME-friendly regimes pair simplified pre-qualification and dependable payment with transparent, outcome-based evaluation (Ancarani et al., 2019; Di Mauro et al., 2020). Demand-pull can directly stimulate innovation and indirectly act as a “certification” mechanism for subsequent adopters (Dai, Li & Chen 2021; Zabala-Iturriagagoitia, 2021). Cross-jurisdiction syntheses and global indicators underline the centrality of proportionate risk management, digital procurement capabilities and clear governance (OECD, 2025a; OECD, 2025b). Practitioner reports highlight the role of startup-dedicated helpdesks, searchable resources, and analytics in raising newcomer entry (Beaz, 2021; Las Naves, 2023). The study developed by Varela & Moñux (2020) offers Spain’s first decade of PPI as a relevant institutional baseline and highlights the “reference-customer” channel as a mechanism for scaling.

Implications and “Bold Steps”

Contracting authorities can: name product owners and create public-private integrated delivery teams; publish a delivery governance model (roles, decision cadences, escalation paths, etc.); and adopt KPI dashboards tied to acceptance criteria (Uyarra et al., 2020; OECD, 2025a). For **centre-of-government actors**: mandate proportionate selection and payment SLAs; publish multi-year procurement roadmaps; and fund helpdesks, bid-clinic and debrief programmes (Beaz, 2021; European Commission, 2023). **Innovation agencies** could: complement PPI with soft-finance (guarantees or low-interest working-capital lines) so startups can invest during R&D-intensive delivery; reserve budget and pathways for post-pilot uptake (Schäfer et al., 2024; Monteiro et al., 2024). For **startups**, the route to government can be understood as a portfolio strategy, where firms assess when to bid directly and when to participate as specialist subcontractors. This approach

also involves codifying compliance requirements (e.g., verification and evidence plan, built-in security, and data protection) and institutionalising after-action reviews to consolidate learning (van Winden & Carvalho, 2019; Talebi, Rezania, & Bragues, 2021).

Conclusion

Startups' under-participation in PPI is not an immutable structural fact; it is, in large part, a design problem. A reinforcing bundle that combines proportionate selection with outcome-based evaluation, predictable cash flow through advances and TRL-gated milestone payments, standard IP/data clause options and early challenge-led engagement with post-pilot routes, can open the door to credible first-time bids while keeping public accountability auditable (GAO, 2020; European Commission, 2021). These steps align with recent EU implementation efforts and broader guidance on effective PPI (European Commission, 2023).

Keywords: Public Procurement of Innovation; Startups; Procurement Barriers; Public Sector Innovation; Procurement Design Choices

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EXPLORING THE INTERSECTION OF NATURE-BASED SOLUTIONS AND GLOBALLY IMPORTANT AGRICULTURAL HERITAGE SYSTEMS IN SUSTAINABLE TOURISM RESEARCH: A BIBLIOMETRIC STUDY

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Extended abstract

In response to the growing interest on sustainable tourism and its integration with agricultural heritage, this study investigates the academic landscape through a bibliometric analysis of publications indexed in the Web of Science (WoS) database from 2006 to December 2024. By applying science mapping techniques, the research aims to organize and interpret the evolution of scientific output related to tourism's role in the dynamic conservation of Globally Important Agricultural Heritage Systems (GIAHS). The analysis particularly examines how tourism contributes to harmonizing environmental sustainability, socio-economic development, and cultural resilience within these systems. Although the literature on sustainable tourism and agri-food systems has grown, studies addressing the interplay between GIAHS and Nature-based Solutions (NbS) remain scarce. To address this gap, the study identifies thematic patterns, emerging concepts, and shared priorities across the three fields of GIAHS, NbS, and sustainable tourism. This study emphasizes the potential for synergies and highlights the necessity of a bibliometric approach to assess tourism's contribution to sustainable development when informed by both GIAHS and NbS frameworks.

The main goal of this research is to analyze the convergence between GIAHS and NbS frameworks in order to assess how tourism contributes to sustainable practices, biodiversity conservation, and the dynamic preservation of traditional agri-food landscapes.

This research adopts a science mapping and bibliometric approach to investigate how academic production has evolved around the topics of NbS, GIAHS and sustainable

tourism. Science mapping facilitates the visual representation of scholarly structures and thematic relationships through tools such as citation analysis and keyword co-occurrence (SSM) provides an integrative framework that supports the review and synthesis of large literature pieces (Herrmann, 2023). Within this context, citation-based visualization is instrumental in uncovering how academic domains have developed over time, using nodes and links to depict relationships between authors, institutions, journals, or concepts (Aria & Cuccurullo, 2017). For the purpose of this study, bibliometric mapping was conducted using VOSviewer (Van Eck & Waltman, 2010), a recognized software for building and analyzing bibliometric networks, which allows the identification of dominant research trends and underexplored areas in the literature.

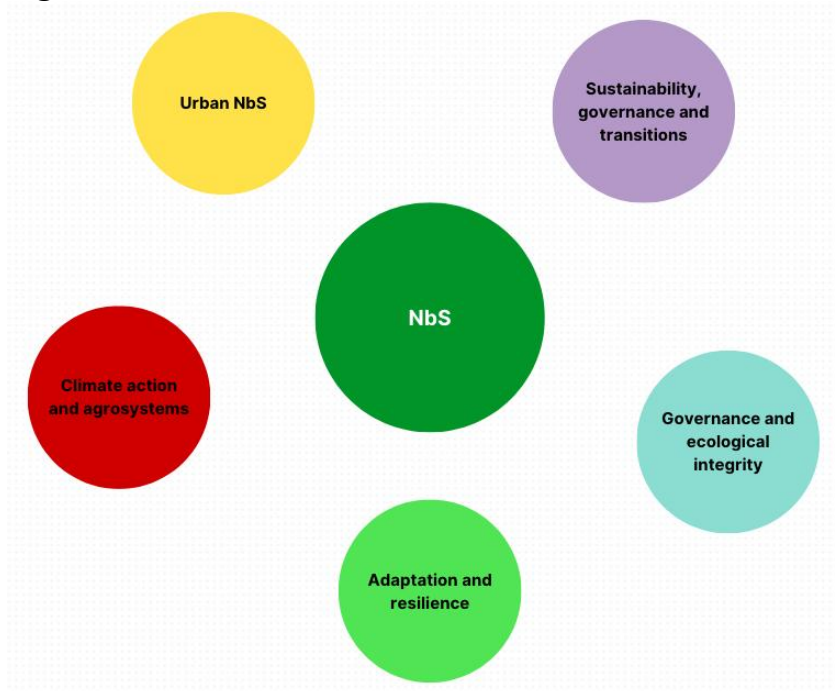
This study employs a dual bibliometric approach—combining keyword co-occurrence and citation analysis—to explore thematic structures and evaluate academic impact. Co-occurrence mapping enables the identification of frequently associated terms, thereby revealing conceptual linkages and collaborative patterns within and across disciplines (Mustafa et al., 2023). In parallel, citation analysis helps gauge the academic relevance of publications through indicators such as the h-index and journal impact factor, which are commonly used to measure research quality and influence academic decision-making (Aroeira & Castanho, 2020; Lemke et al., 2021). Together, these techniques allow for a deeper understanding of how NbS and GIAHS are framed within the discourse on sustainable tourism and dynamic conservation.

Despite its growing importance, the field remains in a formative stage, with ongoing debates and emerging research agendas. A comprehensive literature review is therefore necessary to track its evolution and assess current contributions and methodologies (Duque et al., 2021). By conducting a bibliometric analysis, this study aims to provide a structured overview of the topic, highlighting the most influential works and research trajectories (Merigó et al., 2015). This method offers a quantitative and systematic lens to assess how sustainable tourism is addressed in the context of agricultural heritage systems.

The bibliometric findings reflect a growing but asymmetrical evolution in the academic output surrounding NbS and GIAHS. In terms of volume, publications related to NbS have experienced exponential growth beginning in 2016, with a notable surge after 2020 and reaching a peak in 2024 with 147 publications and 3,410 citations. Conversely, research on GIAHS has progressed more gradually, with its highest output observed in 2022 (34 publications) and a maximum of 647 citations recorded in 2024. This disparity indicates a quicker adoption of the NbS framework within scientific discourse, especially concerning environmental planning and climate resilience strategies.

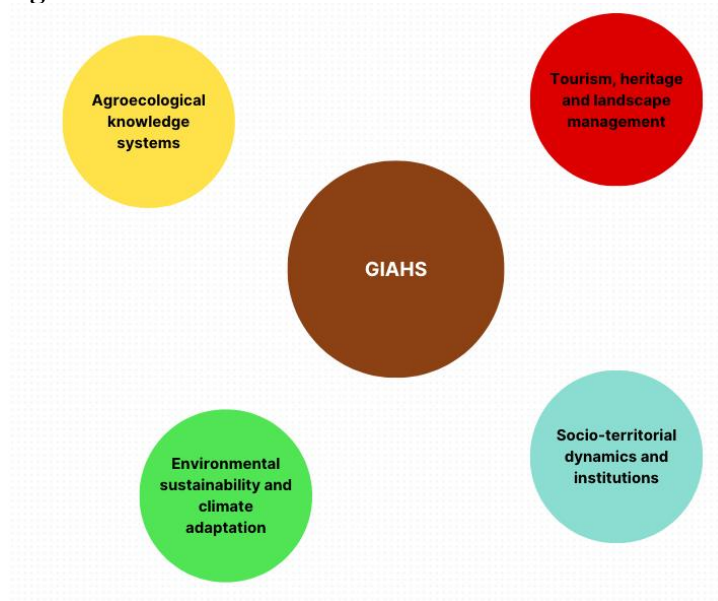
The keyword co-occurrence analysis conducted using VOSviewer identified main thematic clusters in each field (see Figure 1). These findings confirm the applied and cross-sectoral nature of NbS research, which tends to focus on risk management, green infrastructure, and ecosystem-based approaches.

Figure 1. Main thematic clusters in NbS field.



In the case of GIAHS, four clusters were identified (see Figure 2). This network highlights the local orientation of GIAHS research, with strong links to traditional agricultural systems, territorial resilience, and cultural values. Notably, sustainable tourism appears explicitly as a thematic cluster, reinforcing its role as a mechanism for heritage valorization and community-based conservation.

Figure 2. Main thematic clusters in GIAHS field.



A key finding is the conceptual convergence between NbS and GIAHS in areas such as landscape multifunctionality, ecosystem services, climate resilience, and hybrid

governance. Both frameworks promote the integration of traditional knowledge with formal policy instruments, as well as the inclusion of cultural values in land-use planning. This convergence is also visible in tourism-related literature, where NbS and GIAHS are applied to rural and agroecological destinations. GIAHS and NbS advocate for combining traditional governance with formal policy instruments to enable upscaling and sustain benefits (Giordano & Pagano, 2021) and recognize cultural values embedded in landscapes—as living heritage in GIAHS and as cultural ecosystem services within NbS frameworks (Debele et al., 2023).

Finally, the results reveal a growing scientific interest in integrating NbS and GIAHS into sustainable tourism strategies, highlighting the need for interdisciplinary research that addresses conservation, local development, and climate adaptation simultaneously. This emerging trend supports the potential of both frameworks as complementary tools for promoting dynamic conservation and transforming the tourism sector toward sustainability.

Tourism when aligned with NbS, can shift from being a threat to becoming a catalyst for sustainability and dynamic conservation within GIAHS. It contrasts key challenges—such as climate change, biodiversity loss, mass tourism, and weak governance—with opportunities like cultural promotion, rural diversification, and environmental awareness. At its core, the integration of GIAHS and NbS highlights shared pillars—ecosystem services, sustainable land use, community involvement, and cultural identity—that can harmonize heritage preservation with sustainable development.

This bibliometric analysis highlights the growing academic interest in the convergence between NbS and GIAHS, particularly within the framework of sustainable tourism. While NbS has seen broader international uptake and exponential growth in publications, GIAHS research remains more context-specific, centered on traditional knowledge, agrobiodiversity, and cultural landscapes. Despite these differences, both frameworks converge around shared goals: biodiversity conservation, ecosystem resilience, and community participation. Specifically, the co-occurrence networks show that tourism is increasingly recognized as both a threat and opportunity in agricultural heritage landscapes. When tourism aligns with NbS principles—such as ecosystem restoration and multifunctionality—it can contribute to dynamic conservation, cultural promotion, and sustainable rural development.

However, the analysis also reveals a gap between theory and practice. Although conceptual synergies are evident, the operational integration of NbS and GIAHS in real-world tourism strategies remains limited. Future research should explore how participatory tourism can become a bridge between these frameworks, enhancing their contribution to the long-term preservation of agricultural heritage.

Keywords: Nature-based Solutions (NbS); Globally Important Agricultural Heritage Systems (GIAHS); Sustainable Tourism; Bibliometric Analysis; Dynamic Conservation.

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FOSTERING TRADITIONAL AGRI-FOOD SYSTEMS: GIAHS RESILIENCE AND SUSTAINABLE RURAL DEVELOPMENT THROUGH BRANDING STRATEGIES

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Abstract

The Food and Agriculture Organization of the United Nations (FAO) launched the Globally Important Agricultural Heritage Systems (GIAHS) program in 2002, recognizing unique agricultural landscapes through dynamic conservation. Dynamic conservation combines sustainable development and conservation to guarantee the continuity and resilience of traditional agri-food systems (FAO, 2002). The preservation of ecosystems, agrobiodiversity, and traditional knowledge are all included in this framework. It also seeks to improve the economic and social well-being of local communities that have traditionally preserved these agricultural environments and landscapes. Although GIAHS systems have intrinsic ecological and cultural values, their long-term sustainability depends on employment, economic, and social opportunities. This is why the GIAHS program jointly addresses social, environmental, agricultural, and economic principles.

In this context, the importance of valorizing local production, raising the awareness of local territories, and improving economic benefits from agricultural activities has been highlighted by the dynamic conservation strategies of the GIAHS participating communities. Nevertheless, the lack of a global and standardized GIAHS brand generates both opportunities and challenges. The United Nations, together with other international organizations (e.g., UNESCO or FAO, among others), cannot certify the quality and safety of commercial agricultural products. As a result, local actors, including farmers, cooperatives, local governments, national authorities, and non-governmental organizations, have implemented independent initiatives that are consistent with GIAHS objectives. Even though the scale, complexity, and market reach of agricultural local systems differ, the local and regional branding strategies implemented frequently communicate common standards, such as biodiversity conservation, eco-friendly operations, and respect for traditional knowledge systems, to convey to customers the ecological, cultural, and ethical value of GIAHS products. These labeling systems frequently highlight the connection between product, location, and culture, signaling to consumers that the product they are buying comes from a culturally and environmentally significant agroecosystem, as well as the products' uniqueness and heritage value (Yotsumoto et al., 2023). Whereas the producer finds branding as a strategy to increase

industry growth, market value, and the company's earnings (Beverland, 2005; Peñaloza, 2000; Thomas et al., 2013), this branding helps consumers to make decisions on selecting, identifying, and differentiating products from competitors (Haimid et al., 2012).

Therefore, GIAHS' territorial branding not only adds market value to agricultural products but also reinforces the identity and visibility of the agri-food system. The historical, cultural, and ecological uniqueness of the territory can be effectively promoted through a well-designed strategy that prioritizes the quality and meaningful designation of agri-food products. This provides agricultural producers with competitive advantages that position and differentiate their products in the market. Moreover, positive spillover effects can also be generated because communicating the GIAHS values related to community resilience, landscape stewardship, and traditional practices can attract visitors seeking sustainable and authentic experiences. Therefore, sectors such as cultural, ecological, and rural tourism would benefit.

The territorial attractiveness and product identity convergence aligns with integrated rural development strategies, in which agricultural heritage, tourism, and complementary economic activities support and reinforce one another. In this context, branding moves beyond its business function, emerging as a strategic instrument to enhance the social cohesion and economic vitality of GIAHS-designated regions.

GIAHS branding approaches vary across regions due to the influence of different market dynamics, regulatory frameworks, community involvement, and institutional capabilities (Li et al., 2019). Sometimes, brands have been incorporated in existing geographical certification or larger regional development plans, while in others, developing visual identities and traceability systems have been primarily promoted by community initiatives led by local governments and producer associations. Despite being a relatively new phenomenon, these initiatives are starting to provide perspectives into how they might support rural development through increased recognition of local knowledge systems, youth engagement, income diversification, and a stronger sense of place identity (Olivieira et al., 2025).

Some examples include the cases of Chile's Chiloé archipelago, Portugal's Barroso region, and Japan's Chagusaba tea system, whose branding mechanisms and certifications have adapted to each region's characteristics, fostering cultural narratives, landscapes, and agricultural practices. Other examples, such as Japan's Sado Island and Osaki Kōdo or China's Rice-Fish Culture, demonstrate that labeling and branding strategies have increased farming incomes, consumer trust, and price premiums, while promoting biodiversity awareness and sustainable land management. This indicates that GIAHS products are becoming increasingly competitive, while also supporting sustainability standards and raising awareness and recognition for the regions and communities that uphold these traditional practices.

This paper provides a broader perspective on GIAHS branding, thereby expanding the existing literature. Using case examples from GIAHS sites, it explores the drivers behind label and brand development, the governance and institutional frameworks that enable their adoption, and the perceived outcomes for local community and regions dynamics. Product labeling and branding linked to GIAHS have emerged as effective instruments

for advancing dynamic conservation, integrating ecological sustainability with socio-economic progress. Although the FAO designation highlights the cultural, agricultural, and ecological importance of traditional farming systems, its true value resides in their capacity to foster locally driven, financially feasible, and ecologically sound development routes. Within this broader framework, product labeling serves not only as a form of heritage acknowledgment but also as a mechanism for protecting it.

Keywords: Globally Important Agricultural Heritage Systems (GIAHS); agricultural product labeling; traditional agri-food systems; sustainable agriculture.

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INNOVATING CULTURAL SOUVENIRS THROUGH PHYGITAL DESIGN: AN ACTION LEARNING CASE FROM CDTM'S ENTREPRENEURSHIP LABORATORY COURSE

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Abstract

Cultural heritage institutions face intensifying financial pressures that jeopardize their ability to safeguard monuments, artifacts, and traditions. Rising costs for conservation, digitization, and infrastructure coincide with declining subsidies and limited ticket revenue (Borin & Donato, 2023). While souvenirs have long been a secondary source of income, most are low-cost items with limited potential for innovation. This study explores the potential of iterative design methodologies to conceptualize and develop new “phygital” souvenir models that combine cultural authenticity with digital enhancement.

The study adopted an iterative design methodology, informed by a consolidated start-up framework for problem structuring, hypothesis testing, and solution refinement. The initial phase examined the feasibility of developing purely digital souvenirs. A competitive analysis of prominent digital heritage initiatives revealed that, despite their technological sophistication, few demonstrated effective commercialization within the tourism sector. Existing research suggests that digital projects frequently encounter limited adoption due to low perceived value, usability challenges, and the absence of a tangible connection to the visitor experience (Proctor, 2018). Moreover, evidence indicates that visitors generally prefer physical mementos, which poses structural challenges to the market viability of fully digital offerings.

To complement this, 21 semi-structured interviews were conducted with 16 tourists and

5 cultural enthusiasts at heritage sites in the city of Valencia, Spain, aligning with qualitative research standards for theoretical saturation. The results from this sample indicated a strong preference for tangible, affordable, and portable souvenirs. Tourists most frequently cited magnets, small figures, crafts, and food products. Price was the dominant factor in purchasing decisions, followed by design, practicality, and ease of transport. Participants expressed limited interest in digital souvenirs: most rejected them outright, a few would consider them only if they were useful, and only one mentioned potential interest if they were gamified. These findings suggest significant challenges in commercializing purely digital souvenir models, particularly within the tourism sector. The limited consumer interest observed in this sample suggests that the market may not yet be prepared for such novel offerings, and consumer acceptance remains uncertain due to the early stage of development of these digital products.

The second phase pivoted to hybrid alternatives that could integrate digital features with traditional souvenirs. Using these insights, the team co-designed a hybrid phygital magnet that integrates Augmented Reality (AR) storytelling, accessed through a QR code. Iterative prototyping balanced functionality, usability, and aesthetics, adhering to human-centered and culturally sensitive design principles (Kuntjara & Pak, 2024). In parallel, a survey with 135 participants provided additional validation. Results from the survey confirmed that, among all souvenir types, magnets were the most frequently purchased. Respondents expressed a median acceptable price of €5 for an enhanced version, and 37% indicated willingness to purchase at this level or higher. This convergence of findings from the survey and semi-structured interviews led to the development of the phygital magnet: a traditional souvenir enhanced with augmented reality (AR). By scanning a QR code, visitors could access 3D models and contextual narratives about monuments. In this action learning case context, the magnet was not introduced as a predefined solution but emerged through the iterative process as the most

The experiment was conducted in the city of Valencia, Spain, where consumer preferences may differ from other cultural regions. Despite these contextual limitations, the iterative design process is broadly adaptable and replicable across diverse heritage contexts. While magnets may not be universally optimal, the principle of augmenting high-volume traditional souvenirs with digital content remains broadly applicable. Future research should test the phygital souvenir model across varied heritage sectors and international markets. Longitudinal research tracking purchase behaviour and post-purchase engagement is also necessary to provide insights into long-term value creation.

Ultimately, the project demonstrates that phygital souvenirs can provide a credible new revenue stream for cultural heritage institutions. By building on the collaborator start-up's (ePlace Heritage) expertise in digital documentation and responding to visitor preferences for tangible souvenirs, the phygital magnet bridges the gap between technological innovation and consumer demand. Beyond its immediate application, the findings highlight the broader potential of iterative design in heritage innovation, and furthermore, in this type of University-Industry collaboration project. Hybrid souvenirs not only diversify revenue streams but also enrich visitor interaction with heritage, turning everyday objects into channels for storytelling and interpretation. The phygital magnet shows how evidence-based innovation can transform digital heritage resources into sustainable and scalable solutions for institutions worldwide.

Finally, this research was conducted within the framework of the *Entrepreneurship Laboratory (eLab)* module course at the Center for Digital Technology and Management (CDTM) in Valencia. The eLab module is a project-based learning course that promotes interdisciplinary and experiential learning through direct collaboration with startups, public institutions, and corporate partners. By bridging academic environments with industry needs, eLab fosters entrepreneurial mindsets and equips students with the tools to address real-world challenges. The partnership with the start-up ePlace Heritage enabled students to apply strategic innovation and evidence-based design to a pressing problem in the cultural sector. This model of university-industry collaboration illustrates how entrepreneurship education can serve as a platform for applied research, knowledge transfer, and the development of commercially viable solutions with societal relevance.

This approach aligns with the principles of the Triple Helix model, which emphasizes the interplay among universities, industry, and government in driving innovation and societal transformation (Etzkowitz & Leydesdorff, 2000). In this framework, higher education institutions are not merely centers of knowledge, but active co-creators of entrepreneurial ecosystems. CDTM courses embody this perspective by embedding students in authentic innovation contexts, where they experience the complexity of user-centered design, business viability, strategy, and cultural impact.

Moreover, engaging students in project-based learning (PBL) offers substantial pedagogical value. It fosters problem-solving, critical thinking, and interdisciplinary collaboration—key competencies in entrepreneurial education (Pittaway & Cope, 2007). Additionally, the learning process in the Lab course reflects key principles of **experiential and collaborative learning**, where students are immersed in complex, ambiguous problems that mirror the realities of entrepreneurship. Through real-world immersion, students not only apply theoretical knowledge but also develop essential soft skills, including effective communication with stakeholders, navigating ambiguity, and managing innovation cycles. This experience reinforces the role of education as a driver of innovation, especially when aligned with real societal needs.

Keywords: Cultural Heritage; Phygital Souvenirs; Project-Based Learning; Entrepreneurship Education; University-Industry Collaboration

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INSIGHTS INTO THE CONVERGENCE OF UNIVERISTY AND CORPORATE SPIN-OFF RESEARCH

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Abstract

Spin-offs have emerged as important channels for transferring knowledge and technology. University spin-offs (USOs) facilitate the commercialization of academic research, fostering innovation, entrepreneurship, and regional development (Caputo et al., 2022), whereas corporate spin-offs (CSOs) are primarily studied for their strategic and financial roles, such as restructuring and value creation (Bettinazzi & Feldman, 2021; Colak & Whited, 2007). Despite extensive research on each type, comparative studies remain scarce, limiting understanding of their similarities, differences, and key characteristics (Hydle & Meland, 2016; Wennberg et al., 2011).

Research on USOs has developed along two main lines: academic and economic. From the academic perspective, the efficiency of knowledge transfer depends heavily on the structure and capabilities of technology transfer offices (TTOs), which facilitate intellectual property protection, alliance formation, and opportunity identification (Grimaldi et al., 2011; Lockett & Wright, 2005). Studies also examine the impact of entrepreneurial activities on researchers' careers and the determinants of entrepreneurial intention (Neves & Brito, 2020).

Corporate spin-offs (CSOs), by contrast, are typically defined as the creation of independent firms from assets or business ideas developed within a parent company, aimed at improving performance and unlocking shareholder value without direct compensation (Bhat & Shiralashetti, 2024; Parhankangas & Arenius, 2003). Traditional research emphasizes financial outcomes, market reactions, and efficiency gains post-

divestiture (Junge et al., 2021). More recent studies explore innovation-driven CSOs, analyzing whether they originate from opportunity-driven contexts or internal constraints, as well as their contribution to knowledge transfer and organizational strategy (Fryges et al., 2014; Clarysse et al., 2011).

To identify common research themes between USOs and CSOs, a bibliometric analysis was conducted using the Web of Science Core Collection, which provides structured data suitable for such analyses. Three search strategies were applied to retrieve relevant articles: one for USOs, another for CSOs, and a third targeting studies covering both types of spin-offs. Initial searches were unrestricted in terms of time or document type to ensure a comprehensive collection.

To refine the dataset, two filters were applied. First, only documents published between 2004 and the search date were included, reflecting the period following the foundational definitions of USOs (Pirnay et al., 2003) and CSOs (Parhankangas & Arenius, 2003). Second, the selection was limited to peer-reviewed articles, reviews, letters, and notes, excluding less rigorous sources.

Artificial intelligence (ChatGPT) was employed to assist in preliminary classification of titles and abstracts, generating tables that grouped documents according to whether they addressed USOs, CSOs, or both. Manual review was then performed to validate the classifications, showing an agreement of 58% for USOs and 77% for CSOs. For studies potentially covering both types, AI-assisted classification matched the manual review in 77.27% of cases. After reclassification, five articles were identified as truly addressing both USOs and CSOs.

The final dataset comprised 289 articles on USOs, 159 on CSOs, and 5 covering both types, forming the basis for subsequent bibliometric mapping and thematic analysis.

To gain a clearer understanding of the literature and explore potential convergence and divergence between USO and CSO research, a bibliometric analysis was conducted using *VOSviewer*, following the approach suggested by Chaparro-Banegas et al. (2023), separate analyses were performed for USOs and CSOs, enabling the identification of thematic clusters and conceptual linkages within each body of literature. Metadata including titles, abstracts, keywords, and citation data were extracted from the Web of Science Core Collection and analyzed through co-occurrence mapping to visualize the frequency and relational proximity of key terms. Attention was then directed to the small subset of five articles that explicitly address both USOs and CSOs, allowing for an in-depth exploration of how the two types of spin-offs intersect in academic discourse. Further analysis of publication periods and citation patterns provided insight into the most influential studies and the evolving trends within joint literature, highlighting the predominant research themes and their development over time.

The results indicate that while USOs and CSOs are occasionally examined through similar lenses, comparative research explicitly addressing their differences remains very limited (Hydle & Meland, 2016; Wennberg et al., 2011). The fact that only five studies were found simultaneously analyze both types of spin-offs highlight the gap in

understanding their interrelations and potential synergies.

Existing research primarily focuses on performance, technology transfer, and commercialization, showing how both USOs and CSOs contribute to innovation and economic development. Shared themes across the literature include management practices, entrepreneurial motivations, and the factors driving spin-off formation. Comparative analysis of these dimensions could clarify the strategic and motivational differences between USOs and CSOs, providing insight into how each type develops and succeeds within its respective environment.

To gain deeper insights, the five articles addressing both USOs and CSOs were analyzed in detail (see table 1). Dai & Xu (2023) highlight that government-supported USOs in China tend to achieve higher innovation despite lower financial returns, with governance mechanisms shaping both innovation and economic outcomes. Czarnitzki et al. (2014) show that USOs in Germany generate greater employment growth than industrial startups, particularly when maintaining strong academic ties. Fryges and Wright (2014) provide a conceptual typology of academic and corporate spin-offs, clarifying different origins and entrepreneurial pathways. Zayas and Carrillo (2012) find that USOs in the Madrid Science Park leverage university resources more effectively than independent technology firms, resulting in higher R&D investment, patents, and sales. Conversely, Wennberg et al. (2011) demonstrate that CSOs in Sweden outperform USOs in survival and sales growth, while USOs benefit more from founders' prior industrial experience, emphasizing the role of entrepreneurial background in shaping firm performance.

Table 1. CSOs and USOs articles

Authors	Title	Year	Citations
Czarnitzki, D; Rammer, C; Toole, AA	University spin-offs and the performance premium	2014	54
Zayas, JM; Carrillo, GM	Contrasts between university spin-offs and independent technology-based firms: the case of Madrid Science Park	2012	0
Fryges, H; Wright, M	The origin of spin-offs: a typology of corporate and academic spin-offs	2014	63
Dai, YJ; Xu, J	Evaluating government intervention in academic entrepreneurship: an identity perspective and evidence from China	2023	2
Wennberg, K; Wiklund, J; Wright, M	The effectiveness of university knowledge spillovers: Performance differences between university spinoffs and corporate spinoffs	2011	236

Bibliometric findings reveal that USOs receive greater academic attention than CSOs, both in terms of publication volume and citation frequency. Furthermore, USO research

often frames the context for studying CSOs, with corporate spin-offs typically addressed in comparative terms rather than as independent phenomena. In conclusion, this study underscores the need for more integrated comparative research on USOs and CSOs to clarify their distinct motivations, performance patterns, and strategic implications. Understanding these similarities and differences can guide policymakers, practitioners, and academics in designing more effective support mechanisms for knowledge- and innovation-based ventures, ultimately enhancing their economic and societal impact.

Keywords: Innovation; Spin-offs, Knowledge Transfer, Bibliometric

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ASSESSING CYBERSECURITY COMPANY PERFORMANCE THROUGH INVESTMENT AND REPUTATIONAL ANALYSIS

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Abstract

Cybersecurity's growing importance has driven research focused on technical defences, such as encryption and access controls. However, economic factors are just as crucial for digital ecosystem resilience, shaping security through incentives and market dynamics. Research into these economic aspects is still emerging, leaving many issues unexplored (Kianpour et al., 2021).

This research proposal aims to identify the key resources cybersecurity companies need to address changing threats and market demands. The study will pinpoint specific organizational capabilities, financial requirements, and strategic priorities most closely tied to high performance.

The goal of this study is to examine how various configurations of internal and external resources contribute to competitive advantage. The research aims to offer insights into ways cybersecurity firms can improve their operations and investments in response to market demands. It also seeks to identify the factors that support sustainable growth, increased revenue, and long-term resilience in a dynamic environment.

To achieve these objectives, a Research Based View approach has been employed. The Resource-Based View (RBV) is not primarily concerned with cybersecurity; however, some articles apply its concepts to the field. For instance, one study explores how information security capabilities may moderate the relationship between resource-based view principles and firm performance (Wu et al., 2017). A related study by Marasco et al. (2018) investigates cybersecurity from the perspective of the resource-based view

(RBV), analysing its relationship with business value. This study proposes a theoretical framework for understanding how firms can protect their value amid growing cyber threats.

Previous research has investigated multiple factors that associate company characteristics with revenue and profitability. For example, Wetzels et al. (2023) evaluated the relationship between customer experience management practices and profitability. Similarly, Anjaneyulu et al. (2023) assessed the effect of employee count on annual revenue within selected IT companies. Doh and Prince (2015) explored the influence of research and development activities on both revenue generation and investment valuation in information technology corporations. Furthermore, Hartmann (2003) introduced a model for revenue growth, illustrating how enhancements in research and development correlate with increases in annual revenue growth.

The proposed framework offers strategic guidance for organizations to identify and secure essential resources and capabilities, thereby mitigating cyber risks while preserving business value. Within this model, Revenue is specified as the dependent variable, supported by four independent variables.

- Reputational indicator (NPS)
- R&D investment (RandDinv)
- Sales investment (salesinv)
- Company size (emplo)

The study will assess four key variables to understand their influence on cybersecurity firm performance. First, it uses the Net Promoter Score (NPS) as a reputational indicator, recognizing NPS as a stronger predictor of future growth than traditional customer satisfaction measures (Reichheld, 2003). Second, R&D investment is emphasized, with service and product innovation considered vital to the success of ICT companies, though ongoing research and development make it difficult to precisely forecast business benefits (He & Estébanez, 2023). Third, drawing on resource-based theory, investments in sales and marketing are highlighted as pathways for technology-driven firms to achieve sustainable competitive advantage by leveraging valuable organizational assets (Firer & Friend, 2004). Lastly, company size is measured by the total number of employees, as all firms in the study employ over five hundred people. For this reason, the World Bank's typical size categories do not apply (World Bank, 2021), and total of employees count serves as an independent variable.

Each variable is evaluated based on whether it is present within a company. The purpose is to assess the relationship between these variables and the business performance outcomes of cybersecurity firms.

To evaluate the behavior, the next model will be evaluated (Fig. 1):

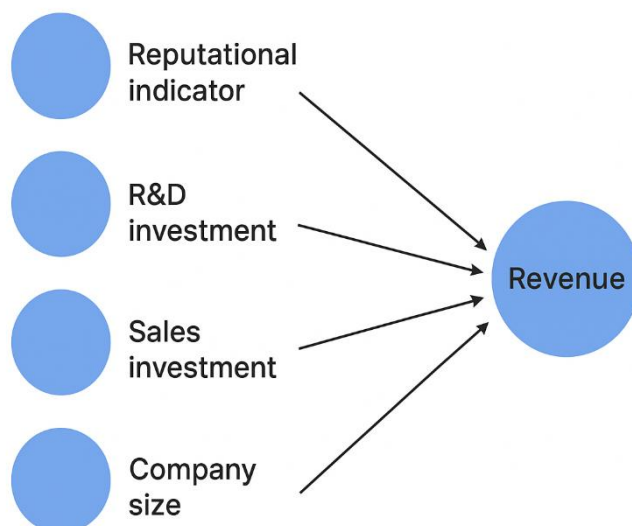


Fig. 1: Performance of cybersecurity model. Own elaboration.

Within this model, revenue will be used as the dependent variable. Consistent with the approach of Chandra and Ro (2008), revenue is regarded as a more effective metric for assessing the performance of technology firms and profit-driven organizations.

This study uses annual and financial reports from twenty top cybersecurity companies, which together held over 40% of the global market in 2023–2024. Statista (2023) reported total cybersecurity revenue at US\$167.3 billion in 2023.

The empirical analysis will be implemented according to the figure above (Fig. 1). It will investigate different causal configurations to identify both the necessary and sufficient conditions that lead either to the presence of revenue (reven) or its absence (\sim reven):

$$\text{reven} = f(\text{NPS}, \text{emplo}, \text{salesinv}, \text{RandDinv})$$

The study used fsQCA 3.0 software for data analysis.

The QCA (Qualitative Comparative Analysis) method excels at analyzing complex causality by allowing for multiple combinations of conditions to lead to the same outcome (equifinality). The initial phase of fsQCA identifies necessary conditions—those that must be present for a specific result (Ragin, 2009; Rihoux & Ragin, 2009). In this study, we evaluate whether NPS_cal, employ_cal, salesinv_cal, or RandDinv_cal are required for market performance (measured by Revenue). A condition is considered necessary if its consistency exceeds 0.9 (Ragin, 2008; Schneider & Wagemann, 2010).

This study aims to determine which strategic investments most improve cybersecurity firms' market performance, with a particular focus on Sales and R&D. It analyses how these investments relate to outcomes like revenue growth and competitive advantage and

seeks the best investment balance for optimal results. The research also evaluates the impact of corporate reputation—especially customer satisfaction measured by Net Promoter Score—on revenue, noting that while consumer industries often rely on brand loyalty, cybersecurity decisions may prioritise technical reliability, compliance, and risk management.

The study will also examine how company size, as determined by both employee count and scale of operations, affects market performance. Larger organisations often benefit from economies of scale, wider service portfolios, increased innovation capacity, and enhanced international reach—attributes that can positively impact financial results.

These findings will offer practical guidance on how cybersecurity firms can allocate resources, build reputation, and use scale to achieve lasting success. The aim of this paper is to get feedback and possible improvements before the study is fully executed and release, to be able to improve the results and get final conclusions.

Keywords: revenue; performance; cybersecurity; resources; fsQCA

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THE ETHICAL PRINCIPLES AS A COMMITMENT ADHERENCE TO ESTABLISHED RULES AND RESPONSIBLE BEHAVIOUR IN COLLABORATIVE NETWORKS

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Introduction

The concept of open innovation in the context of collaborative networks requires the dissemination of information from multiple perspectives. Consequently, these advancements ought to be aligned with the broader interests of society (*Duwell, M., 2019*).

In this study, semi-structured interviews were conducted to analyze multiple elements in which the ethical nature of technology centres could be manifested:

Firstly, the interpretation of the concept of open innovation by stakeholders is considered.

Secondly, the relationship between open innovation and the principles of ethics and integrity in technology centres and companies is examined.

Drawing upon these two aspects, the present study sets out to explore the divergent perspectives held by the three constituent elements of innovation ecosystems: namely, associations/federations of technology centres, technology centres themselves, and companies.

Observations have been made based on the opinions expressed in order to show their vision of open innovation, network collaboration and the ethical and honest treatment of their innovations.

Conceptual framework

It is evident that national and regional innovation systems are of paramount importance in facilitating the economic, political and social development of territories, particularly in the context of the current degree of globalisation (*Freeman, 1995*).

Technology centres exchange their experience and capabilities with other agents, while also drawing on them to increase their organisational capacity for innovation (*Mas Verdú, 2021*).

Trust and mutual respect are considered to be essential elements for creating shared strategies based on the consensus of all stakeholders (*Howells, 2006; Kilelu et al., 2011; Janssen, Bogers and Wanzenböck, 2020*).

In the contemporary context, open innovation has underscored the significance of ethical considerations in research endeavours. In this regard, it is imperative that integrity, openness and transparency be considered indispensable elements in the planning, presentation, execution and development of results in R&D&I projects (*Schöpfel & Azeroual, 2023*).

The objective of this analysis was to provide answers to two specific questions:

- The present study seeks to ascertain the comprehension of the concept of open innovation amongst interviewees.
- The central question guiding this study is whether ethical principles and integrity can be applied to innovative development to ensure the sustainability and competitiveness of the entities involved and their collaborative initiatives.

Methodology

A review of extant literature on ethics in research was conducted, with a particular focus on the actions of research entities, including technology centres.

Subsequent to the theoretical analysis, semi-structured interviews were conducted, divided into three blocks:

1. Context: information regarding the interviewed entity, including its mission, vision and values.
2. Open innovation: interviewee's understanding of this type of innovation, including its application within the organization
3. Relationship between open innovation and the principles of ethics and integrity: role of the interviewee in these issues and the main ethical challenges they face when dealing with open innovation projects within collaborative networks.

To gather different viewpoints, three separate entities were analyzed:

- The Federation of Technology Centres: transversal vision of the figure of the technology centre. It is concerned with open innovation developments and their ethical implications in research.
- Technology Centres: a review of the interpretation of ethical processes in collaborative networks and open innovation is presented, with consideration given to the variability in the typology of the entities interviewed (sectorial vs. transversal).
- Companies: evidence about their activity in collaborative innovation projects and their ethical behaviour, considering their size and their innovative projection throughout their existence.

Results

- All interviewees highlight the importance of collaboration in promoting open innovation processes.
- All interviewees agree on the need to develop projects in collaborative networks.
- Open innovation processes in collaborative networks have been identified as a means of addressing challenges.
- Ethics and integrity are fundamental in any organisation.

It is vital to recognise the **pivotal role that ethics and integrity play in facilitating consensus and dialogue in collaborative networks**, particularly between technology centres and companies. These principles are regarded as the cornerstones for cultivating trust and galvanising active engagement among network constituents.

In a global context where tensions may arise for a variety of reasons, the importance of **working with rigour and integrity is further emphasised**. This approach has the potential to foster healthy collaborative relationships and contribute to the sustainable success of innovation initiatives in an interconnected environment.

Keywords: innovation intermediaries, ethics, integrity, open innovation, collaborative networks.

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CHARACTERIZATION OF FINANCED AGRI-FOOD PROJECTS IN LATIN AMERICA AND THE CARIBBEAN

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The wealth of natural resources and the climatic diversity of Latin America and the Caribbean (LAC) have allowed the region to gain greater recognition in the agri-food sector in recent years (Ayuda et al., 2022). At the same time, consolidated economies and agricultural powers such as the United States, Germany, Japan, and China have increased their interest in maintaining trade and investment relations with Latin America, attracted by its productive potential and the diversity of its agricultural systems (Guo, 2023). Despite the major challenges faced in recent years in political, economic, technological, and climate change-related aspects, the region continues to be one of the areas with the greatest agricultural and agri-food potential, mainly due to its fertile land and water resources (Espinosa-Cristia et al., 2019). However, one of the region's greatest weaknesses is the limited coordination between research centers, training and human talent development institutions, and the connections among academia, industry, government, and production (Ramirez et al., 2021). In this context that knowledge transfer acquires relevance, understood as the process through which the outcomes of research and innovation are transformed into effective capacities for the productive sector and rural communities. Nevertheless, a minority of professionals and farmers have managed to ensure the development of productive projects through collaborative networks and co-financing initiatives, which have enabled the generation, exchange, and transfer of knowledge (Requier-Desjardin et al., 2003).

Within this context, the aim of this study is to analyze the main funded projects in the LAC within the agri-food sector where the highest levels of Research & Developed (R&D) generation take place. To address this, the impact-based characterization methodology was applied, the data based on information drawn from the official Regional Fund for Agricultural Technology (FONTAGRO). The fund supports projects aimed at strengthening the competitiveness, sustainability, and resilience of the agricultural sector. Together with contributions from participating institutions, they have contributed more

than 150 million USD to date (FONTAGRO, 2025). The financial and executing projects between 1998 to 2019 correspond to 141 in the LAC, and Spain countries within the agricultural, technological, and agri-food sector (Argentina, Bolivia, Chile, Colombia, Costa Rica, Ecuador, España, Honduras, Nicaragua, Panama, Paraguay, Peru, Dominican Republic, Uruguay and Venezuela).

The results in the Table 1, show the main countries executing projects funded with the FONTAGRO participation and the greatest number of impacts between 1998 to 2019. The impacts were recommended by FONTAGRO; although the term employed in its technical databases is call “components”. In this study, the impacts include the characterization of achieved indicators: (1) “capacity building”, mainly including training and publications; (2) “environmental”, highlighting the creation of climate and environmental databases; (3) “genetic resources”, referring to the diversity of living samples such as plants and microorganisms; (4) “industrial”, primarily containing information on industrial methods of agricultural production; (5) “production”, prioritizing productive processes and the management of agricultural tools; and (6) “socioeconomic”, emphasizing the reach of beneficiaries who received project support.

The greatest number of impacts correspond to the years 1998, 2005, 2014, 2016 and 2019, with Colombia and Peru standing out (Table 1). The project “°AHoRa: Application for family farming of Musaceae” a technological and innovation project, headed by Colombia in 2019 had the maximum number of impacts (11), followed again by Colombia with the projects “Technological innovation in Andean cacao” in 2016 with 10 impacts and “Reduction of pesticide use and development of resistance in Andean crops” in 2005, with 9 impacts; followed by Peru with the project “Development of sweet potato products in Latin America’ (1998), Mexico with ‘Improvement of wheat industrial quality in the Southern Cone” (1998), and Colombia with ‘Innovation platform to enhance CSA adoption by farmers’ (2014).

The characterization of projects by the total number of impacts achieved made it possible to identify the main countries and projects that have contributed most to the generation of R&D. The project “°AHoRa: Application for family farming of Musaceae” is identifying as such to achieving the highest number of impacts, also makes the greatest contribution to R&D, with 6 impacts in CB, including research documents, operative manuals, digital platforms, and poster presentation (Table 1). It was led by Colombia, with Peru and the Dominican Republic as co-executing countries and was developed over a period of 24 months. Another projects from Colombia, although Peru, Chile, Uruguay and Argentina also predominated.

Table 1

Impact of projects in Latin America and the Caribbean, by year and country

Year	Country	Impacts						
		CB	E	GR	I	P	SE	Total
1998	Mexico	2	0	2	2	3	0	9
	Peru	1	0	0	3	3	2	9
1999	Colombia	2	0	0	0	4	1	7
	Guatemala	2	0	0	1	4	0	7
2001	Colombia	2	0	0	3	1	2	8
2003	Colombia	2	0	1	1	3	1	8
2004	Costa Rica	1	0	0	0	1	0	2
2005	Colombia	2	0	1	0	3	4	10
2006	Colombia	2	0	0	0	1	1	4
	Peru	2	0	0	0	2	0	4
2007	Chile	4	0	0	0	2	2	8
2008	Chile	2	0	1	1	2	2	8
	Colombia	2	0	1	0	4	1	8
2009	Costa Rica	1	0	0	0	3	0	4
	Costa Rica	1	0	0	0	1	2	4
2010	Uruguay	4	1	0	0	0	0	5
2012	Peru	2	0	0	0	1	3	6
2013	Argentina	4	0	1	0	2	0	7
2014	Colombia	4	2	0	0	2	1	9
2015	Chile	4	0	1	0	1	0	6
	Uruguay	3	0	0	0	1	2	6
2016	Colombia	5	1	1	2	1	0	10
2017	Peru	4	0	0	0	1	0	5
2018	Ecuador	3	2	0	0	1	1	7
2019	Colombia	6	2	0	0	1	2	11

Note: CB=Capacity Building, E=Environmental, GR=Genetic Resources, I=Industrial, P=Production, SE=Socioeconomic

To summarize, Colombia and Peru are consolidated key players in attracting funds and generating greater impacts in R&D. The Latin America and Caribbean countries have the capacity to project themselves towards research and innovation and technological projects with sustainable approaches to enhance competitiveness in the agri-food sector. In addition, countries will continue strengthening regional, national and international collaboration among key actors, such as academy, industry and the government to allow, with the potential of agri-food transformation to consolidate productive-innovative-

technological referent projects especially with the knowledge transfer and knowledge generation in Andean and Tropical products.

Keywords: agri-food projects, technological, innovation, R&D, LAC

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DOES NATIONAL CULTURE MODERATE THE IMPACT OF BOARD COMPOSITION ON ESG CONTROVERSIES?

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Abstract

In the last decade, several corporate scandals have shown that having a good ESG (Environmental, Social and Governance) performance is not enough if the risks that can generate controversies are not controlled. For example, the case of Dieselgate, which seriously damaged the reputation and caused multimillion-dollar losses, not only to the company that caused it, but to the entire industry (Bouzzine & Lueg, 2020); the cases of occupational risks in supply chains discovered in fast fashion companies, such as the Rana Plaza case (Schuessler et al., 2023); or serious environmental incidents – such as toxic spills, illegal deforestation, oil spills, etc. – that have led to legal sanctions, boycott campaigns and negative reactions from investors. These news have shown how expensive it can be for a company to not only have these incidents, but to have them visible, and repeated.

ESG controversies reflect negative incidents, such as environmental damage, labor disputes, ethical issues in the supply chain, or questionable corporate governance practices. These have become a key indicator (García-Sánchez et al., 2025) to assess the reputational and financial risks faced by companies (Nirino et al., 2021). News in the press or scandals related to these aspects put companies in very delicate situations, and can generate persistent effects: loss of consumer confidence, decrease in the value of shares, stricter regulatory requirements, etc. Its importance has grown in parallel with the increase in the demand for transparency by society, the media, regulators and investors (Grueso-Gala & Camisón-Haba, 2025). It's not just about measuring what companies do well, but about understanding where and why they fail, because those failures can have very severe reputational impacts, financial losses, and increased legal scrutiny. In this sense, understanding the internal factors that can mitigate or exacerbate the appearance of such controversies is of great relevance.

After conducting a literature review of papers published about ESG controversies in the Web of Science, we detected: 29 articles that investigate determinants of controversies; 46 articles that investigate what consequences they have; and 13 articles that use this variable as mediation/moderation. From the articles that try to establish which factors are determinants, we see that there is a clear predominance of characteristics of the board of

directors.

Following the Upper Echelons theory (Hambrick, 2007; Hambrick & Mason, 1984), the board constitutes the company's central control and management body, and its attributes – such as gender diversity, the independence of its members, the size of the board or the duality of the CEO – can directly influence the ability to adequately supervise business practices and anticipate ESG-type risks.

However, we see that there is still much research to be done regarding the relationship between board characteristics and ESG controversies. Many of the studies are only focused on some characteristics of the board.

For example, Mallidis et al. (2024) study the impact of gender diversity on ESG controversies in a European sample from 2006 to 2021, and find that there is no significant impact. Issa & Hanaysha (2023) also analyse the council's gender diversity in European companies and, however, conclude that the greater the representation of women (especially more than 3), the more the ESG controversies are reduced. Other research (Treepongkaruna et al., 2024) focuses only on the size of the board and determines that the greater the number of directors, the better ESG controversies are mitigated.

We find other studies that focus on specific sectors, for example, Agnese et al. (2023) that studies the impact of board characteristics on ESG controversies but only in European banks. This study concludes that banks with larger boards and more gender diversity are less exposed to ESG controversies.

Other studies focus only on emerging countries (Disli et al., 2022, and look at the size, independence and gender of the board, noting that any characteristic is significant in terms of impact on controversies.

We observed that in general there are no conclusive results, and that studies that have international samples do not take into account factors of the country, such as culture, which could influence the results.

The role of national culture is an aspect that has been little explored. Culture conditions the way in which corporate responsibilities are understood, the legitimacy of government practices and the social acceptance of certain behaviors. To measure these cultural differences, Hofstede's indicators are widely used in international comparative studies (Cubilla-Montilla et al., 2019; DasGupta, 2025; García-Sánchez et al., 2013; Prado Lorenzo et al., 2013).. Dimensions such as distance from power, aversion to uncertainty, or individualism-collectivism can modulate the relationship between board characteristics and ESG controversies. For example, in countries with a high aversion to uncertainty, it is possible that diversity in the board translates into a greater propensity to implement preventive control systems that reduce controversies. In contrast, in more individualistic cultures, the same trait may not have a significant effect.

In summary, in the literature review we find articles focused on a single characteristic of the board (either size or gender diversity), or specific sectors (e.g. banking sector); Even studies that cover more characteristics of the board and are multi-country and multi-sector, but that do not include cultural aspects, which could modify the results obtained. Given the inconclusive results of the articles analyzed, we consider important to include

in the same study several characteristics of the board of directors and the moderating influence of cultural variables.

The main objective of this paper is therefore to analyse how the characteristics of the board of directors influence ESG controversies, considering the moderating role of national culture. It is hypothesized that board characteristics (such as independence, gender diversity, and size) are associated with a lower incidence of ESG controversies, but that the magnitude and direction of this effect depends on the cultural dimensions of the country.

To address this objective, a panel database has been built with information on European companies over a period of ten years. The total sample includes 15,894 observations, obtained from the Refinitiv Database. The study is currently in the empirical development phase; therefore, quantitative results are not available yet.

However, this study seeks to contribute to three academic debates: the effectiveness of boards of directors in sustainability and ESG risk management; the relevance of contextual factors – especially cultural factors – in corporate governance studies; and the interpretation of ESG controversies as an observable outcome that connects the theory of the Upper Echelons with business practice.

Keywords: ESG controversies; board of directors; national culture; gender diversity

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IMPACT OF EU SUSTAINABILITY LEGISLATION ON FINANCIAL INSTITUTIONS' STRATEGIES AND REPORTING

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Abstract

Issues of sustainable development (environmental, social, corporate governance, ESG) and the opportunities and risks associated with them are present today in many dimensions of the activities of financial institutions, with their further strengthening expected in the future. Obligations to take ESG factors into account in operations and reporting result from EU legal regulations, affecting the economic, reputational, competitiveness and corporate social responsibility (CRS) results of institutions. ESG factors expose opportunities, challenges, but also threats in the form of increased risks among many financial market participants in the European Union (EU) countries, as well as their cooperators from outside the EU.

The importance of undertaking sustainable development analyzes in the literature, research and economic practice results from the numerous legal regulations adopted and the schedule for their implementation (covering increasingly wider groups of entities in the future) and the interdisciplinary nature of ESG factors. In parallel with the sustainable development regulations, non-financial reporting regulations are adapted to ensure a complementary and effective implementation process (Battiston, Monasterolo, 2020; Battiston, Monasterolo, 2019; Battiston, et.al., 2017; Kalkuhl, Wenz, 2020; Kosztowniak, 2023; Kosztowniak, 2024)

ESG issues are particularly important in relation to the role of financial institutions on the financial market in terms of investment financing, capital accumulation or risk hedging, financial stabilization, and implementation of micro- and macro-acute supervision (NGFS, 2020). ESG regulations reveal new risks, stimulate the creation of new products and services, and changes in processes and operating strategies. Institutions such as banks, insurance companies, investment, and pension funds (treated as public trust institutions) are regulated by specific sector-specific regulations and additionally introduced ESG, taxonomy and reporting regulations, which reveal additional challenges for the financial sector. These issues determine that sustainable development analyzes of financial institutions and their activities have important analytical, research and practical values.

The aim of the study is to present the key changes in the impact of EU regulations in the field of sustainable development and reporting requirements on changes in the activities of the main groups of financial institutions, i.e., banks, insurance companies and investment and pension funds in EU countries.

Methodology

The analysis of the degree of compliance with sustainability disclosures was carried out using artificial intelligence (AI) technology. The analysis concerned the monitoring of the reporting of more than 3,100 financial institutions for the years 2020-2022, in the scope of 11 required disclosures formulated by the TCFD concerning: Board Oversight, Management's Role, Risks and Opportunities, Impact on Organization, Resilience of Strategy, Risk ID & Assessment Processes, Risk Management Processes, Integration into Overall Risk Management, Climate-Related Metrics, Scope 1, 2, 3 GHG Emissions, Climate-Related Targets.

The assessment of the 11 disclosures required by the TCFD included three criteria, according to:

- four reporting areas: Management, Strategy, Risk management, Metrics and targets;
- eight sectors (for 3,100 institutions): Banking (466), Insurance (237), Energy (430), Construction (543), Transport (323), Agriculture, food and forest (370), Technology and media (382) and Consumer goods (359);
- five geographical regions (for 3,128 institutions): Asia Pacific (724), Europe (616), Latin America (111), Middle East and Africa (271), North America (1 388) (TCFD, 2023; 2024).

The results of data analyses by the TCFD (2023, 2024) and FSB (2023) indicate that:

- in terms of disclosure areas – most financial institutions reported in the following areas: Metrics and targets (including 1, 2, 3 GHG emissions), Strategy (mainly in the field of Risks and opportunities) and Governance (Board oversight);
- in terms of sectors – institutions from the Banking and Insurance sectors were the leaders, while the lowest disclosures were shown in the Technology and media sectors;
- in terms of regions – the highest percentage of disclosures was reported by institutions from the regions of Europe, followed by the Asia-Pacific and North America regions. The lowest percentage of reporting institutions concerned the Middle East and Africa.

Major findings

Due to the multidimensionality of ESG risk factors, it is not isolated but integrated into the existing risk management systems. Financial institutions treat them with the same attention as traditional types of financial and non-financial risks. ESG risk management is treated as the so-called cross-sectional risk, which to varying degrees and through various transmission channels affects the risks occurring in institutions, such as credit,

operational or reputational risk (EBA, 2021; Battiston & Monasterelo, 2019). The increasing importance of ESG factors, especially climate factors, in the global economy determines their strong impact on current operations as well as business models, operating strategies and value creation (IMF, 2022; Battiston, *et.al.*, 2017).

Many financial institutions indicate that climate change is one of the greatest challenges to sustainable development. Coming in 2019 The *Network of Central Banks and Supervisors for Greening the Financial System* (NGFS), bringing together central banks and supervisory authorities, pointed out that climate-related threats are a source of financial risks, and the tasks of central banks and supervisory authorities include ensuring the resilience of the financial system to these threats (ECB, 2022; NGFS, 2020; ESRB, 2020).

The analysis results indicate a significant impact of EU regulations on undertaken processes, risk management systems, business models, financial and value creation strategies. These changes have been particularly noticeable in the last decade among financial institutions, such as banks, insurance companies, investment and pension funds operating in the EU (Monasterolo, 2020).

A review of the regulations indicates that the evolution of ESG strategies of financial institutions mainly concerns incorporating ESG risk into existing risk management systems, taking adaptive actions, using the strategy as a competitiveness tool, financial limitation of high-emission activities while increasing renewable energy projects, building customer awareness. The ESG management strategies may be both an opportunity to build competitiveness and a challenge.

The results of TCFD's analysis of the reporting of more than 3100 companies worldwide for the years 2020-2022 indicate a growing scope of reporting. Among the reporting scopes, the most widely disclosed are metrics and targets as well as strategy. The leaders in reporting are banks and insurance companies, m.in. from the following regions: Europe, Asia and the Pacific, and North America. Companies in the technology and media sectors need to accelerate disclosure work. Geographically, institutions in the Middle East and Africa and Latin America regions require the greatest challenges in stepping up disclosures.

To sum up, the implemented ESG management strategies can be an opportunity and a tool to strengthen competitiveness on the domestic and global market, by building a brand, strengthening reputation, and standing out on the market (TCFD, 2023; 2024).

The evolution of financial institutions' strategies mainly concerns incorporating ESG risk into existing risk management systems, taking adaptive actions in organizational structures, using ESG strategies as a competitiveness tool, limiting the financial involvement of high-emission activities, increasing the financing of renewable energy projects and building customers' ESG awareness.

Implications

The main challenges that should be treated as recommendations for implementation in the field of ESG solutions include: the multidimensional nature of ESG risk, a wide scope of legal regulations, the lack of standardized regulations taking into account the specificity of countries within the EU, the complexity of the required adaptation activities in the current and strategic activities of the institution, limitations staffing of ESG implementation experts and practitioners, gaps in data for ESG monitoring (models, stress tests, portfolio management, etc.), lack of coordination between institutional disclosures and supervisory reporting, problems with the comparability of ESG providers' ratings, or covering the costs of ESG implementations in institutions with appropriate their long-term refinancing. In the case of investment funds, the challenge is the impact of asset price shocks resulting from unfavorable scenarios including climate-related risk, direct declines in individual and entire assets of the managed funds, or the rebalancing of the portfolio by managers after revealing price declines (ECB, 2019; 2020; ESRB, 2020; Kosztowniak 2024; Kosztowniak 2025).

Recommending, the identified challenges should be overcome by the active activity of EU regulatory and supervisory institutions, central banks and the institutions themselves participating in various dimensions of sustainable development. It is particularly important to develop coherent regulations and implementation tools between the EU level and the levels of EU Member States, develop good practices, create databases for ESG monitoring, increase the staff of ESG specialists, and develop solutions for macro- and micro-prudential supervision. It is important that these recommendations are implemented as quickly as possible, ensuring proper coordination and effectiveness of the actions taken and limiting socio-economic costs.

Keywords: *sustainability regulations, financial institutions, reporting, UE.*

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THE EFFECTS OF TECHNOLOGY PROGRESS AND CLIMATE CHANGES ON LABOUR MARKETS AND SOCIAL DIMENSIONS IN UE COUNTRIES

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Abstract

Current and anticipated technological development and climate changes in the global dimension and in the European Union countries impose the need to introduce specific solutions as part of economic policies, including climate policy. Changes in the labour market and social conditions are driven by the development of technology and the accompanying processes of automation, digitalisation and innovation, and the development of innovation, and the climate change and the accompanying increase in physical risks and transitions. The growing awareness of the multidimensional effects of these two processes and their further financial and socio-economic consequences determines that they are becoming challenges and pillars of (Community) policies in the EU countries.

The effects of technological development and climate change are and will be felt in the future, especially in the labour market (with an increase in demand for professions supporting the climate and energy transition) and in the social dimension (possible income disparities in regions with low-carbon and so-called green jobs compared to regions with high-carbon sectors, such as mining and quarrying, utilities).

The essence of these effects are the expected structural changes (employment in individual sectors of the high- and low-carbon economy) and their positive consequences (adaptation in terms of new skills, retraining, e.g. to the so-called green jobs) and negative (difficulties in adapting, especially among middle-aged people, from regions of high-emission enterprises, such as mining and mining).

Nevertheless, if progress in the transformation of dirty sectors is in line with the Paris Agreement plans and most EU countries make progress in reducing emissions (reducing the use of fossil fuels in electricity production and, for example, in transport) by 2030 and beyond, then the occupational structure will become less unequal and polarized (Alexandri et al., 2024; García-García et al., 2020; Bento A.M., 2013). The positive impact of climate policy on economic growth and at the same time employment growth is presented, for example, by many economists (Baker et al., 2016; Saussay et al., 2022; Vona F. et al., 2018).

Nevertheless, the overall level of inequality in the labour market under the climate transition is also the result of many other factors, such as unemployment, wage structure, taxes or public policies (Bernardo and D'Alessandro, 2016, D'Alessandro et al.,

2020, Ravigné et al., 2022, and Vona 2023).

Technological changes in production, transport, communication and communication processes are closely linked to demographic change, population migration, rapid urbanization, as well as resource scarcity and climate change, determining structural changes in economies, from entire industries to individual companies. These changes affect both financial and non-financial actors (supply side) and consumers (demand side), which is reflected in the labour market and socio-economic conditions.

The aim of the paper is to present the changes to date as well as the forecasted trends in the labour market and the social dimension in the EU countries in the perspective until 2035, indicating the main opportunities and challenges in the transformation of economic policies.

Methodology

Analysis and assessment of changes in the labour market in terms of employment and social quality (indicators of nuisance of living conditions) based on Eurostat data for the 27 EU countries for the years 2012-2023.

Synthesis of forecasted transformational trends in the labour market and quality of life until 2035 formulated by The World Economic Forum (2025; 2020), OECD (2016; 2020; 2025a; 2025b), McKinsey Global Institute (2017), Oxford, The Bureau of Labor Statistics, Ernest & Young, as well as the European Commission's communications on the European Green Deal and PARP thematic reports for Polish (2022).

Presentation of the main scenarios of changes in the labour market formulated by experts from: Infuture Institute and Samsung (2019), PwC, Polish Economic Institute and Deloitte, which may be the basis for discussions on the transformation of the labour market and social conditions.

Major findings

An analysis of Eurostat labour market statistics shows that in the EU-27, the EU-27 is most in demand for skilled workers in software and applications and analysts (60% of global demand), followed by technicians in information technology, communications, technical support, and other ICT specialties (close to 21%) in Q3.2023. Data on indicators of the nuisance of living conditions related to pollution, other environmental conditions, and the risk of poverty in relation to income show that more difficult conditions than the EU average are observed in Turkey, Malta, and Greece, with an unfortunately permanent trend in the period 2012-2023.

The impact of climate change on the economies of EU countries is significant, as evidenced by the growing figures of financial losses at the turn of the last two decades, which have tripled. While in the years 2004-2013 the average annual value of losses was EUR 11,350 million, and EUR 29,773 million in the years 2014-2023. The largest increases in average annual financial losses in the last two decades were recorded in countries such as: Belgium (from EUR 124 million to EUR 1,406 million), Luxembourg

(from EUR 3 to EUR 42 million) and Italy (from EUR 675 to EUR 6,808 million). The highest average annual losses in 2014-2023 were recorded in Germany (€8,770 million) and Italy (€6,808 million) (Eurostat, 2015).

The analysis of reports by financial institutions shows that the main determinants of structural changes in economies, particularly important in the labour market and in the social sphere, are: (i) processes of automation, digitisation and innovative processes enabling technological development, (ii) demographic changes, including the growing share of older people, with a decreasing share of people of working age in the total population, (iii) increasing population migrations, (iv) rapid urbanization, (v) scarcity of resources (mineral resources, as well as freshwater and clean air resources) and climate change (rising temperatures and its fluctuations, hurricanes, floods, droughts, etc.) (Kosztowniak, Kozak, 2023).

Among the main transformational trends in the labour market, which also have a major impact on structural changes in economies and social living conditions of the population, there are: (i) automation of manual work and work involving data collection and processing, (ii) an increase in voluntary employee turnover, (iii) a decrease in employee attachment to the employer and a simultaneous increase in expectations towards the company in terms of finances, working conditions and environment, (iv) shortening the time between the recruitment process and taking up a job, (v) changes in work models and mass digital upskilling of employees, (vi) development of alternative forms of employment to full-time work (increase in the number of freelancers), (vii) taking care of the mental well-being of employees, (viii) increasing employee visibility, i.e. employee monitoring.

Among the scenarios of labour market transformation, the following most important processes are highlighted, such as:

- progressive automation of work with the use of robots and artificial intelligence (Infuture Institute and Samsung),
- readiness to acquire new skills or complete retraining to maintain the ability to be employed in the future (PwC),
- virtualisation of the labour market and work in dispersed teams (Polish Economic Institute), simultaneous shortage of qualified employees in some industries, as well as an increase in competition in other industries with their saturation (Deloitte, 2021; ADP, 2021; Human Resource Online; 2025).

Implications

The trends in the labour market observed today will affect the number of jobs, the evolution of professions, the professional development of employees, as well as the nature of work itself, determining the quality of professional and private life. The projected scenarios of the evolution of the labour market are the starting point for a discussion on its transformation and the possibilities of its development. It is possible that multiple scenarios will run at the same time. However, there are many reasons to believe that the adaptation of specific scenarios in economic sectors or regions of the world will depend on their comparative advantages.

The key is that in times of uncertainty, having a well-thought-out employment strategy is and will be a priority for managers and public institutions. The expected changes in the labour market and living conditions indicate the challenges of the need to adapt solutions in the financial and procedural dimension, primarily in the field of education and schooling, labour and pension systems, health care system, social insurance, climate policy and many others. Competitive advantage will be gained by those EU countries that take the right paths of transformation of their economies in good time.

Keywords: technology progress, climate changes, HR, social dimensions, UE.

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SKIN IN THE GAME Y AMBIDIESTRÍA: INCENTIVOS QUE CONVIERTEN LA VISIÓN EMPRENDEDORA EN VALOR FINANCIERO

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Resumen

En un entorno empresarial marcado por la incertidumbre, la volatilidad y la rápida evolución tecnológica, las organizaciones que logran mantener un rendimiento financiero superior no son necesariamente las que disponen de más recursos, sino aquellas capaces de tomar decisiones estratégicas que equilibran la eficiencia operativa con la innovación continua. Esta capacidad, conocida en la literatura como ambidiestría organizativa, se define como la habilidad de una empresa para explotar sus competencias actuales mientras explora nuevas oportunidades. Sin embargo, a pesar de su aparente atractivo teórico, los estudios empíricos han arrojado resultados contradictorios sobre su impacto real en el rendimiento financiero (Raisch & Birkinshaw, 2008; Lavie et al., 2010).

Esta investigación doctoral parte de la premisa de que la ambidiestría organizativa no garantiza por sí misma una mejora del rendimiento financiero, sino que su efectividad depende de ciertas condiciones moderadoras, entre las cuales los incentivos económicos del directivo juegan un papel determinante. Específicamente, se plantea que la participación patrimonial significativa del CEO en la empresa -entendida como una inversión propia superior a nueve veces su salario anual- modera positivamente la relación entre ambidiestría y rendimiento financiero.

Desde la praxeología austríaca, el ser humano actúa con fines, utilizando medios escasos para alcanzar estados futuros más valorados (Menger, 1871; Mises, 1949). Toda acción es, por tanto, teleológica, y está guiada por los fines subjetivos del actor y los incentivos que enfrenta. Carl Menger señaló que toda acción humana es, en última instancia, económica, porque busca acumular recursos para enfrentar la incertidumbre del futuro.

Esta lógica se aplica directamente al comportamiento del directivo: si este posee una participación patrimonial significativa en la empresa, su juicio estratégico estará condicionado por el deseo de preservar y aumentar su capital, lo cual genera un comportamiento más equilibrado, prudente y orientado al largo plazo.

La ambidiestría estratégica, en este contexto, no es solo una capacidad organizativa, sino una manifestación del juicio empresarial humano. Tal como argumenta Peter G. Klein (2010, 2012), la firma no es una unidad abstracta, sino el resultado de decisiones humanas bajo incertidumbre. El motor de la empresa es el emprendedor, y su comportamiento depende, fundamentalmente, de los incentivos económicos que enfrenta. Si el CEO se juega su dinero, tenderá a tomar decisiones estratégicas más razonadas, evitará extremos -ya sea el conservadurismo excesivo o la innovación irresponsable- y buscará mantener un equilibrio coherente entre explotación y exploración.

Esta perspectiva se refuerza con la teoría de la eficiencia dinámica de Jesús Huerta de Soto (2000), quien sostiene que el verdadero progreso económico no proviene de la eficiencia estática, sino de la capacidad de descubrimiento, adaptación y coordinación de oportunidades que tienen los individuos en el mercado. Desde esta óptica, los incentivos no son simplemente mecanismos técnicos de alineación, sino causas eficientes de la acción empresarial: sin ellos, el descubrimiento emprendedor se debilita, y con él, la capacidad de crear valor de forma sostenida.

Además, los aportes de la economía conductual y la psicología de la decisión refuerzan esta tesis. Como plantea B.F. Skinner (1953), los estímulos externos condicionan el comportamiento humano. En el caso del directivo, los incentivos económicos funcionan como estímulos que modulan la forma en que percibe el riesgo, el tiempo y la responsabilidad. Un CEO sin participación patrimonial puede estar más expuesto a sesgos como la búsqueda de estatus, la aversión al riesgo a corto plazo o la presión por resultados trimestrales. En cambio, un CEO con incentivos reales tenderá a priorizar decisiones que generen valor sostenible, incluso si implican sacrificios en el corto plazo.

Esta investigación propone que la ambidiestría organizativa solo se traduce en rendimiento financiero cuando es ejecutada por agentes económicos incentivados adecuadamente, es decir, cuando hay una estructura de incentivos que alinea los fines del directivo con los de la organización. No se trata, por tanto, de estudiar únicamente qué hace la empresa, sino quién toma las decisiones, cómo está incentivado y qué riesgos está dispuesto a asumir.

Para contrastar esta hipótesis, se plantea una metodología cuantitativa con enfoque deductivo y comparativo, basada en el análisis de 12 empresas cotizadas en países de la OCDE, seleccionadas por su transparencia informativa y la disponibilidad de datos sobre estructura accionarial y desempeño financiero. Se dividirá la muestra en dos grupos: seis empresas en las que el CEO presenta altos incentivos patrimoniales (ownership superior a 9 veces su salario anual) y seis en las que dicha alineación no está presente.

La unidad de análisis será la empresa, y se trabajará con datos obtenidos de informes anuales, bases de datos financieras (Bloomberg, SEC, Morningstar) y registros públicos de propiedad accionarial. Las variables se operacionalizarán de la siguiente forma:

- Variable independiente: Ambidestria organizativa, medida a través de indicadores de exploración (I+D sobre ventas, innovación) y explotación (márgenes, rentabilidad sobre activos).
- Variable dependiente: Rendimiento financiero, evaluado mediante ROIC, crecimiento del Free Cash Flow y crecimiento del beneficio por acción (EPS).
- Variable moderadora: Incentivos económicos del directivo, medidos por el grado de participación patrimonial respecto a su salario anual.

El análisis estadístico se realizará mediante regresiones múltiples jerárquicas, lo que permitirá comprobar si la relación entre ambidestria y rendimiento financiero varía en función de la presencia o ausencia de incentivos fuertes en la figura del CEO.

Esta tesis doctoral aspira a realizar tres contribuciones fundamentales:

1. Profundizar en el estudio de la ambidestria organizativa al introducir un factor moderador de tipo conductual-económico, lo que ayuda a explicar la dispersión de resultados encontrada en investigaciones previas.
2. Integrar los aportes de la economía austriaca al campo de la estrategia empresarial, particularmente en lo que respecta al papel de la acción humana, los incentivos y la incertidumbre como elementos estructurantes del comportamiento estratégico.
3. Ofrecer implicaciones para el diseño de estructuras de gobernanza corporativa, resaltando que el verdadero alineamiento estratégico no se logra únicamente mediante controles formales, sino incentivando que los líderes compartan el riesgo económico con los accionistas.

En definitiva, esta investigación sostiene que la clave no está solo en formular buenas estrategias, sino en que las decisiones estratégicas estén guiadas por juicios incentivados y responsables. En otras palabras, que quien decide esté dispuesto a asumir, con su propio capital, las consecuencias de sus decisiones. La ambidestria organizativa, bien gestionada, puede ser una fuente de ventaja competitiva. Pero solo cuando quien la ejecuta tiene algo que perder, puede convertirla en una fuente sostenible de rendimiento financiero.

Palabras clave: ambidestria; rendimiento financiero; economía austriaca; incentivos (Skin in the game); capacidades dinámicas.

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FOSTERING FUTURE SKILLS: PERSONALITY MEETS ENTREPRENEURSHIP EDUCATION

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1. Introduction: Rethinking Entrepreneurship Education

In an era of uncertainty, information overload, and rapid change, higher education must go beyond knowledge transmission. In today's economy, shaped by global challenges, technological change, and disruptive innovation, young professionals need not only entrepreneurial skills but also the capacity to navigate complexity with resilience, creativity, and emotional intelligence.

Entrepreneurship is often considered the Olympic discipline of career paths, as it requires technical expertise, personal resilience, and an adaptive mindset (Ramya & Nisha, 2023). While many programs emphasize business models and market strategies, our experience shows that insufficient personal development often prevents promising ideas from becoming sustainable ventures.

At Hochschule Heilbronn, we designed a Master's in Entrepreneurship that systematically integrates personal development alongside technical competencies. This paper presents our learning journey across the founding phases, introduces the Skill Flower as a framework of essential competencies for emerging founders, and outlines some of the activation tools that connect inner growth with venture development.

2. The Master's in Entrepreneurship: From Idea to Impact

Launched in 2020 as an interdisciplinary master's degree, the program addresses two needs: preparing students for roles as founders, innovators, and change-makers beyond corporate career tracks; and enabling graduates to create sustainable impact on challenges such as climate change, resource scarcity, and social inequality.

Students need no predefined business idea. In the initial phase, they develop or refine one, which then serves as the basis for applying theory in practice across modules and for taking first steps toward founding a company. The curriculum follows the founding process- pre-seed, seed, startup, scaling, and maturity- always through the lens of the student's own venture, with modules primarily focusing on the first three phases.

- **Phase 1: Pre-Seed (Ideation & Inspiration).** Students explore value creation, social entrepreneurship, digitalization, and innovation management while identifying and understanding problems and developing initial solution visions.
- **Phase 2: Seed (Prototyping, Market Testing & Business Modeling).** Students design an MVP, engage customers, refine a value proposition, and build a consistent business model.
- **Phase 3: Startup (Market Entry).** Students bring a market-ready offering to customers, implement a marketing concept, found the company, and begin building the organization—often with a business plan and initial team expansion.
- **Phase 4: Scaling.** Entrepreneurs craft and communicate a growth vision and establish growth-oriented processes (e.g., sales, HR). Often, further investor relations are necessary.
- **Phase 5: Maturity.** Founders lead complex organizations, manage diverse stakeholders, and ensure long-term development.

3. The Skill Flower: IDG-Inspired Framework for Future Skills

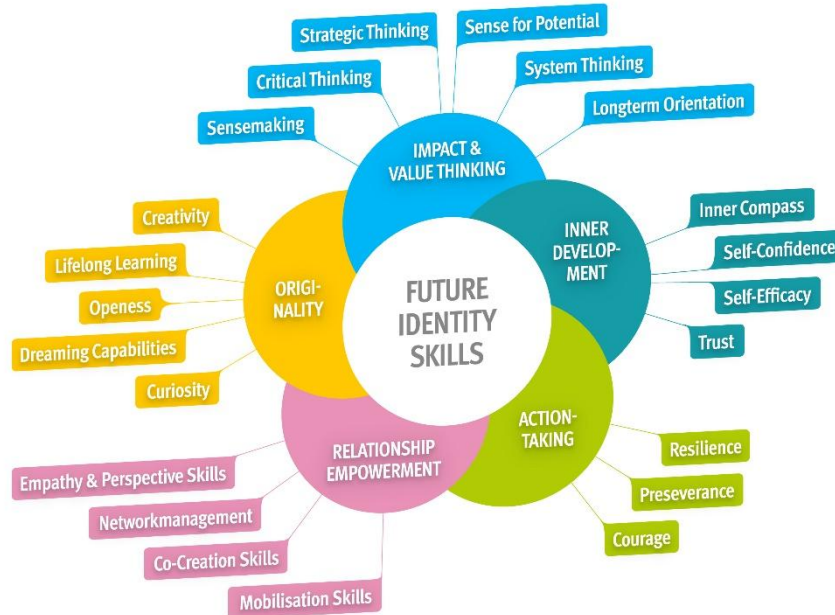
Traditional curricula focus on scientific knowledge and technical skills. Our experience shows this alone does not match what founders need. Starting a business is highly challenging and places unique demands on the personality of a founder. That is why entrepreneurship education must also focus on personal development (McCarthy et al., 2023). We therefore developed the Skill Flower, a framework that outlines the inner capacities students need to cultivate in order to build an entrepreneurial mindset.

The model is inspired by the Inner Development Goals (Inner Development Goals, n.d.), informed by future-skills frameworks such as the EU EntreComp Framework, which defines entrepreneurial competencies as knowledge, skills, and attitudes (Bacigalupo et al., 2016) and enriched by research on personality and founder characteristics, including the Big Five and traits linked to entrepreneurial success (Zhao et al., 2010). Based on these findings and our teaching experience, the Skill Flower supports personal development across all stages of the entrepreneurial journey and serves as a continuous reference point.

The five dimensions are:

- **Originality** – creativity, lifelong learning, openness, dreaming capabilities, curiosity.
- **Impact & Value Thinking** – strategic and critical thinking, sense-making, awareness of potential, systems thinking, long-term orientation.
- **Inner Development** – inner compass, self-confidence, courage, self-efficacy, trust, resilience.
- **Relationship Empowerment** – empathy and perspective-taking, network management, co-creation, mobilization skills.
- **Action Taking** – perseverance and resilience to turn ideas into reality.

Figure 1: The Skill Flower



To integrate the personal development in the curriculum a team of coaches, professors, entrepreneurs, psychologists, and research assistants aligned Skill Flower dimensions with phase-specific demands:

- **Pre-Seed:** dreaming capabilities, creativity, openness, sense-making, critical thinking (Blank & Dorf, 2012).
- **Seed:** courage, resilience, empathy for customer work and iteration.
- **Startup:** mobilization skills, empathy, self-confidence, perseverance (Eisenman, 2013).
- **Scaling:** courage, strategic thinking, mobilization, network management, self-efficacy (Aldrich & Ruef, 2018).
- **Maturity:** lifelong learning, trust, strategic systems thinking (Jansen et al., 2023).

4. Activation Tools and Methods: Curriculum Anchoring

Our personal development track is anchored through two complementary paths: challenge-based learning and dedicated personal development sessions.

(1) Challenge-based learning and experience-based assessment.

Instead of classical assessments, we design challenges in which students work hands-on on their venture and experience transformation in real contexts—consistent with experience-based learning (Kolb, 1984) and challenge-based learning (Nichols et al., 2016; Peterson & Scharber, 2022). The following excerpt presents examples of cross-disciplinary challenges implemented in the first semester:

- **Challenge 1 (Pre-Seed, Semester 1):** Students develop a business idea in the context of global, digital, and future-oriented developments, aligned with personal interests. The goal is to reflect on one's role as an entrepreneurial actor and connect interest with a societally relevant topic. Inputs cover global challenges, technological developments, and international business models. On a personal level, skills such as openness, curiosity, and lifelong learning are stimulated.
- **Challenge 2 (Seed, Semester 1):** Students develop a prototype and business model and test under real conditions. One main task is customer engagement. Core competencies, empathy, resilience, and implementation strength, are cultivated. Acting on feedback is central.

(2) Dedicated personal development sessions. Recurring sessions, co-designed with professional coaches, mentors, and psychologists, activate specific skills at the right time, including:

- Ikigai to activate the inner compass (vocation, passion, mission, profession), (Mahad, 2024).
- LEGO® Serious Play® to visualize a future vision (Dann, 2018).
- Improvisation theatre to foster courage, presence, and adaptability (AB Academies, 2024).
- Power poses and embodied techniques to trigger confidence (The Hosting Empowerment Project Team, 2023).
- Fröbelturn and team challenges to strengthen collaboration and systems thinking (Lamb & Rhodes, 2008).

5. Activation prerequisites

Successful activating personal development requires six prerequisites:

1. Safe, flexible, and creative learning environments – spaces that encourage experimentation, tolerate mistakes, and invite students to explore ideas without fear of failure.
2. Trained facilitators with coaching expertise (separate from grading) – mentors who act as neutral guides, fostering trust, self-reflection, and authentic dialogue. (Kauffeld, 2016)
3. Accessible one-to-one support and group representation – students can approach a facilitator individually when personal challenges arise, while each team nominates a spokesperson to raise group issues in a protected way. This ensures both personal and collective needs are recognized and addressed.
4. Structured reflection tools (e.g., personal learning journals) – instruments that support continuous self-awareness, track progress, and critically examine personal and entrepreneurial growth; weekly reflections create continuity across phases.
5. Regular time slots for personal development – dedicated periods of at least 2–4 hours every 3–5 weeks to ensure inner skills receive the same attention as technical knowledge.
6. Learning agreements – established at program start between the director or facilitator and each student, these agreements capture the individual's baseline

and goals. At the end, they are revisited to reflect on progress, achievements, and areas for further growth. This fosters accountability, strengthens commitment, and makes development visible.

Together, these prerequisites create a culture where students feel both supported and challenged. The classroom becomes a laboratory for entrepreneurial identity-building, where risk-taking is normal, feedback fuels growth, and reflection links directly to venture development. This ensures that technical expertise is reinforced by inner stability, resilience, and creativity, the foundations of lasting entrepreneurial success.

6. Outcomes and Reflections

Since implementation, we observe measurable improvements in confidence, adaptability, and persistence. Students report clearer purpose, stronger collaboration, and greater ability to navigate setbacks. Alumni feedback indicates that personal development is valued as highly as technical content and, in some cases, was decisive for continuing a venture or assuming innovation-oriented roles. Early observations also suggest a larger share of student ventures progresses beyond ideation compared to earlier cohorts.

7. Conclusion: A Call for Intentional Inner Development

As AI and automation take over technical tasks, personal skills, creativity, resilience, empathy, adaptability become key differentiators for entrepreneurs. Higher education must cultivate these capacities alongside business acumen. Our experience shows that combining technical training with structured personal development enables students not only to conceive viable ventures but also to build the inner resources to sustain them. By embedding personal growth as a continuous, intentional thread, universities can foster resilient, values-driven leaders capable of creating meaningful, future-oriented impact.

Keywords: entrepreneurship education; personal development; future skills; higher education; identity-building

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