The Role of University Incubators in Stimulating Entrepreneurial Education Activities and Sustainable Innovation in Morocco: A Critical Analysis

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ABSTRACT

Aim. In recent years, interest in the role of university incubators has significantly increased in the Moroccan context. The study aims to analyse the role of university incubators and evaluate their contribution to entrepreneurial education activities and sustainable innovation within the Moroccan context.

Methods. To achieve our aim, the study employs a qualitative methodology combining semi-structured interviews with 24 key actors in the Moroccan entrepreneurial ecosystem, thorough documentary analysis, and visits to six university incubators. This combined approach has enabled the development of a nuanced understanding of the university incubator ecosystem in Morocco.

Results. Thematic analysis of the data revealed that, despite their crucial role as catalysts for entrepreneurial education, academic entrepreneurship, and sustainable innovation, the achievements of these incubators falls short of expectations. The study

identifies several major challenges hindering the effectiveness of incubators, including lack of human resources, gaps in funding and support for entrepreneurs, and administrative and bureaucratic obstacles.

Conclusion. Despite their potential, university incubators in Morocco face substantial challenges that hinder their contribution to entrepreneurial education activities and sustainable innovation. To enhance their effectiveness and promote sustainable entrepreneurial growth, it is essential to address funding gaps, improve human resource capacities, and streamline administrative processes. The results of this study offer valuable insights for university administrators, incubator managers, aspiring entrepreneurs, and stakeholders interested in fortifying Morocco's entrepreneurial landscape. By implementing these insights, stakeholders can contribute to creating a more supportive environment for entrepreneurial education, sustainable innovation and economic development within the country.

Keywords: University Incubators, entrepreneurial education activities, academic entrepreneurship, sustainable innovation, Moroccan entrepreneurial ecosystem

Introduction

In today's global context, societies worldwide are grappling with the multifaceted challenges of recurring economic crises, the escalating impacts of climate change, and the urgent need for sustainable development. These intertwined issues necessitate innovative, comprehensive solutions that can simultaneously address economic, environmental, and social imperatives. Leading the charge in developing and implementing these solutions are universities, which, through their core missions of research, education, and innovation, are uniquely positioned to drive substantial progress (Zhou et al., 2022).

As institutions at the forefront of knowledge creation and dissemination, universities are increasingly adopting strategic initiatives to respond to these global challenges. One of the most significant strategies involves the establishment of university incubators. These incubators are pivotal in fostering technology transfer, stimulating entrepreneurship, and promoting the development of sustainable solutions (Bruneel et al., 2010; Etzkowitz, 2016; Mian et al., 2016). By providing support structures for budding entrepreneurs, university incubators facilitate the translation of innovative ideas into viable businesses, thus generating new economic opportunities and encouraging the adoption of environmentally responsible practices (Fonseca & Jabbour, 2012).

In the context of economic crises, the role of university incubators becomes even more critical. During periods of economic downturn, traditional mechanisms of economic stimulation often fall short, necessitating innovative approaches to rejuvenate growth. University incubators, with their focus on fostering innovation and entrepreneurship, are uniquely equipped to act as catalysts in this process. They do not only

support the creation of new enterprises but they also ensure that these ventures are aligned with sustainable development principles, thereby contributing to the achievement of the United Nations Sustainable Development Goals (SDGs) (Dumitrascu, 2023). These incubators play a dual role in both economic revitalisation and the promotion of sustainable development, creating a synergistic effect that benefits both the economy and the environment.

Despite the recognised importance of university incubators in various global contexts, there remains a significant research gap regarding their specific roles and effectiveness within the Moroccan setting. Morocco, with its unique socio-economic landscape and development priorities, presents a distinct environment for the operation and impact of university incubators. This study seeks to bridge this gap by critically analysing the role of university incubators in Morocco, focusing on their contributions to entrepreneurial education, academic entrepreneurship, and sustainable innovation.

To achieve this, our research employs a robust qualitative methodology that combines semi-structured interviews with 24 key actors in the Moroccan entrepreneurial ecosystem, thorough documentary analysis, and visits to six university incubators. This comprehensive approach allows for a nuanced understanding of the perceptions, policies, and practices surrounding university incubators in Morocco. The study aims to uncover the successes and limitations of these incubators, providing valuable insights that can inform policymakers, incubator managers, and entrepreneurs alike.

Our research reveals the multifaceted role of university incubators in Morocco. The findings indicate that these incubators act as enablers for the diversification of university activities, vehicles for developing intrapreneurial capabilities among students and staff, and pathways for organisational learning in entrepreneurship development. This study contributes to the existing literature by explaining how university-based incubators can facilitate the development of academic entrepreneurship and enhance the overall educational and research missions of universities.

However, the findings also illustrate that, despite over 20 years of activity, the achievements of Moroccan university incubators fall short of the expectations of all stakeholders, due to various factors, including insufficient funding, gaps in human resources, and bureaucratic constraints. These challenges, which will be discussed and analysed in the last section, with the objective of driving improvements that will align the outcomes of Moroccan university incubators with the expectations of their stakeholders, and support the broader goals of sustainability development and economic revitalisation.

The remainder of the paper is organised as follows. The related work section provides a comprehensive review of literature on the key constructs and concepts relevant to the role of university incubators in fostering entrepreneurial education, academic entrepreneurship, and sustainable innovation. The third section details the methodology employed in this research. It includes a description of the study location, the data collection procedures, a description of the sample, and the data analysis techniques utilised

for the study. Section four presents and analyses the findings from the data analysis, highlighting the key outcomes of the study and discussing the new insights and implications that emerge from the research. Finally, section five concludes and summarises the theoretical contributions of the study, practical implications for stakeholders, limitations of the research, and areas for future research.

Related Work

University Incubators

The concept of university incubators is not new; however, their significance has grown exponentially in recent decades as universities strive to enhance their societal impact through entrepreneurial activities (Jamil et al., 2015). University incubators are established to enhance the entrepreneurial ecosystem by assisting spin-offs and small to medium-sized enterprises during their development and growth stages (Studdard, 2006). They provide a range of resources, including office space, funding opportunities, mentoring, and access to professional networks, to help nascent entrepreneurs navigate the early stages of business development (Bruneel et al., 2010).

The primary goal of these incubators is to bridge the gap between academic research and industry by fostering technology transfer and innovation (Etzkowitz, 2016; Mian et al., 2016). Mohamed Imam Salem (2014) recognised university incubators as the most impactful among all incubator types, noting that student entrepreneurs benefit from these incubators by forging connections with industry to start their own businesses.

A substantial body of literature highlights the multifaceted roles of university incubators. They are often seen as vehicles for regional economic development, providing a supportive environment for the commercialisation of innovative ideas and the creation of new jobs (Al-Mubaraki & Busler, 2013). For instance, a study by Mian et al. (2016) underscores the role of university incubators in enhancing the entrepreneurial capabilities of students and faculty members, thereby contributing to the broader entrepreneurial ecosystem. This aligns with the findings of Magnus Klofsten et al. (2018), who argue that university incubators serve as crucial platforms for nurturing entrepreneurial talent and fostering a culture of innovation within academic institutions.

Furthermore, university incubators play a significant role in advancing sustainable development goals – SDGs (Sieg et al., 2023). According to Fonseca and Jabbour (2012), incubators can promote sustainable practices by supporting startups that focus on eco-friendly technologies and business models. This is echoed by Dumitrascu (2023), who highlights the potential of university incubators to contribute to the achievement of the SDGs by fostering innovation and entrepreneurship that prioritise sustainability.

The existing literature on university incubators underscores their pivotal role in bridging the gap between academia and industry, fostering innovation, and contributing to re-

gional economic development. While they offer significant benefits, the effectiveness of university incubators depends on various factors, including the quality of support services, industry linkages, and alignment with sustainable development goals.

University Incubators and Entrepreneurial Education Activities

In the current dynamic and competitive global, higher education institutions are progressively recognising their responsibility in cultivating entrepreneurial mindsets and equipping students and staff with the requisite skills and knowledge to move towards entrepreneurial activities (Sieg et al., 2023). Through entrepreneurial education and activities, these institutions contribute to the development of entrepreneurial skills fostering economic growth such as: generating ideas, taking advantage of opportunities, self-awareness and efficacy, motivation, financial literacy, initiative, planning, management, collaboration, etc (European Commission, 2019).

University incubators have become an important element of these initiatives, offering a supportive environment that enables students to transform their innovative ideas into viable ventures (Shekhar et al., 2023). They serve as a bridge between academic knowledge and practical application, enabling students to gain valuable insights into the complexities of starting and managing a business.

According to Martin Lackéus (2015), entrepreneurial education is often categorised into three distinct approaches: (a) teaching "about" entrepreneurship adopts a theoretical and content-rich approach aimed at providing a general understanding of the phenomenon, (b) teaching "for" entrepreneurship focuses on a professionally-oriented approach, aiming to equip aspiring entrepreneurs with the practical skills and knowledge necessary for effectively creating and managing a business, (c) lastly, teaching "through" entrepreneurship embraces a process-based and often experiential approach where students engage in a real entrepreneurial learning process. By balancing theory, practice, and hands-on experience, entrepreneurial education not only cultivates competent entrepreneurs but also fosters the innovation and creativity essential for a thriving economy.

Entrepreneurial Education Activities (EEA) has gained significant prominence in higher education institutions (HEIs) worldwide, as universities increasingly recognise the importance of fostering entrepreneurial mindsets and equipping students & staff with the skills and knowledge to share a strong alignment in vision, goals, and contributions to propelling the university's entrepreneurial ecosystem.

Therewith, EEA refers to a range of educational activities designed specifically to develop entrepreneurial skills in individuals. Also these activities may include theoretical courses covering entrepreneurship concepts and theories, practical training focused on the skills required for starting and managing businesses, and hands-on experiences where participants engage in real-world entrepreneurial processes.

For the purpose of analysis, EEAs can be grouped into two distinct categories: curricular and extracurricular.

Curricular EEA refers to educational activities embedded within established courses or programmes, allowing students to develop entrepreneurial skills alongside their regular studies (Overwien et al., 2024). These activities provide students with a structured and systematic approach to learning entrepreneurial concepts and principles.

In contrast to curricular EEAs, extracurricular activities provide uncredited learning opportunities like entrepreneurial seminars and conferences, business visits, Workshops, seminars, and competitions (Pocek et al., 2022). It encompasses all activities that take place outside the formal curriculum, providing participants with the necessary skills to engage with the entrepreneurial ecosystem.

While curricular and extracurricular EEAs represent distinct approaches, they can be effectively combined to create a comprehensive and synergistic entrepreneurial education experience. This complementary approach can foster a deeper and more holistic development of entrepreneurial competencies among students (Overwien et al., 2024).

This point delves into the intricate relationship between university incubators and EEAs, highlighting their complementary roles in shaping the next generation of entrepreneurs. However, according to the literature, university incubators serve as important catalysts for extracurricular EEAs, providing the necessary infrastructure and support for incubates to translate their entrepreneurial aspirations into tangible outcomes.

University Incubators and Sustainable Innovation

Sustainable innovation represents a critical approach to developing new products, services, or processes that generate economic and social benefits while prioritising environmental well-being (Chuang et al., 2022). Annabeth Aagaard and Peter Lindgren (2015) underscored its pivotal role amidst current economic conditions, identifying sustainable innovation as a burgeoning trend in business practices. Moreover, sustainable innovations can serve as the foundation for developing environmentally friendly technologies, products, and services that address pressing environmental challenges for academic entrepreneurship (Sieg et al., 2023). This perspective aligns with Hällerstrand et al. (2023), who highlight the potential for academic institutions to collaborate with industry and stakeholders in developing and commercialising eco-innovations. Such collaborations not only foster new market opportunities but also enhance competitiveness while fostering sustainable economic growth. By providing targeted support and fostering collaboration, University incubators play a vital role in driving the development of solutions that address pressing environmental challenges (Fonseca & Jabbour, 2012).

Firstly, university incubators are instrumental in promoting sustainable practices among startups, urging them to develop solutions that align with environmental and social sustainability goals (Sieg et al., 2023). This can involve providing guidance on incorporating life cycle assessments into product development, exploring circular economy principles, or implementing ethical sourcing practices. Through such initiatives, incubators nurture a generation of entrepreneurs who prioritise sustainability as a core tenet of their business models.

Secondly, these incubators provide support to startups focused on green technologies by offering essential resources and expertise (Fonseca & Jabbour, 2012). The proximity to academic research fosters a rich environment where startups can access cutting-edge knowledge and expertise in areas like renewable energy, sustainable materials, and clean technologies. This targeted support accelerates the development cycle of green technologies, paving the way for a more sustainable future.

Moreover, university incubators act as hubs for collaboration, fostering partnerships between academia, industry, and government agencies engaged in the pursuit of sustainability (Qian et al., 2018). This interdisciplinarity of ideas and expertise can foster synergistic innovation, leading to the development of more comprehensive and impactful solutions. Additionally, university incubators contribute directly to advancing Sustainable Development Goals (SDGs) by nurturing startups that develop innovative solutions aligned with global sustainability targets (Dumitrascu, 2023). Through their focus on green technologies, sustainable practices, and social impact, university incubators become catalysts for positive societal change.

Lastly, university incubators serve as educational platforms, equipping entrepreneurs with the knowledge and skills necessary to integrate sustainability into their business models (Zhou et al., 2022). This includes training on sustainable business models, life cycle assessment tools, and social impact measurement frameworks. By empowering entrepreneurs with the necessary skillset, university incubators ensure that sustainability is not just a buzzword but a driving force in shaping the future of business.

Based on these analyses, university incubators constitute a powerful model for nurturing and accelerating sustainable innovation. Through their multifaceted approach, they cultivate green ventures, support green technologies, facilitate collaboration, advance the SDGs, and educate sustainable entrepreneurs. By promoting a culture of sustainability within the entrepreneurial ecosystem, university incubators play a pivotal role in building a more sustainable future.

The literature review extensively examines the intricate relationship between university incubators, EEAs, and sustainable innovation. University incubators have been identified as pivotal catalysts for nurturing entrepreneurial ventures, particularly in the realm of sustainable innovation. These incubators offer aspiring entrepreneurs essential support, resources, and mentorship to translate innovative ideas into viable businesses. Concurrently, EEAs are crucial in equipping students with the entrepre-

neurial mindset, skills, and knowledge necessary to navigate the challenges and seize the opportunities associated with sustainable innovation.

Despite the growing recognition of the significance of this nexus, the Moroccan context presents a unique opportunity for further exploration. Limited research focuses on the specific dynamics of university incubators, EEAs, and sustainable innovation within Morocco. This study aims to bridge this gap by investigating how these elements interact within Moroccan universities. By examining this interplay, the study seeks to contribute valuable insights that can inform policy and practice, fostering a more robust ecosystem for sustainable entrepreneurship in Morocco.

Research Set-Up and Methodology

This study adopts a qualitative research design to comprehensively analyse the role of university incubators in Morocco, with a specific focus on their contributions to entrepreneurial education and sustainable innovation. A qualitative approach is particularly well-suited for this investigation as it allows for an in-depth exploration of the complex and multifaceted interactions between university incubators, EEAs, and sustainable innovation within the Moroccan context. By employing a qualitative methodology, this study aims to capture the rich experiences and perspectives of key stakeholders, offering a nuanced understanding of the phenomenon under investigation. To achieve the research objectives, this study utilises a multi-pronged approach that combines three methods: documentary analysis (incubators reports, Universities activity reports, Strategic plans and policies, etc.), on-site observation through incubator visits (6 incubators), and interviews with various stakeholders within the ecosystem (incubatees, incubator staff, university officials, funders, incubation experts). In what follows, we will delve into details about our methodology process.

Matthew B. Miles and A. Michael Huberman (2003) advocate for direct observation because it provides firsthand accounts of the research setting, allowing researchers to gain a deeper understanding of the context and dynamics of the situation. By visiting six university incubators and observing interactions and processes, researchers can gather detailed information that may not be captured through interviews or documents alone. This method enriches the understanding of the operational dynamics and contextual nuances. We used an observation checklist to systematically record physical facilities within the incubators, dynamics of interactions among incubator members, support services offered to start-ups, and the overall atmosphere within the visited incubators. Using this checklist enabled us to document observable aspects of incubators in a precise and detailed manner, complementing data collected through other methods such as documentary analysis and interviews.

Robert K. Yin (2013) positions documentary analysis as an indispensable tool for case study researchers, enabling them to delve into the historical, contextual, and organisational aspects of the case being studied. The systematic and rigorous application of documentary

analysis, as outlined by Yin, contributes to the depth, breadth, and validity of case study research findings. We utilised a structured data extraction form designed to systematically analyse relevant documents such as academic literature, institutional reports, public policies, and internal documents from university incubators.

Interviews, as described by Miles and Huberman (2003), serve as a tool for eliciting in-depth perspectives and experiences from participants. They emphasise the importance of establishing rapport with interviewees and creating a safe and comfortable interview environment. Additionally, they stress the need for active listening, allowing participants to fully express their thoughts and experiences. A semi-structured interview protocol was employed to collect 24 key stakeholders experiences with incubators, perceptions of challenges and opportunities, and views on the impact of incubators on sustainable innovation and entrepreneurial education.

Overall, Miles and Huberman (2003) encourage researchers to triangulate data from multiple sources (in this case, documents, observations, and interviews) to achieve a more comprehensive understanding of the research phenomenon. This triangulation helps in validating findings, capturing diverse viewpoints, and enhancing the credibility of qualitative research outcomes.

Table 1

Data Sources

Incubator	Observed Activities	Analysed Documents	Number and Profiles of Interviews
1	Site visit, assistance at a training session, participation in a hackathon	Annual report, business plans, sector studies, website content	5 interviews: 3 incubatees, 1 incubator director, 1 funder
2	Site visit, assistance at a training session, observation of a pitch competition	Activity reports, public policy documents, flyers, communication materials	4 interviews: 2 incubatees, 1 incubator director, 1 expert
3	Site visit, participation in a mentorship program, observation of a networking event	Strategic plans, internal reports, guide of procedures	3 interviews: 1 incubatee, 1 incubator director, 1 coach
4	Site visit, attendance at workshops, participation in a hackathon	Sector studies, academic literature, website content	4 interviews: 2 incubatees, 1 funder, 1 coach
5	Site visit, assistance at a startup mentorship program, observation of a pitch competition	Business model templates, annual reports, communication documents	4 interviews: 1 laureate, 1 incubator director, 2 university officials
6	Site visit, attendance at workshops, observation of a networking event	Reports on regional impact, funding guidelines, flyers	3 interviews: 1 laureate, 1 funder, 1 coach

Source. Own research.

Data analysis followed a systematic and iterative process, adhering to structured procedures inspired by qualitative research methodologies (Gioia et al., 2013). Following the recommendations of Laurence Bardin (2003), we carried out an initial reading of the data collected in order to identify and classify each element in a category using a grid including the sources in columns and the themes in rows.

The raw data underwent comprehensive coding, moving from initial coding to selective coding and conceptualisation. This structured approach aimed to identify patterns, similarities, regularities and notable absences within the data. The collected data were examined holistically and then individually, leveraging diverse data sources to refine emerging themes, corroborate findings, and enrich interpretations. Rigour was enhanced through recurring data analysis, which informed subsequent data collection efforts and built confidence in the analytical process.

Findings

This study critically examines the role of Moroccan university incubators in stimulating EEAs and sustainable innovation, despite encountering challenges and yielding results that are more nuanced than anticipated.

Our findings reveal that while university incubators contribute significantly to diversifying university activities and fostering entrepreneurial education, their impact on sustainable innovation is constrained by various factors. These include regulatory complexities, limited access to green funding, and the challenges of forging effective cross-industrial partnerships. These realities underscore the necessity for adaptive strategies and dynamic capabilities within incubators to navigate evolving market demands and regulatory landscapes effectively.

Despite these challenges, our study highlights the valuable role of university incubators in nurturing a culture of innovation and equipping aspiring entrepreneurs with essential skills and resources. By examining these dynamics, we aim to provide a realistic assessment that informs future strategies and policies to enhance the effectiveness of university incubators in promoting sustainable entrepreneurial ventures in Morocco.

Diversifying University Activities: Contribution to Overall University Missions

University incubators in Morocco, established under Law 01–00, play an important role in expanding the traditional missions of universities to encompass innovation and entrepreneurship. Article 7 of this law empowers universities to engage in income-generating activities, establish innovative business incubators, exploit patents and licenses, and commercialise their activities. This legislative framework underscores

the incubators' mandate to promote the valorisation of scientific research outcomes, foster closer ties between academia and industry, stimulate innovation, and cultivate a dynamic entrepreneurial spirit within academic and research environments.

Therefore, university incubators in Morocco are designed to support the third mission of universities, which is to engage with the socio-economic environment by encouraging community engagement, promoting entrepreneurial education, and fostering innovation practices within academic institutions. They serve as platforms for bridging the gap between academic research and practical application, facilitating the patenting and commercialisation of research outcomes, and promoting a culture of innovation that extends beyond the campus walls. By nurturing partnerships with industry, government bodies, and local communities, these incubators contribute to economic development and societal impact, aligning university activities with national priorities for innovation and sustainable growth.

Our findings indicate that university incubators significantly diversify university activities by facilitating interdisciplinary collaboration among faculties and departments. Also, they actively promote a culture of innovation within institutions, encouraging faculty and students alike to explore entrepreneurial ventures and develop innovative solutions to societal challenges.

Despite their varying sizes, the university incubators studied generally provide adequate spaces tailored to accommodate incubated projects, reflecting a responsive approach to demand. Interestingly, none of the incubators reach their maximum capacity, which can be attributed to several factors: stringent selection criteria, potentially insufficient candidate numbers, the strategic retention of free spaces for new project entries, or the incubators' strategy to maintain occupancy rates aligned with available human and financial resources.

Access to scientific facilities and equipment distinguishes university incubators significantly from other entrepreneurial support structures. This distinction is rooted in their proximity to academic institutions. Our study observed that these incubators are strategically located within or near academic establishments, particularly those in the hard sciences, facilitating direct access to laboratories and scientific research platforms.

We observe the presence and close interaction with key players in the entrepreneurial and academic ecosystem. Notably, all studied incubators maintain ties with key actors in university entrepreneurship and support structures. Some of these actors even have dedicated spaces within the incubators and innovation hubs for direct interaction, fostering beneficial proximity for project developers. This synergy enhances the entrepreneurial fabric by facilitating access to specialised resources and advice. This multidimensional collaboration underscores the incubators' commitment to providing their incubatees with an environment rich with opportunities, expertise, and exchanges to nurture and scale innovative entrepreneurial projects.

Despite these positive contributions, our research also identifies challenges such as regulatory complexities and the need for enhanced collaboration frameworks between universities and industry partners. These insights underscore the importance of continually adapting incubator strategies to effectively meet evolving market demands and face the complex regulatory framework.

According to the report *Moroccan Universities and Entrepreneurship* (Ruiz Navarro, et al. 2017) from the European project DEVEN3C in 2017, the establishment of incubators in universities facilitates entrepreneurship development within academic institutions. However, the report highlights challenges such as insufficient financial and human resources allocated to these structures and bureaucratic constraints hindering their operations.

Fostering EEAs

One of the primary roles of university incubators is to provide structured educational programmes focused on entrepreneurship. These programmes are designed to nurture entrepreneurial skills among students, encouraging them to explore innovative ideas and develop business acumen. By offering courses, workshops, and seminars tailored to the needs of aspiring entrepreneurs, incubators create learning opportunities that blend theoretical knowledge with practical application.

Moreover, university incubators serve as catalysts for students to translate their ideas into viable projects. Through mentorship and guidance from experienced entrepreneurs and industry experts, students are empowered to refine their concepts, conduct market research, and develop robust business plans. This hands-on approach not only enhances their entrepreneurial capabilities but also instils confidence and resilience necessary for navigating the complexities of startup ventures.

University incubators receive support from the Moroccan Network of Incubation and Spin-off (RMIE), which actively promotes entrepreneurship and the creation of innovative businesses. RMIE's initiatives include incubating numerous projects and facilitating entrepreneurship events and training activities aimed at managers, staff of incubators, and project leaders. These efforts underscore the commitment to fostering a vibrant entrepreneurial ecosystem within academic institutions.

The RMIE has made significant efforts to promote entrepreneurship and support innovative ventures through university incubators. According to the data provided, RMIE supported the incubation of 81 projects, but only 23 successfully progressed to the creation stage. This statistic underscores a notable gap between initial support and sustained business establishment, highlighting challenges in translating incubated projects into viable enterprises.

The discrepancy between incubated projects and those that advance to the creation stage suggests several critical challenges. First, while incubators provide initial

support and resources, the journey from business concept to market entry is fraught with obstacles such as funding shortages, market readiness issues, and regulatory complexities. These factors often hinder project scalability and sustainability beyond the incubation phase.

Moreover, RMIE organised over 90 entrepreneurship events and conducted more than 46 training activities aimed at incubator managers, staff, and project leaders. While these initiatives demonstrate proactive efforts to cultivate entrepreneurial skills and knowledge, their impact on overcoming the aforementioned challenges remains ambiguous. Successful entrepreneurship requires not only theoretical knowledge but also practical skills and sustained support in navigating real-world business environments.

To enhance the effectiveness of RMIE and university incubators, it is crucial to address the identified weaknesses. This includes bolstering financial and mentoring support to incubated projects throughout their lifecycle, improving collaboration with industry partners to enhance market readiness, and streamlining bureaucratic processes that often impede business creation.

The project call model illustrates incubators' commitment to providing concrete opportunities for project developers by offering a structured framework to develop innovative ideas. During our study, we observed a concrete example of a project call launched through collaboration between multiple Moroccan universities under a European entrepreneurship-focused project. These calls are typically announced through the universities' websites. Following the submission period, selected project developers participate in accelerated coaching and training sessions to refine and develop their projects. A technical commission composed of entrepreneurship and innovation experts conducts a pre-selection of projects. Successful projects undergo further training in incubation centers to enhance their viability and growth potential. The selection process culminates in the evaluation and selection of the best project from each partner university, followed by a national-level assessment to award the top project. It underscores the significance of international partnerships and university collaborations in strengthening the entrepreneurial ecosystem within universities.

Another notable aspect of activities observed within university incubators is the organisation of events highlighting the successes and experiences of former incubatees or seasoned entrepreneurs. Often referred to as "success stories" or testimonials, these events play a vital role in inspiring and motivating project developers within the incubator. They provide incubatees with insights into the journeys of successful entrepreneurs who have realised their ideas and developed their businesses successfully. Testimonials offer a practical perspective on challenges faced, obstacles overcome, and strategies implemented for success. Project developers value these informal learning moments as they provide opportunities to learn from peers, ask specific questions, and receive practical advice.

Finally, continuous evaluation and adaptation of incubator strategies based on feedback from stakeholders and market trends are essential for fostering a more conducive

environment for sustainable entrepreneurship. By doing so, university incubators can better fulfil their mandate of fostering a thriving entrepreneurial ecosystem that drives economic growth and innovation in Morocco.

Promoting Sustainable Innovation

Since the establishment of university incubators, various strategies have been implemented to enhance the entrepreneurial ecosystem and foster innovation within academic institutions (Centre National pour la Recherche Scientifique et Technique au Maroc [CNRST], 2011). These practices include raising awareness among students and researchers about the potential opportunities in innovation entrepreneurship.

A significant outcome of these efforts is the significant increase in the number of patents filed, which serves as a critical indicator of the effectiveness of university incubators in promoting innovation. By providing resources, mentorship, and infrastructure, incubators support researchers and students in patenting their inventions, thus contributing to the intellectual property landscape and encouraging further innovation within the academic community. In other words, several universities have embarked on a collaborative journey with the Moroccan Industrial and Commercial Property Office (OMPIC) to establish robust Intellectual Property (IP) strategies within their institutions. This collaboration represents a significant step forward in strengthening Morocco's innovation ecosystem. By empowering universities to protect, commercialise, and leverage their IP assets, this partnership fosters knowledge transfer, stimulates innovation, and contributes to the nation's economic competitiveness in the global arena. As Morocco continues to prioritise innovation and sustainable development, the role of university-OMPIC collaboration is expected to become even more crucial in the years to come.

During our visits to various university incubators, we observe a diverse array of activities and events aimed at fostering innovation through entrepreneurship. Hackathons emerge prominently among the observed events, captivating the attention of project developers, students, and innovation enthusiasts alike. Typically, thematic and conducted in collaboration with key stakeholders from the targeted sectors, hackathons provide a dynamic platform where participants collaborate intensively to generate innovative solutions to specific challenges. These events serve to ignite creativity, promote teamwork, and foster personal growth. Moreover, stakeholders add that hackathons not only stimulate individual creativity but also enhance group dynamics and cohesion among participating teams. They underscore the incubators' commitment to creating opportunities to harness the creative potential of project developers and the broader university community.

The establishment of Innovation Cities (ICs) within the framework of Morocco's Innovation Plan further highlights the catalytic effect of university incubators. These

ICs aim to bring together key-players in the entrepreneurial ecosystem, fostering collaboration, idea exchange, and the creation of high-potential development projects. Five cities have already been implemented, while four more have been authorised within public universities.

The integration of university incubators within ICs demonstrates the catalytic role these incubators play in driving innovation, entrepreneurship, and economic development. Indeed, providing a supportive environment university incubators is considered an essential pillar of the ICs initiative, contributing to Morocco's ambition to become a regional hub for innovation. As the ICs initiative continues to evolve, the role of university incubators is expected to become even more crucial in shaping Morocco's innovative plan.

Despite a growing commitment to innovation in Morocco, sustainable innovation initiatives remain largely confined to calls for projects and hackathons that promote this type of innovation within universities. While these activities have undoubtedly spurred some valuable initiatives, a more comprehensive approach is needed to fully harness the potential of sustainable innovation in Moroccan universities. By strengthening the research ecosystem, enhancing education and training, promoting sustainable procurement practices, and developing supportive policies, universities' incubators can foster a thriving sustainable innovation landscape that drives economic growth, environmental protection, and social progress.

Indeed, we observe a notable gap in the priorities of university incubators regarding the incorporation of sustainable environmental practices. This gap encompasses various aspects such as promoting sustainable management practices, adopting ecological criteria in the selection of incubated projects, green buildings and facilities, as well as effectively managing resources like water and energy. These critical dimensions of sustainability appear to be inadequately integrated into the policies and daily operations of university incubators, despite their potential to enhance the positive impact of entrepreneurial initiatives on the environment.

A reform of legislation, adequate funding sources for innovation in general and sustainability in particular, and the availability of specialised and knowledgeable human resources in innovation and sustainability are required for university incubators to enhance their impact on sustainable innovation. Legislative reforms should aim to provide a supportive framework that encourages and incentivises sustainable practices within incubators. Adequate funding mechanisms tailored to promote innovation, especially in sustainable technologies and practices, are essential to foster growth and viability. Furthermore, investing in specialised human capital equipped with the necessary expertise in innovation and sustainability will ensure that incubators can effectively support and nurture sustainable entrepreneurial ventures. Together, these factors will enable university incubators to play a more proactive role in advancing sustainable innovation within academic environments.

Identified Challenges

This section examines four critical challenges faced by university incubators: innovation and entrepreneurial culture, financial and administrative hurdles, model fit and program phases, governance and resource constraints. Each of these challenges significantly influences the role of incubators in promoting EEAs and sustainable innovation. By delving into these issues, we aim to offer a comprehensive view of the current landscape and propose pathways for enhancing Morocco's incubation ecosystem.

The scarcity of mature sustainable innovation projects and motivated project founders presents a significant hurdle. Incubators rely on a continuous flow of promising ideas to achieve their objectives, and the limited availability of such ventures can impede their effectiveness. This challenge is exacerbated by a risk-averse entrepreneurial culture within universities, which inhibits innovation and complicates the identification and support of impactful projects.

University incubators in Morocco also encounter challenges in aligning their models with the needs of early-stage ventures. It is crucial to streamline the stages of support, from pre-incubation to post-incubation phases. This involves establishing clear entry criteria, defining key milestones, and outlining graduation requirements to provide tailored support throughout startups' development stages. Additionally, the availability of skilled mentors and advisors capable of effectively guiding projects remains a critical concern. Optimising these incubation phases is essential for maximising the outcomes and sustainability of ventures nurtured within these programmes.

Moreover, bureaucratic administrative processes, while necessary for maintaining order, can create bottlenecks for incubators. Complex procedures may hinder the agility required for effective business incubation, potentially slowing down support and development processes for startups. Simplifying administrative procedures for sustainable innovation projects could expedite the incubation process and alleviate frustrations among entrepreneurs, thereby facilitating their progress and success.

Addressing these challenges is pivotal to fostering a thriving ecosystem of sustainable innovation. Cultivating a robust entrepreneurial mindset among university stakeholders, students, faculty, and staff is essential. This can be achieved through targeted training programmes, workshops, and mentorship initiatives that encourage risk-taking and promote innovation. By nurturing a culture that embraces entrepreneurship, universities can create an environment conducive to the development of sustainable ventures.

Furthermore, governance issues encompass undefined legal statuses for incubators within academic institutions and a lack of autonomy. The absence of dedicated legislation and supporting structures, as specified in Law 01–00, exacerbates these challenges, presenting additional obstacles to effective operation and growth. Resolving these governance issues requires clarifying legal statuses, enhancing institutional autonomy, and establishing robust legislative frameworks that explicitly support and empower university-based entrepreneurship and sustainable innovation initiatives.

By addressing these concerns, university incubators in Morocco can play a more significant role in nurturing a vibrant culture of innovation and entrepreneurship, ultimately leading to the development of more impactful and sustainable ventures. These efforts will not only benefit the university community but also contribute to Morocco's broader economic and social development.

Conclusion

In this exploratory study we seek to investigate the relationship between university incubators and various entrepreneurship education activities and sustainable innovation. These incubators play an important role in expanding traditional university missions under Law 01–00, fostering innovation, and bridging academia-industry gaps. Despite their varying sizes, they generally provide tailored spaces and access to scientific facilities, facilitating direct collaboration between academic research and practical application.

Furthermore, university incubators significantly contribute to entrepreneurial education through tailored programmes and practical mentorship, empowering students and researchers to develop viable business ventures. However, the transition from incubation to sustainable enterprises faces obstacles like financial constraints and bureaucratic processes, necessitating streamlined support mechanisms.

Promoting sustainable innovation remains underdeveloped within university incubators, despite its potential to enhance environmental impact positively. Legislative reforms, targeted funding, and specialised resources are essential for integrating sustainable practices effectively. Challenges include regulatory complexities, limited green funding access, and the need for effective cross-industrial partnerships. Adaptive strategies within incubators are crucial to navigating these hurdles and meeting evolving market demands effectively.

While this study offers valuable insights into the role of university incubators in Morocco, it is important to acknowledge its limitations. Firstly, the study's focus on self-reported data from key actors may introduce potential biases in the findings. Secondly, the limited sample size of six university incubators restricts the generalisability of the results. Additionally, the study's timeframe may not have captured the full range of challenges and successes experienced by these incubators over time.

Furthermore, the research primarily explores the perspectives of stakeholders within the university ecosystem, potentially underrepresenting external factors that influence incubator effectiveness. A broader analysis incorporating economic, social, and political contexts could provide a more holistic understanding of the limitations faced by university incubators in Morocco.

Despite these limitations, the study provides a valuable foundation for further research and highlights the need for continued exploration of the complexities sur-

rounding university incubators and their contributions to entrepreneurial education, academic entrepreneurship, and sustainable innovation. Future work could benefit from larger, more diverse samples, longitudinal data collection, and mixed-methods approaches to gain a deeper understanding of the challenges and opportunities faced by these incubators.

By acknowledging and addressing these limitations, in the future, we plan to contribute to a more comprehensive and nuanced understanding of the role of university incubators in promoting innovation and sustainable development in Morocco and beyond.

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