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THE ROLE OF UNIVERSITY BUSINESS INCUBATORS IN SHAPING ENTREPRENEURIAL MINDSET - AN ECONOMIC AND SOCIAL PERSPECTIVE IN ALGERIA

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Abstract. This study examines the role of university business incubators (UBIs) in shaping entrepreneurial mindset of Algerian students, emphasizing their economic and social impact. Motivated by the growing need to integrate entrepreneurship into academic frameworks, the research hypothesizes that UBIs significantly influence creativity, entrepreneurial thought, and venture intentions. The study's objective is to assess the effectiveness of incubators in delivering training, mentorship, and financial resources while fostering a supportive entrepreneurial ecosystem. Using Structural Equation Modeling (SEM) and statistical package for social sciences (SPSS), data from 450 university students were analyzed. Findings reveal that UBIs significantly enhance entrepreneurial attitudes, with high reliability scores (Cronbach's alpha = 0.956) confirming the robustness of the analysis. Training and mentorship emerged as pivotal elements, complemented by financial support, in bridging the gap between theoretical knowledge and practical application. The study concludes that UBIs are essential catalysts for fostering innovation and reducing barriers to entrepreneurship. By promoting creativity and collaboration among students, these incubators contribute to economic and social progress. The findings highlight the need for enhanced university-industry-government collaborations to amplify the impact of UBIs and support entrepreneurial ecosystems.

Keywords: *entrepreneurial development, innovation ecosystem, mentorship, startup funding, student entrepreneurship, university incubators.*

Rezumat. Articolul examinează rolul incubatoarelor universitare de afaceri (UBI) în modelarea mentalității antreprenoriale a studenților algerieni, subliniind impactul lor economic și social. Motivată de nevoia tot mai mare de a integra antreprenoriatul în rândul cadrelor academice, cercetarea emite ipoteza că UBI-urile influențează semnificativ creativitatea, gândirea antreprenorială și intențiile de risc. Obiectivul studiului este de a evalua eficiența incubatoarelor în furnizarea de formare, mentorat și resurse financiare, încurajând în același timp un ecosistem antreprenorial sustenabil. Folosind Structural Equation Modeling (SEM) și pachetul statistic pentru științe sociale (SPSS), au fost analizate date de la 450 de studenți.

Constatările arată că UBI-urile îmbunătățesc semnificativ atitudinile antreprenoriale, cu scoruri ridicate de fiabilitate (alfa lui Cronbach = 0,956) confirmând robustețea analizei. Formarea și mentorat au apărut ca elemente esențiale, completate de sprijin financiar, în reducerea decalajului dintre cunoștințele teoretice și aplicarea practică. Studiul concluzionează că UBI-urile sunt catalizatori esențiali pentru stimularea inovației și reducerea barierelor în calea antreprenoriatului. Prin promovarea creativității și a colaborării între studenți, aceste incubatoare contribuie la progresul economic și social. Concluziile evidențiază necesitatea unor colaborări îmbunătățite între universități, industrie și guvern pentru a amplifica impactul UBI-urilor și a sprijini ecosistemele antreprenoriale.

Cuvinte cheie: *dezvoltare antreprenorială, ecosistem de inovare, mentorat, finanțare startup, antreprenoriat studentesc, incubatoare universitare.*

1. Introduction

The university has emerged with its effectiveness in instilling an entrepreneurial spirit and fostering it among the youth, serving as the primary raw material relied upon for economic advancement [1]. It has achieved a qualitative leap into the fourth generation by leveraging entrepreneurship and artificial intelligence. This transformation is facilitated through pedagogical support structures introduced in universities, including incubators and entrepreneurship development centers, offices linking institutions with the university, technological support centers, and manufacturing laboratories. The number of university incubators reached 94, with 84 entrepreneurship development centers, creating a conducive environment for the growth of small and medium enterprises and startups.

Entrepreneurship is considered one of the most important elements of economic development, and various university business incubators play a vital role in supporting entrepreneurs and startups in their projects [2]. They collect students' ideas, provide intensive training in entrepreneurship, conduct awareness campaigns, guide the realization of ideas, protect intellectual property, develop initial prototypes in laboratories to reach Technology Readiness Level (TRL) levels 3 or 4, establish agreements through liaison offices to benefit from experiences, and organize field visits for project holders.

This study explores the extent to which university business incubators are effective in promoting entrepreneurial activities and cultivating entrepreneurial mindsets among students. By addressing the gap between academic learning and real-world business practices, these incubators contribute to fostering innovation, reducing uncertainty, and creating opportunities for economic growth.

The study is grounded in the premise that university business incubators are instrumental in shaping entrepreneurial intentions and capabilities. Specifically, the study hypothesizes that incubators enhance students' entrepreneurial thought, self-efficacy, and creativity while providing structured training and mentorship programs. Additionally, these institutions facilitate critical communication and collaboration between students, entrepreneurs, investors, and other stakeholders, thereby fostering an interconnected entrepreneurship ecosystem. By enabling access to financial support and reducing barriers to venture creation, incubators serve as vital platforms for nurturing entrepreneurial ventures.

The primary objective of this study is to examine the role of university business incubators in supporting and encouraging entrepreneurial initiatives among students. It seeks to assess the effectiveness of the services and resources provided, including mentorship, financial assistance, and hands-on training, in promoting entrepreneurial skills and mindsets.

Ultimately, the study aims to provide actionable insights into how these incubators can be optimized to further enhance their impact on the entrepreneurial ecosystem and contribute to broader economic and social development.

The study is structured as follows: the introduction outlines the study's context and purpose. The literature review explores the role of university business incubators in fostering entrepreneurship. The methodology describes the research design and data analysis. The findings section presents the impact of key support factors on entrepreneurial attitudes. The discussion interprets these findings, while the conclusion summarizes key insights and offers recommendations.

2. Literature Review

Business incubators are organizations that provide essential support and resources to entrepreneurs, assisting them in developing and growing their ventures, the concept first emerged in the United States in the 1950s as a mechanism for fostering local economic growth and supporting small businesses [3]. In the 1980s, business incubators evolved into formalized institutions designed to promote and create successful entrepreneurial ventures. This evolution aligned closely with supporting university and higher education graduates, particularly in transitioning research outcomes from the laboratory to real-world applications [1].

McAdam et al. define incubators as institutions that offer counseling, financial, administrative, and technical support to startups during their early and operational stages [3]. The National Business Incubation Association (NBIA) describes incubators as "organizations providing entrepreneurs with access to resources, mentorship, and facilities necessary to overcome obstacles and challenges in starting and growing a business" [4].

According to Mian, business incubators function as integrated systems, treating each startup as a "newborn" requiring careful nurturing. These institutions shield startups from external challenges, ensuring their sustainability, scalability, and ultimate self-reliance [5].

Business incubators are pivotal in fostering entrepreneurial ecosystems by reducing uncertainties and enabling innovation. Their key roles and objectives can be summarized as follows [2]:

- Providing feasibility studies: delivering scientific advice and feasibility studies for emerging projects while connecting innovative ideas to market dynamics.
- Attracting venture capital: encouraging venture capitalists to invest in high-potential startups.
- Enhancing employment opportunities: contributing to job creation and local economic development.
- Reducing risks and costs: minimizing financial and operational risks associated with startups, particularly during early stages.
- Boosting success rates: increasing the sustainability and success rates of incubated businesses by providing structured support.
- Encouraging innovation: enabling startups to explore new products, technologies, and market segments.

Shalaby highlights that businesses affiliated with incubators benefit significantly from reduced duplication of efforts, cost savings, and shorter time-to-market compared to independent ventures [6].

2.1 Services Provided by Business Incubators

Business incubators provide comprehensive services that address the diverse needs of entrepreneurs, ensuring their growth and resilience [7]:

- Operational Support: Offering facilities such as furnished offices, shared services (e.g., security and maintenance), and temporary storage for small and micro-enterprises [8].
- Technology Integration: Collaborating with universities and research centers to develop intellectual property, manage patents, and support innovation [9].
- Financial Access: Facilitating access to funding by connecting startups with investors, venture capitalists, and grant programs [10].
- Training and Development: Providing structured training programs on strategic planning, management skills, and IT competencies [11].
- Networking Opportunities: Organizing workshops, conferences, and exhibitions to connect entrepreneurs with stakeholders, customers, and investors [12].
- These services collectively reduce the operational and strategic challenges faced by startups, fostering a supportive ecosystem for innovation.

2.3 Entrepreneurship and Related Concepts

Entrepreneurship involves the creation, development, and management of business ventures to achieve economic or social goals. It encompasses identifying opportunities, evaluating risks, and implementing strategic actions to ensure long-term success [13].

Entrepreneurial Thought reflects the mindset necessary for solving problems creatively while embracing calculated risks and learning from failure. This mindset combines strategic thinking, innovation, and adaptability [13, p. 460]. Entrepreneurial Spirit embodies the motivation, passion, and resilience required to pursue opportunities and create value. Entrepreneurs with a strong entrepreneurial spirit often overcome significant challenges to succeed in competitive markets [14]. University business incubators are instrumental in fostering these traits among students and researchers, enabling the commercialization of innovative ideas and enhancing their contribution to society.

2.4 The Role of Business Incubators in Algerian Universities

In Algeria, business incubators represent a crucial pillar in fostering entrepreneurship within universities. The incubator teams typically consist of professors, administrative staff, and workers who collaboratively provide guidance, support, and mentorship to students and entrepreneurs. These incubators operate under the presidency of the university, with their activities coordinated by the head of the working and follow-up cell and aligned with Ministerial Decision 1275. This strategic framework ensures that incubators follow a structured program and work plan, reviewed and implemented annually at the beginning of each academic year [15].

Each business incubator is managed by a director, carefully selected from among university professors with relevant certifications and a demonstrated passion for leadership and supervision. This structure is integral to the incubators' ability to align academic expertise with practical entrepreneurial support. The National Coordinating Committee for Monitoring Innovation and Entrepreneurship in Universities has played a pivotal role in reshaping the entrepreneurial landscape in Algeria. This strategic initiative, introduced under Ministerial Decision 1275, is designed to shift the mindset of students from job-seeking to wealth creation, reflecting the broader economic diversification goals of the Algerian

government [16]. 6,000 project ideas registered under Decision 1275, indicating readiness for implementation. 234 innovative project ideas that showcase creativity and innovation. 853 patent applications, reflecting a proactive approach to intellectual property protection and idea commercialization.

Figure 1 illustrates the distribution of registered project ideas, innovative projects, and patent applications, providing a visual representation of entrepreneurial engagement fostered by university incubators.

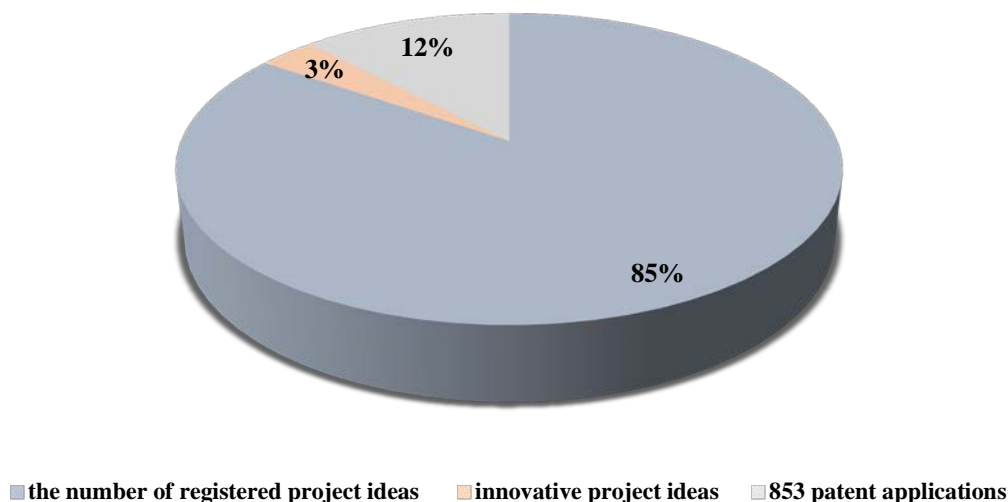


Figure 1. Distribution of Project Ideas, Innovative Projects, and Patent Applications.

Source: Authors' research based on data from the National Coordinating Committee for Monitoring Innovation and Entrepreneurship in Universities.

3. Research Methodology

The theoretical model illustrates how various support elements - Entrepreneurial Thought, Training and Mentorship, and Providing Financial Support—collectively influence the role of University Incubators in fostering a conducive environment for student entrepreneurship. Each factor contributes uniquely: entrepreneurial thought supports the mindset, training and mentorship enhance skills, and financial support provides resources, all of which are essential for the incubator's effectiveness.

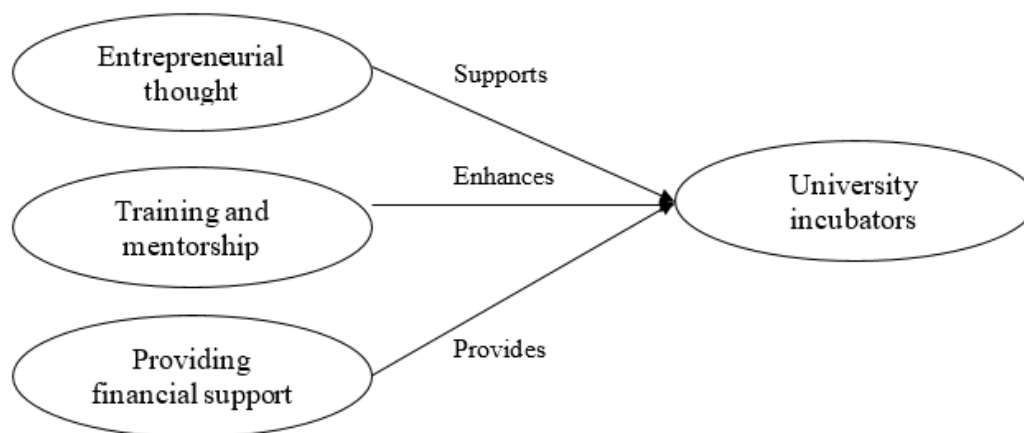


Figure 2. The theoretical model of the study.

Source: authors own research.

3.1 Sample and Data Collection

A sample of 450 students from various universities across the country were selected to understand their perspectives on the role of university incubators in promoting entrepreneurial thinking. This demographic was specifically chosen to assess the knowledge of students who had minimal prior exposure to startup environments.

Table 1

Respondent Characteristics			
Profile	Category	Frequency (N)	Percentage (%)
Gender	Males	345	76.66
	Females	105	23.34
Age	Below 20 years	102	22.6
	21-25 years	277	61.5
	Above 25 years	71	15.9
Education Level	Bachelor's students	211	46.88
	Master's students	239	53.11

Table 1 shows the demographic profile of the respondents reveals several noteworthy trends related to entrepreneurial engagement. The majority of respondents were male (76.66%), indicating a gender gap in participation, which could reflect broader societal or cultural norms that influence entrepreneurial involvement. Addressing this disparity may require targeted initiatives to encourage greater female participation in entrepreneurship programs. Regarding age, the largest group of respondents (61.5%) were aged between 21 and 25 years, aligning with the typical transition from undergraduate to postgraduate studies. This age range is often associated with higher levels of innovation and risk-taking, qualities essential for entrepreneurship. However, the smaller representation of respondents aged above 25 (15.9%) suggests that older students or alumni may be less engaged in entrepreneurial initiatives, highlighting an opportunity to broaden outreach efforts.

In terms of education, master's students constituted a slightly larger proportion (53.11%) compared to bachelor's students, suggesting that individuals in more advanced stages of their academic careers may have greater access to or interest in entrepreneurial programs. This could be attributed to specialized training, mentorship, or networking opportunities more readily available at the graduate level. The findings suggest that entrepreneurial initiatives are most impactful when targeted at students in the latter stages of their academic journey, but expanding support to undergraduate levels could foster earlier engagement. To maximize entrepreneurial participation, universities should focus on enhancing inclusivity for women, broadening age-group outreach, and providing comprehensive support for both undergraduate and postgraduate students.

3.2 Data Analysis Techniques

The data analysis was conducted using SPSS (version 25) to perform descriptive statistics and analyze the demographic characteristics of the respondents. Advanced statistical techniques, including Confirmatory Factor Analysis (CFA) and Structural Equation Modeling (SEM) using Warp PLS, were employed to evaluate the study's theoretical framework and test the research hypotheses. These methods ensured robust assessment of the relationships between latent variables and provided a comprehensive understanding of the data, supporting the validity and reliability of the findings.

3.3 Validity and Reliability Analysis

Table 2 presents the reliability analysis of the questionnaire, with Cronbach's Alpha (α) and Composite Reliability (CR) scores for each section exceeding the recommended threshold of 0.5. These scores confirm the internal consistency and reliability of the study's measurement tools.

Table 2

Reliability and Composite Reliability Analysis		
Section	Cronbach's Alpha (α)	Composite Reliability (CR)
Entrepreneurial Thought	0.962	0.979
Training and Mentorship	0.948	0.955
Financial Support	0.958	0.979
Total	0.956	0.960

Table 2 summarizes the reliability analysis of the constructs used in the study, evaluating internal consistency and composite reliability. Cronbach's Alpha (α) values, which measure the internal consistency of the items within each construct, range from 0.948 to 0.962, indicating excellent reliability across all constructs. Composite Reliability (CR) values, which assess the overall reliability of the constructs by considering the contribution of individual items, are all above 0.955, further confirming the strong reliability of the scales.

Specifically, the construct Entrepreneurial Thought shows the highest reliability with a Cronbach's Alpha of 0.962 and a CR of 0.979, followed by Training and Mentorship with values of 0.948 and 0.955, and Financial Support with values of 0.958 and 0.979. The total reliability values (Cronbach's Alpha = 0.956, CR = 0.960) demonstrate the overall stability and consistency of the measurement tools used in the study.

These results confirm that the constructs of Entrepreneurial Thought, Training and Mentorship, and Financial Support are highly reliable, ensuring that the study's measurement scales effectively capture the intended dimensions.

3.4 Confirmatory Factor Analysis (CFA)

According to the table below, Table 3 presents an overview of the factor loading and validity metrics for the constructs used in the study. It assesses the reliability and convergent validity of the constructs, which are essential for evaluating the measurement model.

Table 3

Factor Loading and Validity Analysis				
Factor	Standardized Factor Loading (SFL)	T-Value	Average Variance Extracted (AVE)	Composite Reliability (CR)
Entrepreneurial Thought	0.950 - 0.754	>24.782	0.892	0.979
Training and Mentorship	0.969 - 0.932	>24.782	0.864	0.955
Financial Support	0.985 - 0.712	>24.782	0.846	0.979

Table 3 provides an overview of the factor loadings and validity metrics for the constructs used in the study.

Standardized Factor Loading (SFL)

The SFL values indicate the strength of the relationship between observed variables and their respective latent constructs. All constructs have SFL values within acceptable ranges, with entrepreneurial thought ranging from 0.950 to 0.754, training and mentorship from 0.969 to 0.932, and financial support from 0.985 to 0.712. These values demonstrate strong relationships between indicators and their respective factors.

All T-values are greater than 24.782, indicating that the factor loadings are statistically significant at a high confidence level. This confirms the robustness of the constructs. AVE values measure the amount of variance captured by the construct relative to the variance due to measurement error. Values above 0.50 are considered acceptable. The AVE values for all constructs exceed this threshold, with entrepreneurial thought at 0.892, training and mentorship at 0.864, and financial support at 0.846, indicating strong convergent validity. CR values assess the overall reliability of the constructs, with values above 0.70 indicating good reliability. All constructs show high CR values, with entrepreneurial thought and financial support both at 0.979, and training and mentorship at 0.955, confirming strong internal consistency.

The results demonstrate that the constructs of Entrepreneurial Thought, Training and Mentorship, and Financial Support have excellent reliability and validity. The high SFL values and T-values confirm strong relationships between observed variables and constructs, while the AVE and CR values indicate robust convergent validity and internal consistency across all constructs.

3.4 Hypotheses Testing and Analysis

Three hypotheses were tested using SEM to examine the relationship between university incubator support (in terms of entrepreneurial thought, training and mentorship, and financial support) and students' entrepreneurial attitudes. Table 4 presents the hypotheses testing results.

Table 4

Hypotheses Testing Results			
Hypothesis	β	T-Value	Hypothesis Result
H1: University incubators promote entrepreneurial activities	0.57	12.879	Supported
H2: Training and mentorship positively impact attitudes	0.46	9.624	Supported
H3: Financial support significantly impacts attitudes	0.38	6.351	Supported

Valuable insights into the relationships between university incubators and entrepreneurial outcomes. The first hypothesis (H1) posits that university incubators promote entrepreneurial activities. This is strongly supported with a path coefficient (β) of 0.57 and a highly significant T-value of 12.879, indicating that university incubators play a pivotal role in fostering entrepreneurship.

The second hypothesis (H2) suggests that training and mentorship positively influence entrepreneurial attitudes. This is also supported, with a β of 0.46 and a T-value of 9.624, demonstrating the importance of structured guidance and mentorship programs in shaping entrepreneurial mindsets.

Finally, the third hypothesis (H3) asserts that financial support significantly impacts entrepreneurial attitudes. The results confirm this relationship with a β of 0.38 and a T-value of 6.351, highlighting the critical role of accessible funding in enhancing entrepreneurial engagement and reducing perceived barriers.

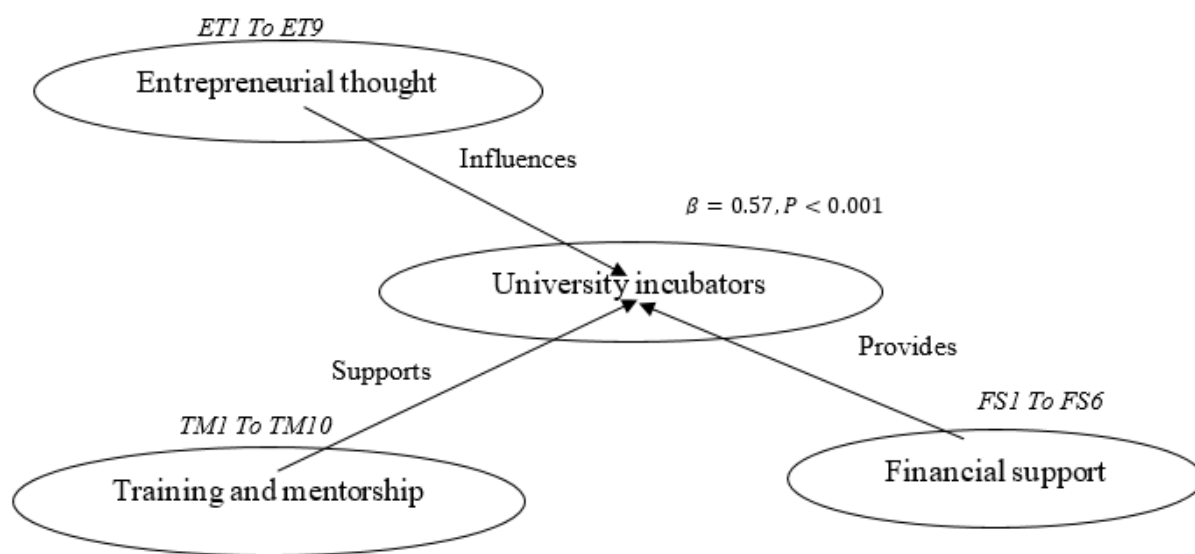


Figure 3. Theoretical Model of the Study.

Source: Authors' own research based on data analysis conducted using Structural Equation Modeling.

The study's theoretical model, as illustrated in Figure 3, highlights the key indicators and relationships that drive the effectiveness of university incubators in fostering entrepreneurial engagement. The model identifies three primary factors contributing to the success of entrepreneurial initiatives: Entrepreneurial Thought (ET), Training and Mentorship (TM), and Financial Support (FS).

ET1 to ET9 represent the indicators of Entrepreneurial Thought, capturing dimensions such as creativity, innovation, and risk-taking propensity. These factors reflect the mindset and behavioral traits that underpin successful entrepreneurial ventures among students.

TM1 to TM10 encompass the Training and Mentorship indicators, which evaluate the influence of structured training programs and mentorship on students' skill development and their ability to transform ideas into viable projects. This dimension emphasizes the critical role of guidance in equipping students for real-world challenges.

FS1 to FS6 measure Financial Support, focusing on the availability of financial resources and the ease of accessing essential funding required to support startup projects. This factor underscores the importance of alleviating financial barriers to foster entrepreneurship.

The regression coefficient ($\beta = 0.57$) and its level of statistical significance ($P < 0.001$) in the model demonstrate a strong and statistically significant relationship between these supporting factors (ET, TM, and FS) and their impact on the effectiveness of university incubators. The high coefficient value indicates that these factors collectively play a substantial role in shaping the entrepreneurial ecosystem within universities, enhancing

engagement, and reducing perceived barriers to entry for students and aspiring entrepreneurs.

This theoretical framework provides a robust foundation for understanding how university incubators can strategically drive entrepreneurial success through targeted support mechanisms.

4. Discussion

The results of the study reveal the significant role of university business incubators in fostering entrepreneurial thinking among students. The findings indicate that structured support systems—comprising training, mentorship, and financial resources—are critical in bridging the gap between theoretical knowledge and practical application. Entrepreneurial Thought was found to have the strongest influence, as evidenced by high standardized factor loadings (SFL ranging from 0.950 to 0.754) and significant regression coefficients ($\beta = 0.57$, $p < 0.001$). This highlights the importance of fostering creativity, innovation, and risk-taking propensity among students.

The impact of Training and Mentorship on entrepreneurial attitudes ($\beta = 0.46$, $p < 0.001$) demonstrates the value of hands-on guidance in equipping students with the skills necessary to turn ideas into viable ventures. Furthermore, Financial Support ($\beta = 0.38$, $p < 0.001$) emerged as a crucial factor in reducing perceived barriers, highlighting the need for accessible funding mechanisms to encourage entrepreneurial engagement.

The results also confirm the reliability and validity of the study's constructs, with high Cronbach's Alpha (ranging from 0.948 to 0.962) and Composite Reliability (CR ranging from 0.955 to 0.979), ensuring the robustness of the measurement scales. The Average Variance Extracted (AVE) values for all constructs exceeded 0.84, affirming strong convergent validity.

The findings underscore the critical role that university business incubators play in developing entrepreneurial ecosystems within academic institutions. By offering tailored support in training, mentorship, and financial assistance, these incubators significantly enhance students' entrepreneurial capabilities. This reflects the broader goal of bridging academic knowledge with practical entrepreneurial application.

Training and Mentorship emerged as a particularly impactful factor, suggesting that beyond formal education, direct guidance and real-world exposure are essential for fostering entrepreneurial readiness. Similarly, Financial Support proved vital, confirming that accessible funding is a key enabler for entrepreneurial engagement, particularly in overcoming initial challenges faced by student entrepreneurs.

These results align with previous research emphasizing the importance of university incubators in reducing uncertainty and creating opportunities for venture development. However, the study also reveals areas for further exploration, such as the role of external factors (e.g., economic or cultural influences) and the long-term impact of incubator support on entrepreneurial success.

The findings suggest that university incubators should prioritize the development of comprehensive training programs, mentorship networks, and accessible financial resources. Collaborative efforts between universities, industries, and policymakers can further enhance the effectiveness of these incubators by expanding their resource base and creating pathways for student entrepreneurs to access markets and funding opportunities.

5. Conclusions

The study highlights the critical role of university business incubators in fostering entrepreneurial thinking and actions among students. The findings demonstrate that structured support systems, including training, mentorship, and financial resources, significantly enhance entrepreneurial attitudes and reduce barriers to venture creation. Entrepreneurial Thought emerged as the most influential factor, emphasizing the importance of fostering creativity, innovation, and risk-taking. Training and Mentorship and Financial Support also played vital roles in equipping students with the necessary skills and resources to navigate the entrepreneurial journey.

These results confirm the reliability and validity of the constructs used in the study and reinforce the need for universities to continue investing in well-rounded incubator programs. By bridging the gap between academic knowledge and real-world application, university business incubators act as a catalyst for entrepreneurial growth, empowering students to turn innovative ideas into successful ventures.

Based on this, we propose actionable steps to enhance the role of university business incubators in fostering entrepreneurship:

1. **Enhance Training and Mentorship Programs.** Universities should develop tailored training programs that focus on practical entrepreneurial skills, including business planning, innovation management, and leadership. Establish strong mentorship networks connecting students with experienced entrepreneurs and industry professionals to provide guidance and real-world insights.
2. **Increase Accessibility to Financial Resources.** Develop financial support mechanisms, such as grants, seed funding, and partnerships with venture capitalists, to ensure students can access the funding needed to launch their ventures. Simplify the process for applying for financial assistance to reduce administrative barriers for student entrepreneurs.
3. **Foster Collaboration with Industry and Government.** Strengthen partnerships between universities, industries, and government bodies to expand the resource base of incubators and create pathways for market access and funding opportunities. Leverage these partnerships to organize events, competitions, and networking opportunities that connect students with potential investors and collaborators.
4. **Integrate Entrepreneurship into Curricula.** Introduce entrepreneurship-focused courses and activities into undergraduate and postgraduate programs to engage students at earlier stages of their academic journey. Encourage interdisciplinary approaches to entrepreneurship by incorporating insights from fields like technology, arts, and social sciences.
5. **Encourage Gender Inclusivity in Entrepreneurial Programs.** Design initiatives and campaigns aimed at increasing female participation in entrepreneurship programs to address the observed gender gap. Provide mentorship and networking opportunities specifically tailored to support women entrepreneurs.

Conflicts of Interest: Authors declare no conflict of interest.

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