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PERCEPTIONS OF A UNIVERSITY INCUBATOR: A STUDY OF ENTREPRENEURSHIP AND INNOVATION AT A PRIVATE UNIVERSITY IN CROATIA

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ABSTRACT

This study explores the role of university incubators in fostering entrepreneurship and innovation within academic community in Croatia, exploring the perspectives of students and faculty. A quantitative approach was used, using a structured questionnaire with closed questions. The data-collection process involved the distribution of a survey questionnaire using Google Forms. The target population ($N = 217$) included undergraduate and graduate students from various study programs as well as teachers involved in professional studies. This study revealed a strong consensus among students and teachers regarding the importance of university incubators in fostering entrepreneurship and innovation. Despite their limited familiarity with incubators (only 12% of the respondents were familiar with their roles), both groups strongly supported their establishment. This research advances our understanding of how to adapt and implement university incubators in specific contexts such as Croatia private university. It provides localized insights into the perceptions of students and teachers, which can be valuable in tailoring incubator strategies to meet local needs. Theoretically, the study highlights the university incubator as a key component of the entrepreneurial ecosystem that bridges academia and industry, supports knowledge transfer, and contributes to economic development by transforming students from job seekers to job creators. Practically, the study provides insights for university administrators and policymakers on establishing and managing effective incubators. It highlights practical strategies such as integrating incubator activities into curricula, providing mentoring and networking opportunities, supporting startups, and fostering interdisciplinary collaboration.

KEY WORDS

university incubators, academic entrepreneurship, innovation, entrepreneurship, entrepreneurial ecosystem

CLASSIFICATION

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INTRODUCTION

University incubators are key elements in fostering entrepreneurship and innovation within academic communities. This could be the result of the changing role of universities, from exclusively teaching to an approach based on economic growth. This university role will contribute more to local, regional and national economic development on a range of "third mission" activities such as innovation, beyond education and research [1]. De Haan et al. [2] stated that academic entrepreneurship in universities allows stakeholders to leverage their expertise and resources to support venture creation and growth.

From a theoretical standpoint, the concept of a university incubator is a crucial element in the development of entrepreneurial skills and commercialization of technology [3]. These incubators provide a platform for students to gain practical experience in entrepreneurship and business, and transform their ideas into viable businesses [4]. Student involvement and the integration of incubators with entrepreneurship curriculum development are key components of a successful university incubator [4, 5]. By implementing incubator concepts, universities can contribute to economic growth, attract entrepreneurial-minded students and faculty, and facilitate the transformation of knowledge into viable businesses, ultimately supporting the development of a sustainable entrepreneurial society [3]. Therefore, university incubators represent a structured approach to supporting and developing entrepreneurial skills among students and faculty members.

The average government expenditure on research and development (R&D) in higher education institution is 0,48% of the GDP in Europe [6]. Thus, the EU's higher education sector shows signs of significant underfunding, especially in light of the increase in the number of students and growing responsibilities of universities [7]. Croatia's economy is ranked 44th in the world by *The Global Innovation Index 2023* which measures innovation performance in relation to the development level. Notably, the R&D sector is ranked 52nd, which is lower than the quality of education ranked in the top 30 countries. As worldwide R&D has expanded by 7% in 2021, a rate that has not been observed since 2014, this is a significant disadvantage for Croatia [8]. This means that Croatia lags behind other countries in R&D expenditures; therefore, investing in a university incubator can facilitate changes in the current trend.

Establishing a university incubator involves the investigation of several concepts. Reyes Acevedo and Ormeño Torres [9] indicate one of the concept refer to entrepreneurial ecosystem where person has to become an entrepreneur. Another concept refers to universities as mediating elements in the transfer of knowledge and scientific research in the field of business [10]. However, establishing such incubators presents challenges and risks that must be considered carefully [11]. Therefore, it is important to emphasize that a university's mission is linked to teaching, research, and society.

The higher education system in Croatia has undergone comprehensive reform within the framework of the Bologna process. Currently, there are 117 higher education institutions [12]. One of the first private universities in Zagreb offers four undergraduate and three graduate programmes at Business School alone. Establishing new capabilities within a university can serve as a catalyst for interdisciplinary innovation, entrepreneurship, and economic development [13]. As Santoso et al. [14] stated that business and management education require teaching students the new skills that entrepreneurs need, including thinking outside the box, knowing how to acquire and utilize new resources, how to start and manage companies, build networks, produce sales, and work effectively in teams. The university incubator framework typically integrates various elements to create a comprehensive learning experience for aspiring entrepreneurs in the university ecosystem. According to Tylżanowski [15] there are various categories of incubators: academic, technological, social and research. The operation of incubators at universities leads to the activation of students in entrepreneurship.

Therefore, university business incubators fill the gap in support of knowledge and technology transfer processes because their offer is addressed to the academic community. Tylżanowski further states that universities participate in building a knowledge-based economy and generating economic growth in the regions where entities are located.

The purpose of this empirical research is to determine the importance of establishing a university incubator at a private university in Zagreb from the perspective of students and teachers as new university capacities that currently do not exist. This private university was specifically chosen for its potential across three faculties and a Business School that alone hosts approximately 1600 students. Currently, there is only one similar private university that integrates incubator services with higher education through mentoring and workshops. In addition, Croatian best practices are visible in incubators such as ZICER (Zagreb Innovation Center), Varaždin Technology Park and Startup Incubator Rijeka. For example, Startup Incubator Rijeka has 173 teams, 435 users, 290 workshops, 889 consultations and 23 companies founded over 11 generations [16]. Unfortunately, these three incubators mentioned are not academic, that is, they do not operate within universities. Therefore, it was necessary to check how popular the services of university incubators are from the perspective of students and teachers.

For this purpose, two hypotheses were developed and tested using descriptive statistics. Although numerous studies have investigated university incubators as places to foster innovation and entrepreneurship, the strength of this study is that it focuses on a private university, which provides a more specific perspective that could help in understanding how university incubators can be modified and applied in different contexts. Data collection using a quantitative methodological research framework offers insights that can be useful in adapting incubator strategies to regional requirements.

THEORETICAL BACKGROUND

As part of its training activity, the university promotes student initiative in entrepreneurial learning by providing advice or by using institutional facilities and equipment [9]. Entrepreneurial learning is no longer only discussed in theory but is also necessary for the implementation of the business plan created during the learning process. This change requires theoretically delivered learning using a learning methodology that is more responsive to the current needs [4]. Lie et al. further discussed the concept of establishing a student entrepreneurial incubator on campus as an effort to create a new entrepreneur who will not be a job seeker, but instead become a job creator.

Noha Ahmed [5] states that the role of traditional universities has changed, and entrepreneurial universities are now required to redirect new knowledge for economic development through business incubators. The “entrepreneurship” competence is one of the main requirements for creating an innovative climate. Motivating students to introduce themselves to the basic concept of entrepreneurship is fundamental [17]. This led universities to amplify their roles where entrepreneurial paradigms are gaining prominence with emergence of entrepreneurial universities. These entities reflect profound shifts in university culture, organizational structure, and external relationships, driven by intense external pressures [1].

Earlier studies of entrepreneurial universities can be classified into patenting and licensing inventions, technology transfer offices, science parks and incubators, academic spinoffs, external teaching and education, academic entrepreneurship, regional growth, and research-led technological innovation [1]. However, despite studies on entrepreneurial universities over the years, this topic remains underexplored [18]. Given this context, Kohn Rådberg and Löfsten [1] stated that the prevailing goal was to establish an innovation milieu that fosters collaboration and exchange, while also enhancing research and education at universities. They concluded that entrepreneurial universities play a pivotal role in advancing research

infrastructure by establishing international connections, nurturing social and business environments, and fostering economic development.

Despite growing research, the entrepreneurial ecosystem remains a vague metaphor, and there is little consensus regarding the causal mechanisms underlying the entrepreneurial ecosystem and innovation outcomes because current research is fragmented and includes a variety of viewpoints [19]. Based on a study by Vaz et al. [20] universities made two primary contributions to this research. The first refers to academia's responsibility to train new students to enter the industry and the second is to establish an environment in which new ideas can potentially turn into new business ventures. Entrepreneurship thrives in higher education and many universities have created incubators with programs to train aspiring business owners and assist them in launching companies. At the core of these activities is the recognition that by providing students with proper and meaningful support, many can flourish in the modern economy [21]. University incubators provide a platform for young entrepreneurs to develop innovative ideas and start-ups, potentially enhancing the university ecosystem and contributing to economic development [22].

According to Reyes Acevedo and Ormeño Torres [9] students increasingly relate their research to the application demands. The incubation process, which involves providing students with information, knowledge, and practical experience in entrepreneurship, is a key factor for enhancing their motivation and competency. Christy and Mingchang [23] provided examples of universities in Singapore's best practices, and emphasized the importance of incubators in integrating professionals, providing training, encouraging start-up engagement, commercializing intellectual property, and connecting academics with entrepreneurs. In Ecuador, while interest in incubators is high, barriers such as bureaucracy and a lack of knowledge hinder their development [24]. In Poland, business incubators have become significant investments in local development, enabling students to combine theoretical knowledge with practical skills [25]. Additionally, Doblinger et al. [26] and Noha Ahmed's [5] studies indicate that public funding for university incubators helps to reduce R&D costs. The conversion of scientific results into new products and services is a key component of the use of research funds [27]. By implementing a comprehensive learning framework, university incubators can create a supportive environment that nurtures entrepreneurial talent and drives innovation in the academic community [28]. Collectively, these studies highlight the important role of university incubators in fostering entrepreneurship and innovation among both students and teachers. This is emphasized by three components: training and education, experience, and student mentoring [14]. In addition to helping students, this strategy enhances the university's standing as a center for economic development and entrepreneurship, which requires further investigation.

HYPOTHESES

This study aims to determine the degree of agreement between students and teachers regarding the function of a university incubator as an initiator of innovation and entrepreneurship at a private university in Zagreb. Therefore, the following hypothesis is proposed:

H_1: Students agree that the university incubator could serve as an initiator of entrepreneurship and innovation at a private university.

H_2: Teachers agree that a university incubator could serve as an initiator of entrepreneurship and innovation at a private university.

In order to support the two hypotheses, the following research questions were submitted:

1) I believe it is important to develop entrepreneurial skills at university.
2) The university should support the establishment of startups.
3) I believe it is important for universities to encourage the exchange of technology that simultaneously enables practical and scientific research.

4) The university should encourage collaboration between scientists and industry experts.
5) I believe universities should develop entrepreneurial education through programs that transform students from job seekers to job creators.

METHODOLOGY

QUANTITATIVE APPROACH

A quantitative approach was used to collect primary data using the methodological instruments of a survey questionnaire distributed to the Business School for undergraduate and graduate professional studies. A structured questionnaire with closed questions was used for the survey. They are widely used in research to collect quantitative data [29] and are particularly useful when obtaining broad insights from a larger group. A 5-point Likert scale was used, ranging from 1 (strongly disagree) to 5 (strongly agree).

DATA COLLECTION

This study involved data collected using Google Forms. That is a popular, free, online survey platform that offers researchers an efficient way to collect data from diverse populations [30]. The data were collected from July 28th to October 28th 2024. It included several invitation letters at monthly intervals. The invitation letters were distributed via the university intranet, where students and teachers had regular access.

RESEARCH PARTICIPANTS

The research was finally completed by 217 respondents, who were distributed from the undergraduate university study programs including business economics ($N = 72$), tourism and hotel management ($N = 55$), sports management ($N = 30$), and business security management ($N = 21$); and the graduate professional study programs including banking, insurance, and financial management ($N = 17$), tourism and hotel management ($N = 17$), and domestic and international trade management ($N = 5$).

DATA ANALYSIS

The statistical significance of the differences between the groups was analyzed using descriptive statistical analysis, which involves calculation of the median, standard deviation, and asymmetry coefficient, usually called the coefficient of skewness (positive or negative). This approach is crucial for establishing a foundation for research analysis because it can be applied to various types of data such as survey results [31]. This approach was chosen because descriptive statistics provide a foundational understanding of the data distribution and can be applied to various types of quantitative data such as Likert scale survey results. It is noted as crucial for establishing a research analysis base, summarizing responses' central tendency, variability, and asymmetry.

Although only descriptive statistics are primarily used, the inclusion of chi-square tests provides inferential support for hypothesis testing. Descriptive statistics provide insight into response tendencies, while chi-square tests statistically show that the observed distributions are significantly different from random or uniform expectations. This combination adequately supports hypothesis testing within the quantitative survey framework used in this study.

RELIABILITY AND VALIDITY OF THE RESEARCH

Cronbach's alpha calculated is approximately 0,87. This value indicates good internal consistency and reliability for the 5-item scale measuring perceptions related to the university incubator, as values above 0,7 are generally considered acceptable for social science research.

The high reliability supports the trustworthiness of the quantitative data collected and the stability of the measured concept. This supports the use of the survey results for meaningful interpretation and hypothesis testing in the study.

In terms of validity, the instrument is based on previous literature, designed to capture directional constructs related to entrepreneurial skills, startup support, technology exchange, collaboration, and educational development – key dimensions for university incubators. Although external validity or generalizability may be limited by sample size and context, the instrument itself demonstrates solid measurement validity within the scope of the study.

RESEARCH FINDINGS

Of the total number of responders, 168 were students (77%) and 49 were teachers (23%). When asked whether they were familiar with the role of the university incubators, 68% answered negatively, 20% were unsure, and 12% were familiar. This question was presented at the very beginning of the survey to determine how familiar respondents were with the role of university incubators. After that, respondents were offered an explanation so that they could continue with the survey. The results clearly showed that there was insufficient knowledge among the academic population about the purpose of university incubators.

The arithmetic mean (M = 4,54) and negative skewness distribution (α = –1,34) in

Table **1** indicate that most students had higher values.

Table 1. Questions to support the hypothesis H_1. Number of students N = 168.

Questions	MIN	MAX	Arithmetic mean	Standard deviation	Asymmetry coefficient
1) I believe it is important to develop entrepreneurial skills at university.	1	5	4,66	0,64	–2,25
2) The university should support the establishment of startups.	2	5	4,36	0,77	–0,79
3) I believe it is important for universities to encourage the exchange of technology that simultaneously enables practical and scientific research.	2	5	4,53	0,66	–1,35
4) The university should encourage collaboration between scientists and industry experts.	3	5	4,53	0,65	–1,05
5) I believe universities should develop entrepreneurial education through programs that transform students from jobseekers to job creators.	2	5	4,63	0,63	–1,65
AVERAGE	**2,2**	**5**	**4,54**	**0,51**	**–1,34**

We conclude that the presented values confirm hypothesis **H_1**: Students agree that university incubators can serve as initiators of entrepreneurship and innovation in private universities.

From the numbers in

Table 2, we can see that the arithmetic mean (M = 4,83) and negative skewness distribution (α = –1,76) indicate that teachers tended to have higher values.

Table 2. Questions to support the **H_2**. Number of teachers N = 49.

Questions	MIN	MAX	Arithmetic mean	Standard deviation	Asymmetry coefficient
1) I believe it is important to develop entrepreneurial skills at university.	1	5	4,82	0,63	–4,93
2) The university should support the establishment of startups.	3	5	4,71	0,61	–2,03
3) I believe it is important for universities to encourage the exchange of technology that simultaneously enables practical and scientific research.	4	5	4,86	0,35	–2,11
4) The university should encourage collaboration between scientists and industry experts.	4	5	4,94	0,24	–3,78
5) I believe universities should develop entrepreneurial education through programs that transform students from jobseekers to job creators.	3	5	4,84	0,43	–2,68
AVERAGE	**3,8**	**5**	**4,83**	**0,28**	**–1,76**

The presented values confirm hypothesis **H_2**. This means that teachers agree that university incubators can serve as initiators of entrepreneurship and innovation at private universities.

Additionally, a chi-square test was performed to compare the deviation of the distribution of the obtained results with a uniform distribution: **H_1** chi-square is 254,8 and **H_2** chi-square is 136. In both cases, the distribution of the results deviated statistically significantly (p < 0,01) from a uniform distribution (therefore higher values prevail (4 and 5)).

The theoretical perspective of university incubators underlines the ***question of the infrastructure*** required for science and education. Reyes Acevedo and Ormeño Torres [9], Noha Ahmed [5], and Mohamed et al. [32] emphasized this direction. Therefore, the following options were provided:

- research places with state-of-the-art hardware and networking,
- the simulation and modeling space provided software support and access to research tools (software development kit, SDK),
- physical space for scientific research and laboratory inventory,
- supporting spaces with intelligent assistants by connecting them to other scientists and industry experts.
- a place to improve cooperation between different study programmes on joint research projects,
- none of the above.

In Figure 1 the distribution of respondents' answers determines the vast majority (30%; N = 70), emphasizing the university incubator as a place to improve cooperation between different study

programs on joint research projects. Academic incubators are becoming essential components of universities, helping recruit and retain entrepreneurial students, instructors, and researchers with an entrepreneurial mindset [3]. However, assessing the effectiveness of university incubators remains challenging due to the lack of systematic evaluation tools [21].

The second most important role was the simulation and modeling space with software support and access to research tools (25%; $N = 46$). This approach allows universities to leverage their unique resources and expertise to support high-technology startups, potentially reaching a broader range of entrepreneurs than traditional incubators do. These incubators provide essential resources and services including infrastructure, funding, mentoring, and networking opportunities[33]. Technological incubators at universities can enhance entrepreneurial growth by offering access to advanced technologies and technical support [32].

The third most important role was to support the space with intelligent assistants (20%; N=40). This role is usually connected to pre-incubation, incubation, and post-incubation programmes to assist students, doctoral candidates, and academics in developing innovative concepts [34]. They provide various forms of support including financial assistance, technical guidance, and mentorship from industry experts [35]. By leveraging their human, organizational, and administrative resources, universities can effectively meet the needs of the industrial sector in conducting research, consulting, and mentoring services, which ultimately positively contributes to reducing the risks associated with the implementation of business ideas and strengthening local economies. Digital technologies, particularly social, mobile, analytics, and cloud tools, facilitate interactions within university incubators and the broader entrepreneurial ecosystem, although they are currently underutilized [36].

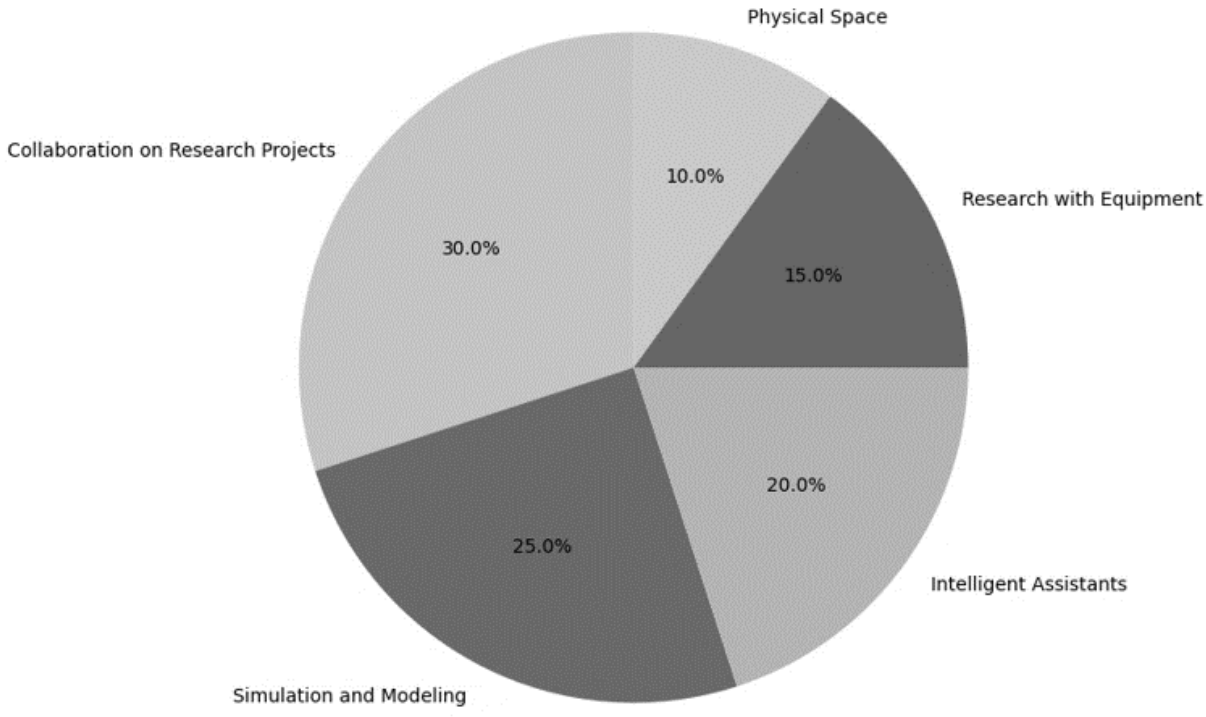

Figure 1. Preferred roles of the university incubator.

Finally, the roles that respondents considered the least important for university incubators included research with cutting-edge hardware and networking (15%; $N = 33$), lab inventory (10%; $N = 33$), and physical space for scientific research (10%; $N = 20$). Eight respondents did not consider any of the offered answers important for the role of the university incubator. **Error! Reference source not found.** highlights the strong emphasis on collaboration and access to advanced tools over the physical infrastructure. Both students and teachers strongly

support initiatives related to entrepreneurship and innovation with minor differences in emphasis. The university incubator views collaboration in research projects as its most critical role with access to advanced tools and networking capabilities following closely behind. Alignment between students and teachers suggests a shared vision of fostering an entrepreneurial ecosystem in university settings.

Figure 2 presents the average ratings of the students and teachers across the five categories. Both students and teachers show strong support for entrepreneurial initiatives with slight variations in their priorities.

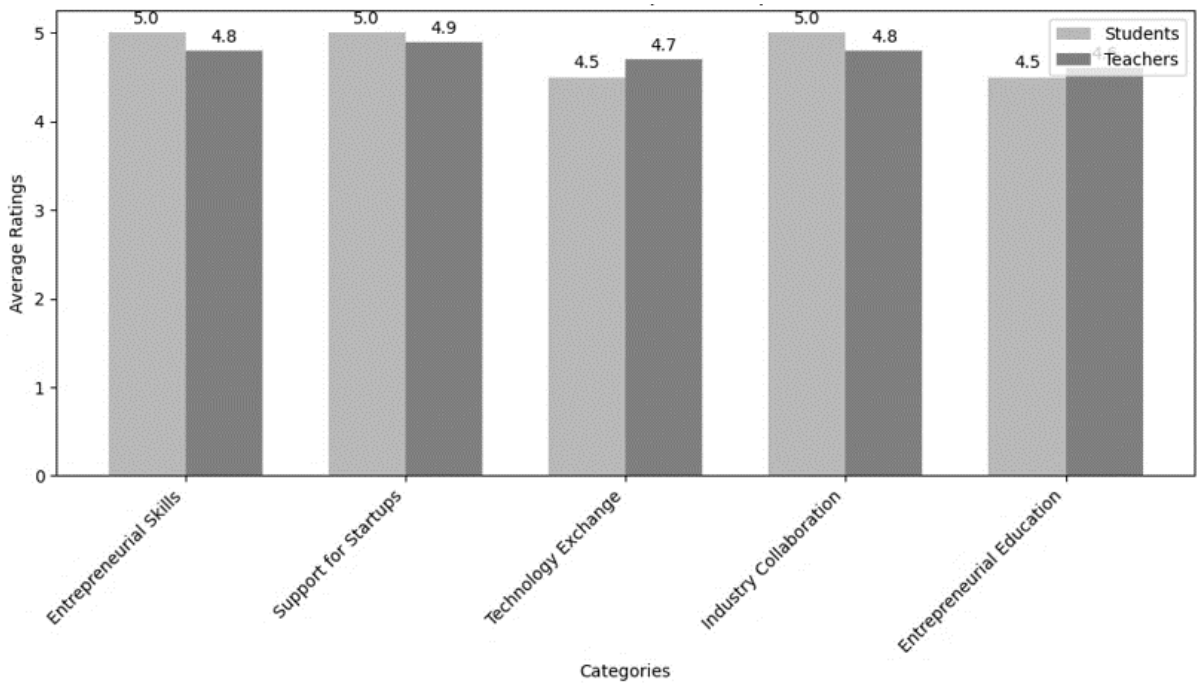

Figure 2. General attitudes toward entrepreneurship and innovation.

Collaboration between study programs is a top priority for incubators, as shown in both the graphs. There is significant interest in leveraging advanced tools, such as simulation software and intelligent assistants, to enhance research and innovation efforts. These visuals effectively summarize the survey results, offering a clear understanding of preferences and attitudes toward entrepreneurship at private university.

DISCUSSIONS

There is certainly a strong consensus among respondents that the university incubator is a multifaceted entity, that value its role in fostering collaboration, providing technical resources, and connecting academia with industry. Boudendouna and Mounir [37] describe the importance of academic startups, specifically those established through the utilization of university-owned assets, and appraise their performance using three pivotal metrics: funding, innovation, and incubators.

University incubators engage multiple stakeholder groups with distinct roles and expectations. In this study, students saw university incubators as places that connect them with scientists and industry experts. Students consistently emerged as primary beneficiaries across all studies, with their roles spanning from passive learners to active contributors in business development. Teachers highlight the incubator's function in attracting and choosing students with creative ideas while also delivering scientific and technical competence, training, and supervision. Similar to other studies, faculty involvement varied significantly across contexts. Business

academic faculty at Stony Brook supported and coordinated inventor, entrepreneur, and investor roles [38], while academics at the University of the West of Scotland engaged in teaching, mentoring, and research within incubator spaces [39]. Although not mentioned directly, Table 3 illustrates the potential for subtle variations as we computed averages and standard deviations to evaluate the response variability for every category. Students might focus more on practical benefits such as access to resources and networking opportunities. Teachers placed slightly more emphasis on technology exchange (+0,2) and entrepreneurial education (+0,1), indicating interest in integrating advanced tools and educational frameworks into innovation. It is important to note that these inferences were based on limited information from search results.

Table 3. Averages and standard deviations according to observed category.

Category	Students (Avg.)	Students (SD)	Teachers (Avg.)	Teachers (SD)
Entrepreneurial Skills	5,0	±0	4,8	±0,2
Support for Startups	5,0	±0	4,9	±0,1
Technology Exchange	4,5	±0,3	4,7	±0,2
Industry Collaboration	5,0	±0	4,8	±0,2
Entrepreneurial Education	4,5	±0,3	4,6	±0,2

The results show the demand for a thorough entrepreneurial ecosystem at universities. For example, Moraes et al. research [40] indicates that traditional approaches to foment entrepreneurship are less effective than nurturing linkages between universities and the broader entrepreneurial ecosystem and that private universities are more effective in promoting entrepreneurial behavior. From a practical standpoint, their assessment suggests the need for universities to approach entrepreneurial education more flexibly and to foster interactions with the industry.

Respondents are likely to appreciate the general concept of entrepreneurship and innovation and perceive incubators as positive drivers aligned with these goals, even without detailed knowledge. This reflects the underlying aspiration of university environments to actively support economic development and job creation. The high level of support may also be influenced by the explanations about incubators provided during the survey, which occurred after initial unfamiliarity was noted. This education may have shaped positive attitudes regardless of prior direct experience.

However, limited knowledge points to potential gaps in practical understanding and highlights the need for comprehensive awareness and education campaigns to ensure that stakeholders can fully benefit from and contribute to incubator activities. The variation in awareness approaches correlates with stakeholder familiarity with entrepreneurship concepts. Institutions in established entrepreneurial ecosystems, such as Stony Brook [38] implemented advanced programs assuming baseline entrepreneurial literacy, focusing on specialized skills like business model development and investment readiness. This gap between strong support and limited familiarity cautions against overestimating the immediate impact of incubators without concurrent capacity building and clear communication of roles and benefits. For example, communication approaches varied from highly structured to informal. The University of the West of Scotland implemented formal sessions, mentoring, and student-focused events throughout the academic year with periodic reporting [39]. Data collection methods for stakeholder engagement included semi-structured interviews and surveys at the Ecuadorian university [24], while Jordanian universities used questionnaires as formal, one-way communication tools [41]. Several studies provided limited or no specific information about communication methods [38], suggesting this may be an underdeveloped aspect of incubator operations.

There is also a significant interest in integrating advanced technology and software tools into universities' entrepreneurial and research activities. Faculty start-ups highlight the

interconnected nature of university innovation ecosystems [42]. Digital innovation platforms can enhance an organic product initiative at a university but do not address the effect of research grants or startup initiatives. The high preference for collaboration between different study programs suggests recognition of the value of interdisciplinary approaches to innovation and research. This analysis suggests that private universities have a strong foundation for the development of a robust entrepreneurial and innovative environment with both students and teachers aligned with their importance and potential benefits. Findings call for practical strategies to bridge the awareness gap and foster deeper participation in entrepreneurial ecosystems at universities.

CONCLUSIONS

Both groups strongly supported the role of incubators in enhancing collaboration between different study programs, providing access to advanced tools, and facilitating connections with industry experts. Although academics are unfamiliar with incubators, there is a clear desire for a comprehensive entrepreneurial ecosystem incorporating industrial connections, start-up support, and skills development. This aligns with broader trends in academic entrepreneurship, where universities are increasingly seen as catalysts for economic growth through the commercialization of research and innovation.

Descriptive statistics showed high mean values and negative skewness, indicating strong agreement. Additionally, a chi-square test confirmed the deviations were statistically significant ($p < 0,01$), supporting the hypotheses.

This study advances existing knowledge beyond simply describing perceptions by quantitatively validating stakeholder attitudes through rigorous reliability analysis such as Cronbach's alpha measurement (0,87 suggests that the scale is reliable enough for use, according to a general rule of thumb) and placing these insights in the practical context of university policy readiness. By uncovering the gap between positive attitudes and limited knowledge, it highlights the critical need for focused capacity building, bridging conceptual support with practical engagement. Consequently, it informs the tailored design of interventions to improve the success of incubation and the impact of innovation at Croatian universities, marking a valuable empirical contribution to the discourse on education and innovation policy. Specifically, is highlighted the importance of partnerships between the academic community, industry experts and government bodies. This important role of external stakeholders has already been addressed in similar studies such as Wolfs [38] where mentors of serial entrepreneurs has been identified for guidance and expertise. Therefore, companies and academic institutions need to work closely together to create a favorable entrepreneurial environment, which is a key emphasis in the Croatian competitiveness and smart specialization program.

THEORETICAL IMPLICATIONS

This study emphasizes the importance of university incubators for fostering an environment that encourages entrepreneurship. By connecting academics with industry, this ecosystem not only encourages innovation, but also strengthens the university's contribution to economic development. They contribute to economic growth by developing human capital, advancing technology, and by participating in economic development [43]. This is important, because entrepreneurship is greatly facilitated by a university's backing. Farrell et al. [44] addressed the paucity of academic entrepreneurial research in low- and middle-income countries by identifying specific factors that inhibit entrepreneurs' transition from entrepreneurial intention to entrepreneurial action.

Interdisciplinary cooperation also has several implications. The focus on cooperation among various academic programmes implies that interdisciplinary methods are essential for

creativity. Innovation incubators provide guidance, resources, and networking opportunities, enabling interdisciplinary collaboration and mentorship programmes to develop entrepreneurial skills [45]. As Yuliana et al. [28] stated, the educational system should create a favorable environment that enables young people to develop their mindset from employees to employers and prepare them to improve their skills and knowledge to create jobs. These challenges put the conventional partitioned systems of education to the test and promote a holistic approach to entrepreneurial education.

Finally, the preference for advanced tools and digital technologies highlights their potential to enhance research and innovation in university incubators. They provide new opportunities for entrepreneurial activity [46]. This aligns with the broader trends in leveraging technology to facilitate entrepreneurship and innovation. Singh et al. [47] stated that the interconnection between entrepreneurship, technology, and innovation is growing, and requires consolidation.

PRACTICAL IMPLICATIONS

From a practical standpoint, the creation of incubators that emphasize interdisciplinary collaboration, access to advanced tools, and industry contact should be top priorities for universities. Strategic planning is required to integrate incubator activities within existing curricula and research initiatives. Entrepreneurial education should be tailored to develop students as job creators rather than job seekers [5]. Key strategies include integrating entrepreneurship into curricula, providing financial support, establishing incubators and co-working spaces, and offering mentoring programmes [22]. Universities should effectively allocate resources to support incubator activities including funding infrastructure, mentorship programs, and networking opportunities. Incubators in higher education benefit from access to resources, mentoring, networking opportunities, and funding support while facing challenges such as limited funding and institutional constraints [48]. Public funding can play a critical role in reducing R&D costs and facilitating research commercialization [49].

Students must fortify their relationships with industry professionals because they offer mentorship and real-world experience. Therefore, key collaboration types include mentorship and networking at the individual, organizational, and institutional levels [50]. This can enhance the incubator's effectiveness in launching successful startups and contribute to local economic development. In **Error! Reference source not found.** the practical implications of the outlined strategies for university incubators emphasize that universities should proactively design and integrate incubator activities to maximize their impact on students and the regional economy.

Overall, these practical considerations form a roadmap for universities to build effective incubators, acting as hubs for knowledge sharing, business creation and the growth of regional innovation, ultimately preparing students to be proactive contributors to the economy, not just job seekers. This strategic integration benefits students, universities, industry and the wider community.

LIMITATIONS AND FUTURE RESEARCH

The research focused on a single private university in Zagreb limits applicability to other types of institutions (public universities, polytechnics) or regions due to organizational, financial, or cultural differences. The relatively small sample of 178 participants, skewed toward undergraduate students and faculty – *and under-representing graduate students* ($N = 39$) – may compromise validity and comprehensive insight into all incubator stakeholders. Therefore, future studies should include a broader range of faculties and settings to increase the relevance of these findings, including a higher percentage of graduate students (e.g., more experienced).

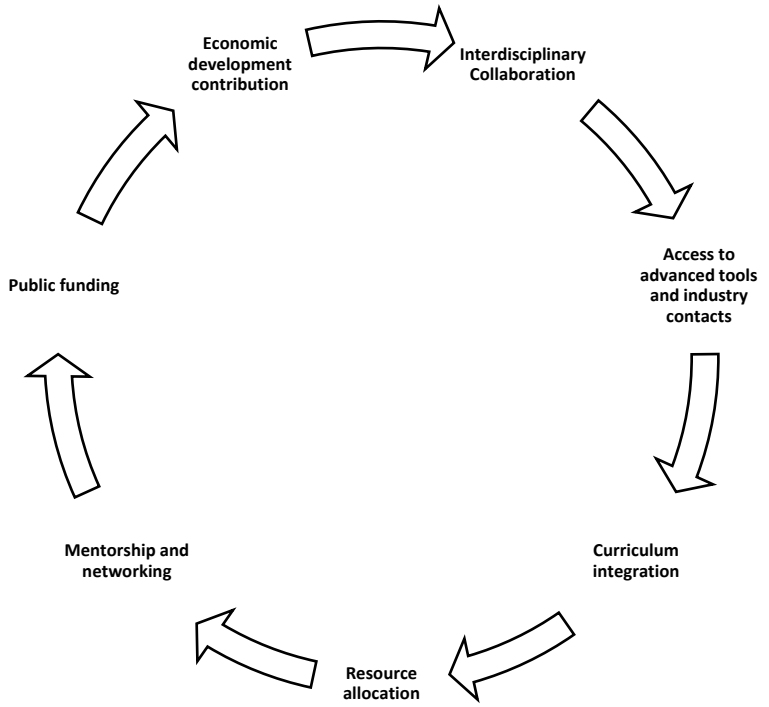

Figure 3. Key practical implications. Adapted from [5, 22, 48-50].

University incubators often face financial challenges, including limited funding and difficulties accessing resources [48]. This can hinder the entrepreneurs' ability to provide comprehensive support. While there is strong emphasis on integrating entrepreneurial education into university curricula, more work is needed to ensure that these programs are effectively aligned with incubator activities and industry needs. For example, future research could include comparative analyses of public and private university incubators across different regions to provide insights into best practices and challenges. It is methodologically challenging to determine the exact impact of university knowledge flows on startup success, with firms' absorptive capacity and contractual/licensing mechanisms playing crucial but variably measured roles.

Investigating innovative entrepreneurial education models that integrate theoretical knowledge with practical incubator experience can enhance incubators' effectiveness in fostering entrepreneurship. Donaldson and Villagrasa [51] presented an integrative approach at the EDEM Business School, combining formal curriculum with out-of-curriculum activities to provide a holistic learning experience for aspiring entrepreneurs. This model aims to equip students with the essential knowledge, skills, and networks. This approach can be replicated at both public and private universities. Additionally, studying the specific economic impacts of university incubators on local communities can help policymakers understand their roles in regional development. These incubators serve as platforms for entrepreneurial ecosystems and bridge gaps between universities and local communities [46].

The research focused primarily on general perceptions at a private Croatian university, emphasizing the overall value of incubators in fostering entrepreneurship and innovation across various disciplines, with reference to economic development and educational impacts, but without a targeted comparative study across STEM and economic fields or institution types. The research highlights private-sector perspectives, noting the potential for private universities to tailor incubator strategies to local needs and the alignment of students and faculty on incubator value. While references are made to Croatian best practices (such as Startup Incubator Rijeka), these are not strictly academic incubators and a direct comparison with public university incubators is not made.

The prevailing consensus among the academic community is that there is no development of society without the support of its most creative and innovative aspects, namely the academic community. The Croatian economy is largely (90%) based on micro, small and medium-sized enterprises that do not have sufficient human and financial resources to independently develop innovative services and products or to establish R&D centers [52]. Therefore, they will need the support from the academic community. The latest Global Innovation Index (GII) report [53] states that Croatia's weaknesses continue to be university-industry research collaboration (ranked 101st). While Croatia's innovation performance in relation to economic development is now in line with expectations (previously being below average), GII results continue to reflect moderate innovation performance with significant strengths in infrastructure and education. It is therefore safe to say that the biggest innovation hubs are public and private universities, which need to be connected to enterprises to improve collaboration and the innovation ecosystem.

In this study the global perspective is discussed in terms of literature and general best practices, but without direct comparative data between study areas or types of institutions. The findings highlight the importance and high support for incubators in all fields and types, but do not measure or compare their effects in these categories. Long-term benefits for the economy and society arise from strengthening academic entrepreneurship that connects investors, industry experts and other stakeholders.

REFERENCES

[1] Kohn Rådberg, K. and Löfsten, H.: *The entrepreneurial university and development of large-scale research infrastructure: exploring the emerging university function of collaboration and leadership*.
The Journal of Technology Transfer **49**, 334-366, 2023,
http://dx.doi.org/10.1007/s10961-023-10033-x,

[2] de Haan, U.; Shwartz, S.C. and Gómez-Baquero, F.: *A startup postdoc program as a channel for university technology transfer: the case of the Runway Startup Postdoc Program at the Jacobs Technion–Cornell Institute at Cornell Tech*.
The Journal of Technology Transfer **45**, 1611-1633, 2020,
http://dx.doi.org/10.1007/s10961-019-09764-7,

[3] Budac, C. and Ilie, L.: *Academic Business Incubators as a Tool in Implementing Entrepreneurship Education – Theoretical Approach*.
Studies in Business and Economics **19**(2), 37-48, 2024,
http://dx.doi.org/10.2478/sbe-2024-0023,

[4] Lie, L.; Andraini, F. and Novita, M.: *Incubation of creative industry and information technology business based on stikubank university (case study of sbs incubator stikubank university)*.
International Conference of Banking, Accounting, Management and Economics (ICOBAME). Magelang, pp.194-201, 2016,

[5] Noha Ahmed, H.: *University business incubators as a tool for accelerating entrepreneurship: theoretical perspective*.
Review of Economics and Political Science **9**(5), 434-453, 2020,
http://dx.doi.org/10.1108/REPS-10-2019-0142,

[6] Eurostat: *R&D expenditure*.
https://ec.europa.eu/eurostat/statistics-explained/index.php?title=R%26D_expenditure, accessed 26th June 2024,

[7] European Commission: *Communication from the Commission to the European parliament, the Council, the European economic and social committee and the Committee of the regions.*
European Commission, Strasbourg, 2022,

[8] WIPO: *The Global Innovation Index 2023.* https://www.wipo.int/global_innovation_index/en/2023, accessed 25th June 2024,

[9] Reyes Acevedo, J.E. and Ormeño Torres, Y.N.: *Implementation model of spinoff incubator in non institutionalized universities*. Journal of Global Management Sciences **2**(1), 15-21, 2019, http://dx.doi.org/10.32829/gms.v2i1.108,

[10] Kobylińska, U. and Irimia-Dieguez, A.: *Sustainable university – Knowledge and technology transfer channels to enterprises*. Economics and Environment **86**(3), 527-555, 2023, http://dx.doi.org/10.34659/eis.2023.86.3.668,

[11] Murray, A.: *Supporting academic entrepreneurship: a blueprint for a university based business incubator*. https://www.researchgate.net/publication/369385076_Supporting_academic_entrepreneurship_a_blueprint_for_a_university_based_business_incubator, accessed 25th June 2024,

[12] Eurydice: *Higher education*. https://eurydice.eacea.ec.europa.eu/national-education-systems/croatia/higher-education, accessed 7th March 2025,

[13] Heaton, S.; Lewin, D. and Teece, D.J.: *Managing campus entrepreneurship: Dynamic capabilities and university leadership*. Managerial and Decision Economics **41**(6), 1126-1140, 2019, http://dx.doi.org/10.1002/mde.3015,

[14] Santoso, T.R.; Junaedi, W.I.; Priyanto, S. and Santoso, D.: *Creating a startup at a University by using Shane's theory and the entrepreneural learning model: a narrative method*. Journal of Innovation and Entrepreneurship **10**, No. 21, 2021, http://dx.doi.org/10.1186/s13731-021-00162-8,

[15] Tylżanowski, R.: *University business incubators and their importance for beginners*. Scientific Papers of Silesian University of Technology – Organization and Management Series No. 176. Silesian University of Technology, 2023, http://dx.doi.org/10.29119/1641-3466.2023.176.43,

[16] Potępa, D.: *Best Startup Accelerators And Incubators In Croatia*. https://www.vestbee.com/insights/articles/best-startup-accelerators-and-incubators-in-croatia, accessed 16th November 2025,

[17] Patrignani, N. and Mogliotti, P.: *Case study: I3P, the innovative enterprises incubator of Politecnico di Torino, Italy*. In: Jasieński, M.; Kotra, J. and Ünür Yılmaz, E.: *A roadmap to a successful incubator*. Bursa Technical University, Bursa, pp.68-79, 2018, https://ec.europa.eu/programmes/erasmus-plus/project-result-content/62430d97-ec5d-476f-84dd-c74731e5beb6/A%20Roadmap%20to%20a%20Successful%20Incubator.pdf,

[18] Secundo, G.; Rippa, P. and Cerchione, R.: *Digital academic entrepreneurship: A structured literature review and avenue for a research agenda*. Technological Forecasting and Social Change **157**, No. 120118, 2020, http://dx.doi.org/10.1016/j.techfore.2020.120118,

[19] Chaudhary, S.: Kaur, P.; Ferraris, A.; Bresciani, S. and Dhir, A.: *Connecting entrepreneurial ecosystem and innovation. Grasping at straws or hitting a home run?* Technovation **130**, No. 102942, 2024, http://dx.doi.org/10.1016/j.technovation.2023.102942,

[20] Vaz, R.; Vidal de Carvalho, J. and Teixeira, S.: *Developing a Digital Business Incubator Model to Foster Entrepreneurship, Business Growth, and Academia–Industry Connections*. Sustainability **15**(9), No. 7209, 2023, http://dx.doi.org/10.3390/su15097209,

[21] Bennett, D.; Pérez-Bustamante Yábar, D. and Saura, J.: *University Incubators May Be Socially Valuable, but How Effective Are They? A Case Study on Business Incubators at Universities*.
In: Peris-Ortiz, M.; Gómez, J.; Merigó-Lindahl, J. and Rueda-Armengot, C., eds.: *Entrepreneurial Universities. Innovation, Technology, and Knowledge Management*. Springer, Cham, pp.165-177, 2017, http://dx.doi.org/10.1007/978-3-319-47949-1_11,

[22] Arakerimath, A.R. and Chavan, C.S.: *Review and Development of Innopreneurship Model to Enhance the University Ecosystem*.
International Journal of Scientific Research in Engineering and Management **8**(8), 1-7, 2024, http://dx.doi.org/10.55041/ijsrem37192,

[23] Christy, N. and Mingchang, W.: *A study on the implementation approaches of University Incubation Centres to reinforce entrepreneurship - taking the example of Singapore*.
International Journal of Contemporary Management **57**(3), 39-49, 2021, http://dx.doi.org/10.2478/ijcm-2021-0009,

[24] Sanata-Moreira, J.I.: *University incubators in Ecuador as means of development*.
International Journal of Business, Economics & Management **7**(3), 124-130, 2024, http://dx.doi.org/10.21744/ijbem.v7n3.2292,

[25] Siemieniuk, Ł.: *Academic business incubators as an institutional form of academic entrepreneurship development in Poland*.
Oeconomia Copernicana **7**(1), 143-159, 2016, http://dx.doi.org/10.12775/OeC.2016.010,

[26] Doblinger, C.: Surana, K. and Diaz Anadon, L.: *Governments as partners: The role of alliances in U.S. cleantech startup innovation.*
Research Policy **48**(6), 1458-1475, 2019, http://dx.doi.org/10.1016/j.respol.2019.02.006,

[27] Shenkoya, T.; Yun Hwang, K. and Sung, E.: *Student Startup: Understanding the Role of the University in Making Startups Profitable Through University—Industry Collaboration*.
SAGE Open **13**(3), 2023, http://dx.doi.org/10.1177/21582440231198601,

[28] Yuliana, E.; Putro, U.; Hermawan, P. and Ghina, A.: *Viable System Model as A Framework for Value Co-Creation Service System Analysis of Technology-based Business Incubator*.
Jurnal Manajemen Indonesia **23**(1), 36-47, 2023, http://dx.doi.org/10.25124/jmi.v23i1.4674,

[29] Chyung, S.Y.; Kennedy, M. and Campbell, I.: *Evidence-Based Survey Design: The Use of Ascending or Descending Order of Likert-Type Response Options*.
Performance Improvement **57**(9), 9-16, 2018, http://dx.doi.org/10.1002/PFI.21800,

[30] Mondal, H.; Mondal, S.; Ghosal, T. and Mondal, S.: *Using Google Forms for Medical Survey: A Technical Note*.
International Journal of Clinical and Experimental Physiology **5**(4), 216-218, 2019, http://dx.doi.org/10.5530/IJCEP.2018.5.4.26,

[31] Sharma, S.K.; Kanchan, T. and Krishan, K.: *Descriptive Statistics.*
The Encyclopedia of Archaeological Sciences, Wiley & Sons, 2018, http://dx.doi.org/10.1002/9781119188230.saseas0165,

[32] Mohamed, W., et al.: *The role of technological incubators in fostering entrepreneurial growth: the case of Egyptian universities and research centres*.
Insights into Regional Development **6**(3), 85-97, 2024, http://dx.doi.org/10.70132/d2467724723,

[33] Halim, F.; Gunawan and Agustina: *Digital-Based Incubator Framework Modelling for University*.
International Journal of E-Entrepreneurship and Innovation (IJEEI) **10**(1), 14-27, 2020, http://dx.doi.org/10.4018/ijeei.2020010102,

[34] Rudawska, J.: *The incubation programme as an instrument for supporting business ideas at university. An example from Poland*.
Zeszyty Naukowe Uniwersytetu Przyrodniczo-Humanistycznego. Seria Administracja i Zarządzanie **52**(125), 5-14, 2020,
http://dx.doi.org/10.34739/zn.2020.52.01,

[35] Benchaa, O.; Mekhnane, O. and Zouaouid, L.: *The role of the university business incubators in accompanying and supporting the innovative projects in the light of decree 1275 – a pilot study from the perspective of Ghardaia University students*.
International Journal of Professional Business Review **9**(8), No. e04878, 2024,
http://dx.doi.org/10.26668/businessreview/2024.v9i8.4878,

[36] Chan, Y.E.; Krishnamurthy, R. and Sadreddin, A.: *Digitally-enabled university incubation processes*.
Technovation **118**, No. 102560, 2022,
http://dx.doi.org/10.1016/j.technovation.2022.102560,

[37] Boudendouna, M.A. and Mounir, L.: *Academic Start-ups: International Experiences*.
European Economic Letters, **14**(2), 1832-1841, 2024,
http://dx.doi.org/10.52783/eel.v14i2.1512,

[38] Wolf, G.: *Entrepreneurial university: a case study at Stony Brook University*.
Journal of Management Development **36**(2), 286-294, 2017,
http://dx.doi.org/10.1108/JMD-06-2016-0113,

[39] Crammond, R.J.: *Entrenching the enterprise message through innovative incubators: Asserting pedagogical principles towards assisted academic practice*.
Journal of Perspectives in Applied Academic Practice **11**(3), 111-123, 2023,
http://dx.doi.org/10.56433/jpaap.v11i3.591,

[40] de Moraes, G.H.S.M.; Fischer, B.B.; Guerrero, M.; da Rocha, A.K.L. and Rücker Schaeffer, P.: *An inquiry into the linkages between university ecosystem and students' entrepreneurial intention and self-efficacy*.
Innovations in Education and Teaching International **60**(1), 134-145, 2021,
http://dx.doi.org/10.1080/14703297.2021.1969262,

[41] Al-Mimi, F.R.H.; Rasmi, M.; Aldahoud, A. and AlWadi, B.M.: *The Role of Business Incubators in Promoting Entrepreneurship of Higher Education Institutions*.
Journal of Namibian Studies **33**(S1), 906-924, 2023,
http://dx.doi.org/10.59670/jns.v33i.470,

[42] Lee, Y. and Lee, Y.-H.: *University Start-Ups: The Relationship between Faculty Start-Ups and Student Start-Ups*.
Sustainability **12**(21), No. 9015, 2020,
http://dx.doi.org/10.3390/su12219015,

[43] Heaton, S.; Siegel, D.S. and Teece, D.J.: *Universities and innovation ecosystems: a dynamic capabilities perspective*.
Industrial and Corporate Change **28**(4), 921-939, 2019,
http://dx.doi.org/10.1093/icc/dtz038,

[44] Farrell, A.A., et al.: *Consensus study on factors influencing the academic entrepreneur in a middle-income country's university enterprise*.
Journal of Entrepreneurship in Emerging Economies **16**(5), 1409-1430, 2024,
http://dx.doi.org/10.1108/JEEE-08-2022-0241,

[45] Dulović, T.; Pajović, S.; Mladenović, P. and Grković, V.: *The Impact of the KVINK Innovation Incubator on the Development of the Startup Ecosystem at the Faculty of Mechanical and Civil Engineering in Kraljevo*.
In: *10th International Scientific Conference Technics, Informatics and Education*. University of Kragujevac – Faculty of Technical Sciences Čačak, Čačak, pp.448-455, 2024,
http://dx.doi.org/10.46793/TIE24.448D,

[46] Lamine, W.; Fayolle, A.; Jack, S. and Audretsch, D.: *Impact of digital technologies on entrepreneurship: Taking stock and looking forward*.
Technovation **126**, No. 102823, 2023,
http://dx.doi.org/10.1016/j.technovation.2023.102823,

[47] Singh, S.; Singh, S. and Dhir, S.: *The evolving relationship of entrepreneurship, technology, and innovation: A topic modeling perspective.*
International Journal of Entrepreneurship and Innovation **27**(1), 91-110, 2023,
http://dx.doi.org/10.1177/14657503231179597,

[48] Rukmana, A.Y.; Meltareza, R.; Harto, B.; Komalasari, O. and Harnani, N.: *Optimizing the Role of Business Incubators in Higher Education: A Review of Supporting Factors and Barriers*.
West Science Business and Management **1**(03), 169-175, 2023,
http://dx.doi.org/10.58812/wsbm.v1i03.96,

[49] Wang, I-C. and Qian, L.: *Technology vs Market Knowledge: How can Public Funding Aid Commercialization and Industry Emergence?*
Academy of Management Proceedings **2023**(1), 2023,
http://dx.doi.org/10.5465/AMPROC.2023.15799abstract,

[50] Kazhenov, S.: *University business incubators and opportunities for collaboration with companies within the start-up 2*.
Global Journal of Business, Economics and Management: Current Issues **13**(1), 106-114, 2023,
http://dx.doi.org/10.18844/gjbem.v13i1.8452,

[51] Donaldson, C. and Villagrasa, J.: *Integrative Entrepreneurship Education: The Case of EDEM Business School*.
Journal of Management and Business Education **7**(3), 419-434, 2024,
http://dx.doi.org/10.35564/jmbe.2024.0023,

[52] Vitas, Z.: *It is known how Croatia stands among 132 countries: "Given the current support, we will not progress"*. In Croatian.
https://www.vecernji.hr/vijesti/poznato-kako-hrvatska-stoji-medu-132-zemlje-s-obzirom-na-trenutnu-potporu-necemo-napredovati-1713288, accessed 14th February 2025,

[53] WIPO: *Global Innovation Index 2025: Innovation at a Crossroads*. 18th edition.
WIPO, Geneva, 2024,
https://www.wipo.int/web-publications/global-innovation-index-2025/en/index.html, accessed 16th November 2025.