ENTRANCE: Enhancing the ENTRepreneurial mindset of non-business Academics in Europe

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Contents

Project Partners 3

1. Introduction 4

2. Background information about Portugal 4

2.1 Emphasis to entrepreneurial activity 5

2.2 Emphasis to Entrepreneurial Education 5

3. Collection of best practices from secondary research 5

3.1 Scientific articles 6

Scientific article 1 6

Scientific article 2 6

3.2 National & International programmes 7

National programmes 7

International programmes 7

4. Primary research 8

4.1 Summary of findings from the survey for non-business academics 8

4.2 Summary of findings from the interviews with industry experts 9

5. Conclusions 10

References 11

Appendices 12

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1. Introduction

Developing entrepreneurial competences, through the stimulus of education for entrepreneurship (EE), is one of the main objectives of the Europe 2020 strategy (European Commission, 2015). Although many countries have implemented EE since the 90s, in 2002, Portugal was identified as the only EU country to have developed actions aiming to stimulate the entrepreneurial spirit. However, only in 2006 did the first project emerge, conceived and implemented under the authority of the Ministry of Education's Board of Innovation and Curricular Development, in the form of the *National Plan of Education for Entrepreneurship (PNEE)* (Teixeira, 2012), concluding that students developed various key competences such as self-confidence, assuming risks, capacity for initiative, planning, organisation, resistance to frustration, creativity, innovation, inter-personal relations and strengthened communication capacity.

Regarding EE in Higher Education Institutions (HEI), this was promoted and implemented from 2000, despite the existence of some courses already in the 90s. The year 2003 is indicated as confirmation of EE in HEIs, with 27 entrepreneurship courses in operation. A positive effect was noted, characterised by rapid growth due to recognising entrepreneurship as a bonus in students' training. In this scenario, Portugal has focused on EE and on creating structures to support development of the entrepreneurial spirit in university students (Redford, 2006).

A debate remains about what methodologies should be adopted in EE programmes, as a way to maximize learning about entrepreneurship. These programmes should always be designed with a view to reproducing as faithfully as possible the contexts in which entrepreneurs act, and should be based on experimental learning techniques that can accelerate the pedagogical effect, stimulating motivation and the development of relational dimensions among participants (Silva et al., 2013). Some EE programmes in Portugal have used digital tools as platforms to activate business ideas, in order to bring the community closer together, while others have opted for more conventional structures, allying theoretical aspects to practical components, developing business ideas based on innovative products/services, centred on 'learning by doing' processes in stimulating creativity (Gomes, 2020).

2. Background information about Portugal

Portugal is situated on the edge of Western Europe, with Lisbon being its capital and largest city. It has a population of 10 295 909, distributed over an area of 92 090 km², with a population density of 115,3/km², bordering with Spain in the North and East and the Atlantic Ocean on the West and South. The official language is Portuguese, which it shares with eight other countries and is spoken by 273 million people worldwide (5th most spoken).

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2.1 Emphasis to entrepreneurial activity

Forecast GDP (PPP) for 2020 is US$ 339,948 billion (50th position) and GDP per capita is US$ 33 131, having an HDI considered very high (0.864 - 38th in the world). According to the *Global Innovation Index* (GII - 2020), the environment to develop business is one of the country's strengths (score of 85.5, 18th in the ranking), although the difficulty of access to credit is one of the main threats to entrepreneurs (score 45, 101st in the ranking), as well as levels of investment (29.2, 96th in the ranking). However, the country is well regarded concerning levels of education (57.2, 22nd in the ranking), presenting growth in *Total Early-Stage Entrepreneurial Activity* (TEA) (12.9%, 20th in the ranking in 2019/2020), and being the 34th most competitive country in the world (WEF).

Concerning start-ups, according to Ecommercenews.pt, 60% of them show three-digit growth, with an average increase from 2018 to 2019 of 196%. In 2016, the Ministry of the Economy launched Start-up Portugal – National Strategy for Entrepreneurship, aiming to extend to the whole country and to all sectors of activity support for the current dynamics of the Portuguese ecosystem (IAPMEI, 2021). A study by the Portuguese Innovation Society (SPI) shows that the Portuguese population is very risk-averse, overestimating entrepreneurs' failure, unlike the case, for example, in countries like England and the United States. Nevertheless, about 61% of people state they have the necessary knowledge and competences to start a business (GEM, 2019).

2.2 Emphasis to Entrepreneurial Education

Portuguese HEIs have contributed greatly to this development, by including the subject of entrepreneurship in various courses, forming programmes and activities that encourage business creation. An analysis of HEI websites reveals around 310 courses nationally, which include the subject of Entrepreneurship in their curricular structure, of 1042 courses analysed. In the vast majority of those courses, the subject is compulsory and is included in various courses in Business, Engineering and Health Sciences. The largest number of courses including the subject of entrepreneurship are in Economics and Business Sciences (38,3%), with the other courses being in the areas of Technology (25%), Law, Social Sciences and Services (19,3%), Health (5,0%), Agriculture/Natural Resources (5,0%), Humanities (3,3%), and other courses (1,7%) (Gomes, 2020).

In Portugal, EE has also been the subject of specific conferences, which demonstrates the relevance it is given (e.g. "Conference on Education for Entrepreneurship", held in 2017 in University of Aveiro).

3. Collection of best practices from secondary research

The curricula of EE programmes must be carefully planned, presenting attractive topics and inter-disciplinary approaches, to make this type of training accessible to all students, particularly those not studying business science. Project-based learning is a common aspect in practically all EE programmes, with various methods being used to stimulate entrepreneurship, namely business

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plans and business model canvas, students' company creation projects, market viability studies and others (Redford, 2006; Sawitiri & Suswati, 2019). Therefore, besides conventional theoretical components and business plans, there are numerous alternative teaching methods: spin-off projects, visits to companies, individualized advice seminars, pre-acceleration programmes, design thinking methodologies, lean start-up and fast idea generator.

3.1 Scientific articles

Scientific article 1

Title: *International entrepreneurship education: barriers versus support mechanisms to STEM students.*
Year of publication: 2020
Journal: Journal of International Entrepreneurship
Authors: Ferreira, J., Paço, A., Raposo, M., Hadjichristodoulou, C., & Marouchou, D.
Aim of the research: Analysing how HEIs develop entrepreneurship education programmes, as well as discussing how STEM students perceive the barriers to entrepreneurship education.
Main results: The results show that HEIs carry out several types of activities and in different ways to stimulate entrepreneurial spirit among STEM graduates and students. STEM graduates value, above all, coaching from experts and services to support business creation and career development. As barriers to business creation, the difficulty in obtaining financial support associated with high patent costs was highlighted.

Scientific article 2

Title: *Do entrepreneurship programmes raise entrepreneurial intention of science and engineering students? The effect of learning, inspiration and resources.*
Year of publication: 2007
Journal: Journal of Business Venturing
Authors: Souitaris, V., Zerbinati, S., & Al-Laham, A.
Aim of the research: Testing the effect of entrepreneurship programmes on the entrepreneurial attitudes and intentions of science and engineering students in order to confirm (or disconfirm) conventional wisdom that entrepreneurship education increases the intention to start a business.
Main results: The results show that the programmes raise some attitudes and the overall entrepreneurial intention and that inspiration (a construct with an emotional element) is the programmes' most influential benefit.

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3.2 National & International programmes

National programmes

- *Start-Up Programme*: this is a programme from Junior Achievement Portugal that helps students to understand better how to create and manage a company, providing university students with entrepreneurial training. The aim is to create a fictitious company, but operating as if it was real, where students learn about the structure of the business system and its benefits. The students work on communication, decision-making, negotiating, organisation and time management competences. The programme has stimulated self-confidence, leadership capacities, creativity, problem-solving, team work and entrepreneurial skills, allowing active participation in the community. It has helped to give a more global view of the range of professional possibilities, prepare for entry to the labour market and develop and put business ideas into practice.
- *Business Ignition Programme*: is a programme of interaction of business models for technology developed in the academic sphere, following the Lean Start-Up methodology. Business models are presented and validated in the market, facilitating technology transfer and promoting the creation of new business. The programme aims to identify market opportunities, respond to challenges/needs, create business opportunities in the area of technology and provide participants with skills in the valorisation and commercialization of technology.

International programmes

- *CEBT Ibérico (Technology-based Entrepreneurial Course)*. This project aims to invert the logic of supported training for advanced consultancy, in value creation and Technology-Based Firms (TBFs), using the wide experience of specialists, through close accompaniment of multi-disciplinary teams, being led by academics and consultants. This was last held in 2018, with the participation of six universities in Portugal's Central Region and Castile and León in Spain. It has four themed workshops led by academics (Market Study, Business Models, Strategy and Marketing, Communication and Negotiating), four mentoring sessions led by consultants, one coaching session and a final joint event to present the business ideas. This normally lasts ten weeks, and has originated in some start-ups of reference in the region and in Portugal and also given STEM students a perspective of entrepreneurship.
- *SCIENT*. This was a European University-Business Alliance aiming to foster young SCIEntists' ENTrepreneurial spirit. The goal was to make doctoral students and graduates aware of their career options and aware about the possibility of using their research findings and starting their own company. A pre-accelerator programme for universities, research and entrepreneurship centres, accelerators and incubators was developed and tested, opening up new learning opportunities through the practical application of entrepreneurial skills (start-ups, spin-offs,

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products, prototypes). It involved a consortium of 15 organisations from eight countries: Cyprus, Malta, Italy, Portugal, Spain, Lithuania, Germany and the United Kingdom.

4. Primary research

4.1 Summary of findings from the survey for non-business academics

Portuguese non-business academics (N = 18) are mostly from Life Sciences areas (33.3%) and are teaching from a range between 11 and 20 years (38.9%). Respondents consider that the university collaborates with local companies to promote an entrepreneurial culture. Regarding the university providing researchers with the opportunity to receive funding to explore a business idea, opinions are divided: 55.6% gave a positive answer (yes), and the remain answered no. The department's relevance for fostering entrepreneurship in academia is also recognized (72.25%), with a small percentage of Portuguese academics (55.6%) having experience in developing business ideas.

Most non-business academics seem to have already considered developing a business idea, scoring this question with 50% and 16.7% (strongly disagree and disagree, respectively). However, they consider there are not enough incentives in the university (38.9% agree and 22,2% strongly agree), in addition to an inaccurate policy for entrepreneurship at the university (66.6% of responses).

It is recognized that university colleagues are not aware of working on business ideas, recognizing legal difficulties in the spin-off process (50% agree and 11.1% strongly agree). 77.7% of non-business academics acknowledge working too many hours in other academic activities. Regarding this, Covid-19 does not appear to be a threat for them (66.6%).

On the other hand, there is recognition of the innovative characteristics of the business idea, with 77.7% (44.4% strongly agree + 33.3% agree) and almost all respondents feel they have leadership characteristics, being able to develop their action plan and measure possible risk (38.9% Agree + 27.8% strongly agree).

As for the business plan development, a slight majority said they are qualified, although the answers are quite diversified. Likewise, concerning the university's objectives of stimulating entrepreneurial mindsets and skills, the majority of the respondents opted for a neutral response (38.9%).

Most non-business academics find that academics do not follow an entrepreneurial teaching approach (66.6% strongly disagree and disagree). However, they try to involve students in projects in a real environment (61.1% + 38.9% strongly agree and agree) through an 88.9% experiential learning approach.

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4.2 Summary of findings from the interviews with industry experts

1st Interview: Gonçalo Fonseca – BEDEV (Allergy detection applications and prototype development).

2nd Interview: Rafael Ferreira – Prummo (Real estate agency and asset management).

Challenges and the role of Universities

One of the industry expert interviewed hold a bachelor in Civil Engineering and the other is graduate in Bioengineering, two courses in which they did not the opportunity to contact with subjects related to entrepreneurship. Both recognize that they have a lack of knowledge on entrepreneurship, having several difficulties in the venture creation process, and because of that, they made several management mistakes during their journey. They have sought to get knowledge through extracurricular programs such as postgraduate degrees in business management, leadership and marketing.

Both start-ups are very engaged with university, although in different ways. Respondents highlighted partnerships with the university, consultancy services, use of its facilities (e.g., incubation), participation in entrepreneurship contests, access to qualified human resources, and participation in projects.

Nevertheless, industry experts totally agree that universities should strengthen relations with entrepreneurial ecosystem and industries, in order to allow smoother access to recent graduates to labor market. The university support to start-up through several different support instruments (e.g. entrepreneurial contests, financial rewards, training and mentoring programs, consulting, incubation) is highly appreciated, especially during the initial steps.

Entrepreneurial Skills

The main motivation to start up, for both entrepreneurs, was the sense of autonomy. In the case of the entrepreneur related with civil construction business, the opportunity was reinforced by the fact that the labor market in the area was saturated and poorly renumbered. In the case of the entrepreneur dedicated to the 3D prints, he assumed that he was driven by necessity, motivated by the lack of financial assets of his family; nevertheless, during the start-up growth process, several other opportunities were identified and explored. Both entrepreneurs started in specific business areas, but soon they sought to diversify to other complementary niche markets. The interviewees highlighted the importance of the development of the networking with university and other firms, in addition to the qualified HR structure, which allowed them to add value to business. Besides of the lack of business knowledge, they pointed out the scarcity of financing for their start-ups during the initial phase, delaying their growth and development. Both entrepreneurs have plans to expand their businesses to other markets and increase the product and service portfolio.

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All the detailed information can be seen in Annex II.

5. Conclusions

Portugal is committed to increasing entrepreneurship rates, introducing Entrepreneurship subjects in about 30% of courses at HEI's and developing several EE national and international programs.

Based on our primary research, non-business academics noted that few projects finance and support the development of entrepreneurial ideas in a university context. Although the university collaborates with companies, they consider that there is not an adequate entrepreneurship policy and incentives. In particular, our sample considers having an innovative business idea, having leadership skills and already thinking about developing a business idea. To go ahead, they recognize the need to acquire more skills to develop a business plan. They also recognize that most of their non-business academics colleagues are not aware of entrepreneurship due to several difficulties and risks associated with the entrepreneurial process.

Regarding the industry experts interviewed, they noticed a lack of knowledge in the entrepreneurship field when creating their own business. This mean that, especially in the initial phase, they had several difficulties and made many mistakes that compromised the start-up growth. They sought to acquire this knowledge in extra-curricular training programs over time. Start-up's dependence on the university is notorious, although at different levels; both agree that the university should have a more active role in training and supporting entrepreneurial activities through different instruments (financial included).

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Appendices

Appendix I: Non-business academics survey (Portugal)

Does your university collaborate with local firms (e.g., SMEs, large corporations, start-ups) for the promotion of entrepreneurship culture within the university?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	18	100,0	100,0	100,0

Does your university provide to its academics/researchers the opportunity to receive research or innovation funding for the development and exploitation of a business idea?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	8	44,4	44,4	44,4
	Yes	10	55,6	55,6	100,0
	Total	18	100,0	100,0	

Is there a relevant office or department within your university that supports academics or students in developing entrepreneurial activities?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	5	27,8	27,8	27,8
	Yes	13	72,2	72,2	100,0
	Total	18	100,0	100,0	

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Do you have any relevant experience in the development and the exploitation of a business idea?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	8	44,4	44,4	44,4
	Yes	10	55,6	55,6	100,0
	Total	18	100,0	100,0	

I never thought to develop and exploit any business idea until now.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	9	50,0	50,0	50,0
	Disagree	3	16,7	16,7	66,7
	Neutral	3	16,7	16,7	83,3
	Agree	3	16,7	16,7	100,0
	Total	18	100,0	100,0	

My university does not provide any incentives for academics to develop entrepreneurial activities.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	3	16,7	16,7	16,7
	Neutral	4	22,2	22,2	38,9
	Agree	7	38,9	38,9	77,8
	Strongly Agree	4	22,2	22,2	100,0
	Total	18	100,0	100,0	

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There is no clear university policy regarding relationship with business.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	2	11,1	11,1	11,1
	Neutral	4	22,2	22,2	33,3
	Agree	6	33,3	33,3	66,7
	Strongly Agree	6	33,3	33,3	100,0
	Total	18	100,0	100,0	

My university does not have a relevant office/department that supports academics in developing entrepreneurial activities.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	3	16,7	16,7	16,7
	Disagree	5	27,8	27,8	44,4
	Neutral	5	27,8	27,8	72,2
	Agree	1	5,6	5,6	77,8
	Strongly Agree	4	22,2	22,2	100,0
	Total	18	100,0	100,0	

My research work is more theoretical, it is not so relevant with entrepreneurial activities.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	6	33,3	33,3	33,3
	Disagree	3	16,7	16,7	50,0
	Neutral	5	27,8	27,8	77,8
	Agree	3	16,7	16,7	94,4
	Strongly Agree	1	5,6	5,6	100,0
	Total	18	100,0	100,0	

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My colleagues at university are not willing to start working on this new business idea together so I face difficulties in forming a successful team.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	3	16,7	16,7	16,7
	Disagree	1	5,6	5,6	22,2
	Neutral	3	16,7	16,7	38,9
	Agree	9	50,0	50,0	88,9
	Strongly Agree	2	11,1	11,1	100,0
	Total	18	100,0	100,0	

There are many legal complications between the university and the academics when they start a spin-off and I do not want to get into arguments with my superiors.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	2	11,1	11,1	11,1
	Disagree	3	16,7	16,7	27,8
	Neutral	5	27,8	27,8	55,6
	Agree	6	33,3	33,3	88,9
	Strongly Agree	2	11,1	11,1	100,0
	Total	18	100,0	100,0	

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I am not aware of the Intellectual Property Rights associated with my invention or the procedure that I should follow to protect them.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	4	22,2	22,2	22,2
	Disagree	4	22,2	22,2	44,4
	Neutral	3	16,7	16,7	61,1
	Agree	4	22,2	22,2	83,3
	Strongly Agree	3	16,7	16,7	100,0
	Total	18	100,0	100,0	

I work so many hours to conduct other academic tasks that I don't have time to embark in such exploitation/entrepreneurial activities.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	1	5,6	5,6	5,6
	Neutral	3	16,7	16,7	22,2
	Agree	6	33,3	33,3	55,6
	Strongly Agree	8	44,4	44,4	100,0
	Total	18	100,0	100,0	

I do not hold a previous experience of how to start in exploiting my research findings or embarking on entrepreneurial activities (e.g., development of a business plan).

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	4	22,2	22,2	22,2
	Disagree	1	5,6	5,6	27,8
	Neutral	4	22,2	22,2	50,0
	Agree	6	33,3	33,3	83,3
	Strongly Agree	3	16,7	16,7	100,0
	Total	18	100,0	100,0	

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I am not sure how to identify a business opportunity considering the needs of a particular target group and the characteristics of my business idea.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	4	22,2	22,2	22,2
	Disagree	5	27,8	27,8	50,0
	Neutral	3	16,7	16,7	66,7
	Agree	5	27,8	27,8	94,4
	Strongly Agree	1	5,6	5,6	100,0
	Total	18	100,0	100,0	

I am afraid that I won't be successful in my entrepreneurial efforts since I was not trained in this area before thus I avoid starting altogether.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	4	22,2	22,2	22,2
	Disagree	2	11,1	11,1	33,3
	Neutral	6	33,3	33,3	66,7
	Agree	5	27,8	27,8	94,4
	Strongly Agree	1	5,6	5,6	100,0
	Total	18	100,0	100,0	

I am afraid that my potential business idea will not be attractive in the market.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	3	16,7	16,7	16,7
	Disagree	3	16,7	16,7	33,3
	Neutral	4	22,2	22,2	55,6
	Agree	8	44,4	44,4	100,0
	Total	18	100,0	100,0	

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The legal framework in my country does not support academics when they start entrepreneurial activities within Universities.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	1	5,6	5,6	5,6
	Disagree	3	16,7	16,7	22,2
	Neutral	6	33,3	33,3	55,6
	Agree	4	22,2	22,2	77,8
	Strongly Agree	4	22,2	22,2	100,0
	Total	18	100,0	100,0	

The current situation of the COVID-19 pandemic.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	6	33,3	33,3	33,3
	Neutral	6	33,3	33,3	66,7
	Agree	4	22,2	22,2	88,9
	Strongly Agree	2	11,1	11,1	100,0
	Total	18	100,0	100,0	

Other (please write your own reasons)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		17	94,4	94,4	94,4
	there are not enough resources (human and etc) allocated to the innovation and projects office at the university, ie, the structure is there but it's largely under-resourced to be efficient	1	5,6	5,6	100,0
	Total	18	100,0	100,0	

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I can recognize community's and surroundings' needs for the development of my idea/activity.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	1	5,6	5,6	5,6
	Neutral	2	11,1	11,1	16,7
	Agree	10	55,6	55,6	72,2
	Strongly Agree	5	27,8	27,8	100,0
	Total	18	100,0	100,0	

I can identify innovative characteristics of my idea/activity.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Neutral	4	22,2	22,2	22,2
	Agree	6	33,3	33,3	55,6
	Strongly Agree	8	44,4	44,4	100,0
	Total	18	100,0	100,0	

I can choose the right resources for the implementation of my idea.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	2	11,1	11,1	11,1
	Neutral	6	33,3	33,3	44,4
	Agree	4	22,2	22,2	66,7
	Strongly Agree	6	33,3	33,3	100,0
	Total	18	100,0	100,0	

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I can identify my strengths and weaknesses and those of my team.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	1	5,6	5,6	5,6
	Neutral	4	22,2	22,2	27,8
	Agree	7	38,9	38,9	66,7
	Strongly Agree	6	33,3	33,3	100,0
	Total	18	100,0	100,0	

I can keep my team motivated to what they want to achieve.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Neutral	1	5,6	5,6	5,6
	Agree	12	66,7	66,7	72,2
	Strongly Agree	5	27,8	27,8	100,0
	Total	18	100,0	100,0	

I can look for external help if need be, for the development and implementation of my activity/idea (e.g., social enterprise advisors).

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	1	5,6	5,6	5,6
	Neutral	7	38,9	38,9	44,4
	Agree	5	27,8	27,8	72,2
	Strongly Agree	5	27,8	27,8	100,0
	Total	18	100,0	100,0	

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I can draw up the budget of my activity/idea.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	1	5,6	5,6	5,6
	Disagree	6	33,3	33,3	38,9
	Neutral	2	11,1	11,1	50,0
	Agree	5	27,8	27,8	77,8
	Strongly Agree	4	22,2	22,2	100,0
	Total	18	100,0	100,0	

I can use social media appropriately based on my audience and the purpose of my activity/idea.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	1	5,6	5,6	5,6
	Disagree	2	11,1	11,1	16,7
	Neutral	5	27,8	27,8	44,4
	Agree	8	44,4	44,4	88,9
	Strongly Agree	2	11,1	11,1	100,0
	Total	18	100,0	100,0	

I can develop an action plan which includes the basic steps to achieve the goals of my activity/idea (e.g., set milestones).

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	1	5,6	5,6	5,6
	Neutral	4	22,2	22,2	27,8
	Agree	7	38,9	38,9	66,7
	Strongly Agree	6	33,3	33,3	100,0
	Total	18	100,0	100,0	

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I can recognize in advance possible risks related to my activity/idea.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Neutral	6	33,3	33,3	33,3
	Agree	7	38,9	38,9	72,2
	Strongly Agree	5	27,8	27,8	100,0
	Total	18	100,0	100,0	

I can develop a business plan describing how to achieve the goals of my activity/idea.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	3	16,7	16,7	16,7
	Neutral	4	22,2	22,2	38,9
	Agree	7	38,9	38,9	77,8
	Strongly Agree	4	22,2	22,2	100,0
	Total	18	100,0	100,0	

One of the goals of the university is to stimulate and support the development of entrepreneurial mindsets and skills.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	1	5,6	5,6	5,6
	Disagree	5	27,8	27,8	33,3
	Neutral	7	38,9	38,9	72,2
	Agree	4	22,2	22,2	94,4
	Strongly Agree	1	5,6	5,6	100,0
	Total	18	100,0	100,0	

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Academics and staff follow an entrepreneurial teaching approach across all the departments, promoting diversity and innovation in teaching and learning.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	6	33,3	33,3	33,3
	Disagree	6	33,3	33,3	66,7
	Neutral	4	22,2	22,2	88,9
	Agree	2	11,1	11,1	100,0
	Total	18	100,0	100,0	

Ask students to decide their own problem-solving procedures.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Neutral	2	11,1	11,1	11,1
	Agree	10	55,6	55,6	66,7
	Strongly Agree	6	33,3	33,3	100,0
	Total	18	100,0	100,0	

Encourage academics and students' collaboration for common assignment.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Neutral	2	11,1	11,1	11,1
	Agree	9	50,0	50,0	61,1
	Strongly Agree	7	38,9	38,9	100,0
	Total	18	100,0	100,0	

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Ask students to work and examine case studies.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	8	44,4	44,4	44,4
	Strongly Agree	10	55,6	55,6	100,0
	Total	18	100,0	100,0	

Engage students in real-world projects (e.g., problem-based learning).

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	7	38,9	38,9	38,9
	Strongly Agree	11	61,1	61,1	100,0
	Total	18	100,0	100,0	

Use experiential learning approach (e.g., organize students' visits in local firms as an objective of your class, pop-up shops).

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	1	5,6	5,6	5,6
	Neutral	1	5,6	5,6	11,1
	Agree	7	38,9	38,9	50,0
	Strongly Agree	9	50,0	50,0	100,0
	Total	18	100,0	100,0	

What is your gender?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Female	9	50,0	50,0	50,0
	Male	9	50,0	50,0	100,0
	Total	18	100,0	100,0	

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How old are you?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	31-40	6	33,3	33,3	33,3
	41-50	9	50,0	50,0	83,3
	51-60	3	16,7	16,7	100,0
	Total	18	100,0	100,0	

By the end of this academic year, how many years will you have been teaching altogether?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1-5 years	2	11,1	11,1	11,1
	11-20 years	7	38,9	38,9	50,0
	21-30 years	4	22,2	22,2	72,2
	31 or more years	2	11,1	11,1	83,3
	6-10 years	3	16,7	16,7	100,0
	Total	18	100,0	100,0	

In which country are you located?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Portugal	18	100,0	100,0	100,0

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In which institution/university are you employed?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	UBI	7	38,9	38,9	38,9
	Universidade Beira Interior	1	5,6	5,6	44,4
	Universidade da Beira Interior	3	16,7	16,7	61,1
	Universidade da Beira Interior and Universidade Europeia	1	5,6	5,6	66,7
	University of Beira Interior	6	33,3	33,3	100,0
	Total	18	100,0	100,0	

What is your area of specialization?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Arts and Humanities	2	11,1	11,1	11,1
	Clinical and Health	4	22,2	22,2	33,3
	communication	1	5,6	5,6	38,9
	Computer Science	2	11,1	11,1	50,0
	Engineering	1	5,6	5,6	55,6
	Life sciences	6	33,3	33,3	88,9
	Social Sciences (This option is missing in the questionaire)	1	5,6	5,6	94,4
	Sport Sciences	1	5,6	5,6	100,0
	Total	18	100,0	100,0	

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Which is the exact position you hold in the organization/university?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Assistant Professor	10	55,6	55,6	55,6
	Associate Professor	3	16,7	16,7	72,2
	Professor	1	5,6	5,6	77,8
	Researcher	4	22,2	22,2	100,0
	Total	18	100,0	100,0	

Would you like to participate in the free online training of entrepreneurship addressed to non-business academics during 2021-2022 offered by the "ENTRANCE" EU-funded project? (For more information, please visit https://entranceproject.eu/)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	1	5,6	5,6	5,6
	Not sure	6	33,3	33,3	38,9
	Yes	11	61,1	61,1	100,0
	Total	18	100,0	100,0	

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Appendix II: Industry experts interviews

1st Interview - BEDEV

Part I: Demographic characteristics/Professional & Educational Background

1. Name: Gonçalo Fonseca
2. Interviewee work position: CEO & Founder
3. Date of interview: March 8th
4. Age of the interviewee: 28
5. Educational Background:Bioengineering (bachelor degree)
6. Professional Background: Some jobs unrelated to the area.
7. Years of experience in business sector: 1 year

Part II: Challenges and the role of universities

1. In 2018 he won the "startup voucher" scholarship to develop a project he had in mind, which patented and began development. At the end of this program, IAPMEI (the funding entity) provided a small incentive to create a start-up. He risked developing the idea, encouraged by a mentor assigned by the program itself and also by being included in the UBIMEDICAL business incubator. Then, he began to participate in some business idea contests, obtaining several recognitions and financing.

He considers it was badly timed, since it coincided with the beginning of the pandemic and made him postpone many plans. However, this period let him begin to shape the company, still helping health professionals with some medical devices and 3D prints that conferred protection. The company is closely involved in the university, obtaining the collaboration of students from various fields.

2. He felt great limitations because he had no notion of certain basic concepts, namely about management, business, negotiation, marketing and even presentation skills for potential investors. He tried to acquire this knowledge of entrepreneurship with the help of UBIMEDICAL managers and some friends and professors. He thinks in the short term he is going to hire a manager.

Nevertheless, UBIMEDICAL managers regularly challenge him to participate in advanced entrepreneurship programs in the biohealth sector, notably through a postgraduate program covering several areas, which has been decisive in acquiring knowledge and in terms of networking with other European start-ups. This was determinant in forming some partnerships.

3. He is still studying for his master's. His ex-classmates tell him a lot of stories and he sees they are demotivated, due to working in other companies with low wages and a bad working environment. He did not want this conventional path. He feels that only a few companies are

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able to provide happiness at work. He considers that he needs to develop his own projects and ideas to be motivated in this early stage of his career as well as acquiring knowledge and experience. He considers it very motivating that the decision is focused on the project and the interaction with different projects. He takes the opportunity to create curriculum and invest in his own qualifications.

4. He thinks this relationship is the basis of everything. Recent graduates usually finish their course without practical knowledge and know-how, and without the experience that can be immediately useful in companies. There should be an entity at the university making the bridge with companies, so that recent graduates can gain experience, to be better prepared for the labor market, through training programs for this purpose, research in the business context, etc. He himself felt the weight of inexperience when he started his business.
5. It depends. He thinks it is important to give students the option to choose Entrepreneurship and Business CUs (Course Unit). Not all degrees offer this, and those that do, are limited to very basic concepts. In his course they have an optional CU in entrepreneurship, only in the master's degree. He considers it would be relevant to study entrepreneurship earlier, perhaps in the last year of the course. This could provide knowledge of project management, new business development, team management, leadership, etc.
6. Don't be afraid to take risks. Risk, fear and doubt are part of the concept of entrepreneurship, especially in the initial phase of projects. Never lose focus and have a lot of resilience to deal with the issues and obstacles that arise throughout the process. The further you go, the more feelings develop. The human component is extremely important for business success.

Part III: Entrepreneurial skills

Ideas & Opportunities

1. The initial business idea was to find allergens through an application that notified users of the potential of energy. Currently, they are developing a diagnosis of allergy, only by pricking a finger to detect allergies. They have entered other business areas such as waste in the 3D industry, where they are creating a recycling system to form new filaments. The intention is to go further into the area of recycling medical waste. At the origin of the business idea are close family members who have allergies and suffer a lot. Allergies are one of the XXI century pandemics, and the company intends to contribute to a better quality of life, benefiting patients and even health professionals by providing them with useful information about disease evolution. There are other devices on the market, although they are quite expensive and use other technology.
2. Innovation is important, but if you don't have motivation or focus to develop ideas that benefit multiple parties, it becomes complicated. There has to be a reason behind it. I believe that

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both complement each other, but it draws special attention to the significance of the products and the multiple benefits they provide.

3. In the area of biomedical devices, there is always very strong competition. We can only stand out through the value of the products/services we develop and the partnerships formed, such as those we have with the university, the incubator and other international start-ups, trying to make the most of the resources available. Several companies already established in this area enter new niches very easily, embarking on new projects, sometimes in completely diversified areas.

Resources

4. This question is always raised along the short entrepreneurial path. It is the only medical device company in the region. Only in the Lisbon and Porto region are there similar, directly competing companies. In the area of 3D printing, they develop prototypes at a very reduced cost and can make very competitive proposals. Like many other start-ups, it is still outlining a path of specialization. He highlights the HR structure being created and also takes advantage of some students who want to get involved, gain experience and are interested in this area. The UBIMEDIAL location allows him excellent conditions for project development, with free consultancy services and access to various entrepreneurship programs and financing. Another area highlighted is communication capacity and network development, which allows several partnerships to be formed with reference companies.
5. His company works in very technical areas, requiring various types of software to design prototypes of medical devices quite regularly. Regarding social networks, it has only a minimal presence to ensure the connection with society, since its area is business to business.
6. People are the main thing. They hold the various types of knowledge required by this business area, reducing the time required for certain tasks and projects. He values employees very much since they are the starting point for innovation and growth.
7. He seeks to create work teams dedicated to certain areas, appointing a coordinator. He gives people freedom to chart their own path, as long as they follow the philosophy of the company. They are in constant contact.
8. It is extremely important because they have different projects in different areas. In this way, only by developing several networks can they expand their product supply. The company also seeks to integrate people from various areas, namely: computing, biomedicine, engineering.

Into Action

9. The focus and what is intended to be achieved are very important. In addition, the plan should include an appropriate mixed funding structure. There must be multidisciplinary knowledge,

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to define how to reach the market and how to convince companies to collaborate and finance your business.

10. It is one of the most important business components. If they do not, they are bad entrepreneurs and bad project managers. The positive and negative sides must always be kept in mind.

11. He is ambitious and always wants to reach the maximum that is within his reach. He wants to continue with the Portuguese start-up and be a reference in the core business, always supporting university students, not losing identity and focus. He would like to expand to other regions and even develop projects abroad.

12. It can benefit a lot. They do not have fixed stakeholders.

2nd Interview – Prummo Real Estate

Part I: Demographic characteristics/Professional & Educational Background

1. Name: Rafael Ferreira
2. Interviewee work position: CEO & Founder
3. Date of Interview: March 12th
4. Age of Interviewee: 29
5. Educational Background: Civil Engineering (Bachelor)
6. Professional Background: His parents had a similar business
7. Years of experience in the business sector: 6

Part II: Challenges and the role of universities

1. He created the company in 2013. At that time, his family started to have financial difficulties and they had to find a simple solution to face the situation. He had some knowledge in the area due to the family business, which was a help. The business concept that he created was intended to be in or near the university. Initially, it started with the business of renting rooms and apartments to students, considering that the university had a large percentage of incoming students.

He looked for small premises and developed a business model with a low-cost structure. The concept was evolving, following the needs of the market, until he had the opportunity to start selling real estate and making the business less seasonal. In 2015 there were already 3 employees, with a new partner and former colleague joining the company, developing a new business model and creating a new office in Porto. In 2018, an investor became interested in the company, injecting capital and contributing with a lot of experience and knowledge of the sector, allowing growth in the following years. They started to enter other business areas, namely the construction, acquisition and redevelopment of properties and also real estate management.

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2. Clearly! The lack of financing was the main difficulty, which greatly delayed the company's growth plans. In addition, not having a business background caused him to make several mistakes that weighed heavily on the company. At the beginning it was all “trial and error”, they had little market presence and resources, nobody to ask for advice in the business area, nor the possibility of hiring a manager. Especially from 2016, he tried to remedy this weakness with various types of training (negotiation, leadership, HR management, entrepreneurship, marketing, etc).
3. Initially he made the investment through necessity. Later, he associated the opportunity with development of the business. As he met people, he formed the ambition to have his own project and many friends encouraged him. He identified a lot with the sense of autonomy and compared this with the institutionalized system promoted by the university.
4. On the entrepreneur's side there must be a closer relationship, to overcome difficulties, especially in the initial steps of company creation. If this relationship is close, there will certainly be a greater number of successful entrepreneurs and soon we will have a university with greater recognition and greater benefits for this region, considering that some of them will invest locally. He felt several difficulties and a lack of proximity since the business concept was not exactly innovative and of high added value. Not being a technological start-up, he did not have the desired recognition by the university, despite thinking that it was contributing to solving a problem and providing a service to students.
5. No doubts about it. He had no Entrepreneurship CU. He points out that students are often instilled with a mentality about what they should do in the future. Entrepreneur rates are very low and he considers that those who developed projects were precisely those who thought differently and those who questioned the institutionalized system.
6. In his business area, he would suggest participating in some training courses and postgraduates in entrepreneurship, team leadership and commercial management. People often have an excellent technical component but lack the business component and business vision.

Part III: Entrepreneurial skills

Ideas & Opportunities

1. In the initial stage, his business aimed to address the need to find accommodation for people in difficulty. Later, with the evolution to other business areas, he moved into the field of valuation of real estate assets through professional management.
2. He would say the benefit of the product. Novelty is practically non-existent in a world where almost everything has been created. He believes in the right business in the right place.
3. As innovative features, he highlights a very young team.The average age in the real estate sector is generally extremely high, and his team is young, trained and unconventional. He

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considers his company does the same thing as the others, but in a different way, in terms of the speed with which they undertake projects. They use a lot of innovative digital tools that competitors don't use. This gives his company particular advantages.

Resources

4. He highlights the company's human resources. All employees who had bad experiences meant a very long delay in the company's growth. People who cannot do a good job just have to identify another company where they can be useful, and vice versa. There were also many cases of people who identified with the company's philosophy and who boosted its growth.
5. They use a CRM in the customer relationship. They also invest in social media marketing and digital channels, and are currently launching a new web site with many more features and resources. They also develop powerful email marketing and newsletter tools. They have an excellent ERP, designed to suit the company needs and which is permanently improving, through additional developments, bridging the gap between property owners and the Tax Authority. He considers that in Portugal, all other companies manage this manually. This allows the company to save a lot of time, comply with legal aspects and minimize errors.
6. In this activity, people are extremely important. Without them, business does not flow.
7. There are several factors. In the sales department, he follows up the consultants very closely. In several cases, he works as a business unlocker and makes consultants feel much better by earning more commission. As the whole team is young, they have a closer relationship and friendship. They also organize team building activities at the end of the year. Additionally, they invest a lot in HR training plans, because they believe that the world is constantly changing and need to follow trends and become professionals of recognized merit.
8. It is an important element, although he considers they do not have a very active stance in this field. The service itself has a lot of added value and it is customers who usually look for them. However, they have already entered into several previous partnerships with construction companies, which has opened the door to other profitable segments.

Into Action

9. It is the relation between expectations and reality. He considers the relationship of being competitive and having a growth position. He is not a passive agent and has to project growth so as not to stagnate. However, in the case of the company, they want to diversify their areas of business. Financing is another very important aspect that should be taken into account in a business plan. You need to know the market very well and know how to position yourself in relation to the competition.
10. He does not agree! He has several friends with excellent business ideas and above-average technical management skills that allow them to identify excellent business opportunities. As their thinking is very comprehensive, they foresee too many risks and the venture does not

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go ahead. In the case of his company, he had to accept several risks, or he would not have created the company. Success often comes from dedication and insistence on what is believed. It is important to be very focused and just concentrate on one thing.

11. The initial idea was to grow horizontally, that is, to expand the business idea in several cities. This creates several management difficulties. He changed his perspective and started to explore the region to the fullest. They only think of another location when the current location is already stable and then they move forward. They define new markets for the same products and intend to increase sales in their current market, while differentiating themselves from other companies in the market.
12. He believes so. Having a variety of inputs helps them to do things differently and save time, especially if those inputs have a multiple background. When several entities can collaborate in the environment, growth is much faster. This perspective is also valid for attracting more investors.

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