HOCHSCHULE OSNABRÜCK

Faculty of Business Management and Social Sciences

MASTER THESIS

As part of the

MASTER OF RESEARCH AND INNOVATION IN HIGHER EDUCATION

ARE PERUVIAN UNIVERSITIES READY FOR THE FUTURE? ASSESSING ENTREPRENEURIAL AND INNOVATIVE CAPACITY IN PERUVIAN UNIVERSITIES USING THE HEINNOVATE'S ENTREPRENEURIAL UNIVERSITIES FRAMEWORK

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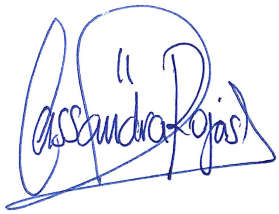
February 4th, 2021

Declaration

I, Viviana Rojas Rivera, hereby declare on oath that:

1. I have written this thesis independently and without outside help.
2. The thoughts adopted directly or indirectly from external sources are marked as such.
3. No other sources or aids were used apart from the ones stated.
4. The thesis has not been submitted to any other examination office in the past, nor has it ever been published.



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Acknowledgements

To the memory, forever present, of my grandpa.

Abstract

This qualitative study focuses on assessing the *"future readiness"* capacity of three Peruvian Higher Education Institutions under the HEInnovate framework. The main question guiding this research is: *To what extent can Peruvian universities be considered entrepreneurial and ready for tackling the Challenges of the Future?* The Challenges of the Future are understood as the challenges generated by concepts such as The Future of Work, The Global Skills Gap, Employability and unexpected and destabilizing risks of the environment, such as COVID-19. Universities were studied based on 4 research sub-questions: 1) How do Peruvian HEIs rate in Entrepreneurial Capacity according to the HEInnovate framework? 2) What are the factors supporting or preventing Peruvian HEIs to accomplish their entrepreneurial potential? 3) What efforts are Peruvian HEIs making for developing 21st century skills, accomplishing Digital Transformation, and enhancing their students Employability? and 4) What measures could Peruvian HEIs take in order to maximize their entrepreneurial and future-proof potential? The research methodology used was mixed, applying first a quantitative assessment, and then complementing the results with in-depth interviews. After presenting the conclusions, recommendations for policy action and for university management are given.

Keywords: future of work, entrepreneurial university, employability, digitalization, 21st century skills, skills development, entrepreneurial training, entrepreneurship, future of higher education, peruvian higher education, covid.

Zusammenfassung

Diese qualitative Studie konzentriert sich auf die Bewertung der "Zukunftsfähigkeit" von drei peruanischen Hochschulen im Rahmen von HEInnovate. Die Hauptfrage, die diese Forschung leitet, ist: Inwieweit können peruanische Hochschulen als unternehmerisch und bereit für die Bewältigung der Herausforderungen der Zukunft angesehen werden? Die Herausforderungen der Zukunft werden als die Herausforderungen verstanden, die durch Konzepte wie die Zukunft der Arbeit, die globale Qualifikationslücke, die Beschäftigungsfähigkeit und unerwartete und destabilisierende Risiken der Umwelt, wie COVID-19, entstehen. Die Hochschulen wurden anhand von 4 Forschungsunterfragen untersucht: 1) Wie sind die peruanischen Hochschulen in Bezug auf ihre unternehmerische Kapazität gemäß dem HEInnovate-Rahmenwerk eingestuft? 2) Was sind die Faktoren, die peruanische Hochschulen dabei unterstützen oder daran hindern, ihr unternehmerisches Potenzial zu entfalten? 3) Welche Anstrengungen unternehmen peruanische Hochschulen, um Kompetenzen des 21. Jahrhunderts zu entwickeln, die digitale Transformation zu vollziehen und die Beschäftigungsfähigkeit ihrer Studierenden zu verbessern? und 4) Welche Maßnahmen könnten peruanische Hochschulen ergreifen, um ihr unternehmerisches und zukunftssicheres Potenzial zu maximieren? Es wurde eine gemischte Forschungsmethodik angewandt, bei der zunächst eine quantitative Bewertung durchgeführt und die Ergebnisse dann durch Tiefeninterviews ergänzt wurden. Nach der Darstellung der Schlussfolgerungen werden Empfehlungen für politische Maßnahmen und für das Hochschulmanagement gegeben.

Keywords: future of work, entrepreneurial university, employability, digitalization, 21st century skills, skills development, entrepreneurial training, entrepreneurship, future of higher education, peruvian higher education, covid.

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Abbreviations

ASU	Applied Sciences University
CreU	Creative University
CU	Comprehensive University
CUB	Business Faculty of the Comprehensive University
HEI	Higher Education Institution

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1. INTRODUCTION

This study focuses on assessing the *"future readiness"*[1] capacity of three Peruvian Higher Education Institutions under the Entrepreneurial University's framework adapted by HEInnovate. This chapter provides an introduction and rationale to the thesis topic, the study context, the research gap, study purpose and potential contribution, and finalizes with an explanation of the research questions and the structure of the study.

1.1 Background of the study

One of the major issues being studied today within the Higher Education context is how the concept of "The Future of Work" is already transforming and forcing Higher Education institutions to rethink their own nature and essence. While there are numerous implications being brought to the table by this paradigm shift and the *Fourth Industrial Revolution*[2], issues such as Employability, the existing Skills Gap between Academia and the labor market, and Digitalization stand out among the most pressing matters, especially for their implications on the relevance and sustainability of the Higher Education system (Selingo, 2017a). In addition, the COVID-19 outbreak represents a special urgency factor for the need for systemic change, not only in the education sector but also in the nature of work and practically all aspects of daily life (UNESCO, 2020).

In this context of uncertainty, higher education institutions, despite their complex nature, face the challenge of becoming agile, adaptable (Selingo, 2017a), and above all, capable of ensuring their survival in an autonomous way while assuming a responsibility to generate positive impacts on their societies. Given this, the way forward that best fits these needs is for higher education institutions to become entrepreneurial (Wain, 2018). As Gibb (2013) rightly mentions:

> "Entrepreneurial higher education institutions are designed to empower staff and students to demonstrate enterprise, innovation and creativity in research, teaching and pursuit and use of knowledge across boundaries. They contribute effectively to the enhancement of learning in a societal environment characterised by high levels of uncertainty and complexity and they are dedicated to creating public value via a process

[1] Ability to adapt and overcome future challenges

[2] "A new chapter in human development, enabled by extraordinary technology advances commensurate with those of the first, second and third industrial revolutions" (World Economic Forum, 2016)

of open engagement, mutual learning, discovery and exchange with all stakeholders in society - local, national and international." (Gibb, 2013)

1.2 Research gap and research purpose

As mentioned above, it is indisputable that there is an urgent need for transformation for HEIs at a global scale; nonetheless, the changes that the Fourth Industrial Revolution is bringing to the axes of the labor market, higher education and professional skills are not occurring the same way in all geographies (Shwab, 2019). Whilst there is much research being done on this topic, most of it is focused on the higher education contexts of the USA and Europe (the so-called 'Global North'), and few are focused on the Latin American context. Moreover, almost none of this research is situated in the Peruvian context of higher education, which is very different from those mentioned above, as it has been undergoing major important changes since 2014 (the year in which the Peruvian University Reform came into effect), especially in terms of demand growth and quality assurance in higher education (SUNEDU, 2018).

Given the fact that in 2019 Peru has reached its best historical score in competitiveness according to the World Economic Forum, it is curious to observe that although its pillars of innovation capacity and entrepreneurship culture have an increasing tendency, the pillar of professional skills presents a decreasing tendency, particularly in the fields of quality vocational training, skills of graduates and digital skills among the active population (Shwab, 2019). Bearing this in mind, it can be inferred that there is an important improvement opportunity for Peruvian higher education institutions (HEIs) in terms of ensuring the qualification and readiness of their students and graduates for the labor market, and the question arises as to whether Peruvian universities are prepared to educate the professionals of the future. Moreover, the COVID-19 outbreak has added a special sense of urgency to this matter, due to the effects it has had on the Peruvian society, work, and economy, where it has become painfully evident that Peruvian Education institutions need to face an imperative transformation, for which most of them are probably not suitable yet[3]. With this, an opportunity window opens where research in the fields of Entrepreneurial Education and Entrepreneurial Culture within the Peruvian Higher Education field become more relevant than ever before. It is worth noting that until the day this research started, there were no previous studies on the Entrepreneurial Capabilities of Peruvian

[3] Digital divide and COVID-19: inequalities in access to online education. https://www.universia.net/pe/actualidad/orientacion-academica/brecha-digital-y-covid-19-desigualdades-de-acceso-a-la-educacion-online.html

HEIs and no data about any Peruvian HEI in the HEInnovate assessment tool, to the point at which the author of this research had to ask the HEInnovate team directly to add Peru to the list of eligible countries because it did not even appear.

In order to address this gap, this qualitative case study aims to accomplish two main objectives: a) to assess Peruvian universities' current Entrepreneurial capacity to adapt and tackle potential future challenges, especially related to 21st century Skills Development, Employability, and Digitalization; and b) to provide recommendations for improvement based on the analysis of the results.

1.3 Research questions and structure

The main question guiding this study is:

To what extent can Peruvian universities be considered entrepreneurial and ready for tackling the Challenges of the Future?

Under this main question, for sub-questions are addressed:

1. *How do Peruvian HEIs rate in Entrepreneurial Capacity according to the HEInnovate framework?*
2. *What are the factors supporting or preventing Peruvian HEIs to accomplish their entrepreneurial potential?*
3. *What efforts are Peruvian HEIs making for developing 21st century skills, enhancing their students Employability, and accomplishing Digital Transformation?*
4. *What measures could Peruvian HEIs take in order to maximize its entrepreneurial and future-proof potential?*

The thesis is organized into six chapters. This first chapter focuses on presenting the research context and the rationale behind it. The second chapter explains the methodology used to develop the study, the research design, data collection, and finalizes pointing out the limitations of the study.

Chapter three provides a literature review of the challenges affecting Higher Education Institutions globally, explaining the concepts of the Future of Work, the Skills Gap, Employability, and Digitalization; additionally, it also describes how the outbreak of COVID-19 has affected Higher Education around the world and propelled its transformational urgency.

Chapter four introduces the concept of Entrepreneurial Universities and the HEInnovate framework, which were used as the theoretical framework for this research.

Chapter five answers the 4 sub-questions by first giving an overview of the current Peruvian Higher Education field and then presenting and analyzing the results of the assessment for the chosen sample.

Finally, chapter six presents the main conclusions and gives an answer for the main research question. After presenting the conclusions, recommendations for policy action and for university management are given.

2. RESEARCH METHODOLOGY

As mentioned, the main objective of this study is to understand how currently fit for the future Peruvian HEIs are by assessing their innovative and entrepreneurial capacity using HEInnovate's Framework and self assessment tool, to then deepen in the factors behind the results, to identify the factors that could be improved in order to increase this capacity. It is relevant to measure the entrepreneurial capacity because this characteristic is considered as an indicator of *future readiness,* this means whether or not a university may be apt and capable to face the challenges of the future, mainly related to managing uncertainty and finding innovative ways to thrive in defiant scenarios. Special focus is given to understand how Peruvian universities are currently preparing, if at all, to face future challenges related to Skills development, Employability, and Digitalization.

This chapter presents the research method selected and the rationale behind it. It begins explaining the research design and the sample selection, after that it deepens on the procedures of data collection; finally, it points out the limitations of the study and the additional research opportunities that arise from these.

2.1 Research Design

In order to achieve the aforementioned objective, this research is a combination of a literature review of the current global trends affecting HEIs future and a case study of three Peruvian universities.

A case study is an ethnographic study. Using this type of study design, one can identify a group of people; study them in their homes or workplaces; note how they behave, think, and talk; and develop a general portrait of the group (Creswell, 2012). A case study is an in-depth exploration of a bounded system (e.g., activity, event, process, or individuals) based on extensive data collection (Creswell, 2007). This approach is the most suitable for this research for a number of reasons. As stated in the background of the problem and research gap, there is a notable lack of research in this topic for the Latin American context, and even more for the Peruvian context, which makes the case study suitable because this approach is preferred when "why" and "how" questions are being asked (Creswell, 2014).

Additionally, case studies can involve single or multiple cases and the collected data can be quantitative or mixed; thus, this research focuses on measuring and describing the entrepreneurial potential of three Peruvian universities using the mixed-methods approach of

Sequential Explanatory Strategy. This research strategy is characterized by the collection and analysis of quantitative data in a first phase of research followed by the collection and analysis of qualitative data in a second phase that builds on the results of the initial quantitative results (Creswell, 2009). Here, quantitative results serve as a basis of information for the qualitative data collection; therefore, in this research, the results of the quantitative HEInnovate assessment are collected first, and then used as the basis for the in-depth interviews, so the two forms of data are separate but connected.

2.2. Sample Selection

A characteristic of qualitative research is to present multiple perspectives of individuals (Cresswell, 2012), therefore the sampling type for this study will be purposeful sampling separated in phases. Maximal variation sampling for the first phase of the research, after the literature review, and confirming and disconfirming sampling for the second phase.

In qualitative research, participants and sites are identified on purposeful sampling, based on places and people that can best help understand the central phenomenon of study (Creswell, 2012). In purposeful sampling, researchers intentionally select individuals and sites to learn or understand the central phenomenon. Maximal variation sampling is a purposeful sampling strategy in which the researcher samples cases or individuals that differ on some characteristic or trait (Creswell, 2012). Using this method for the first phase will help to obtain perspectives from people who play different roles in the universities studied, so that a more comprehensive idea of the reality of the institution is obtained. Confirming and disconfirming sampling is used in the second phase with the aim to corroborate and get deeper insights of the data obtained in the first phase (Creswell, 2012). The standard used in choosing participants for the second phase is if they are “information-rich”. Purposeful sampling applies to both individuals and sites (Creswell, 2012) and it is a strategy used during a study to follow up on specific cases to test or explore further specific findings (Creswell, 2012).

The sample is conformed by different stakeholders from three Peruvian universities. The universities were chosen for two reasons: 1) the researcher's access to information and 2) the different characteristics of the universities. A traditional, non-profit, long-standing and highly renowned Comprehensive University (CU), which was studied at the university level and also at the level of the Faculty of Business (CUB), and two for-profit universities, younger and with a more modern perspective: a University of Applied Sciences (ASU) with a focus on business-oriented careers and a Creative University (CreU) with a focus on creative careers. In

order to reduce the bias and to make the assessment more accurate and comprehensive, the author decided to select representatives from the different groups of interest of each university. Then, the points of view of professors, students, administrative staff, researchers, heads of department, faculty and rectorship of each of the chosen universities have been collected. The total number of people who have participated in this research is 50.

2.3. Procedure of Data Collection

The data for this study has been collected in three phases. The first one is the document analysis of existing literature and current global reports about the challenges affecting Higher Education's future, meaning the Future of work, the Skills Gap, Employability, Digitalization, and COVID-19. The second phase consisted in the completion of the HEInnovate assessment on the eight dimensions of an entrepreneurial university for each of the selected institutions. The third phase consisted of in-depth interviews with selected key players from each university, and its aim was to better understand the rationality behind the assessment's results.

a. Document analysis

Documents consist of public and private records that qualitative researchers obtain about a site or participants in a study. These sources provide valuable information in helping researchers understand the central phenomena (Creswell, 2012).

For this study, the source of documents gathered is of public domain, and consists of academic papers, the universities websites, and annual reports published by specialized organizations such as McKinsey, Adecco, Accenture, Deloitte, OECD, World Economic Forum, among others, about issues related to the Future of Work, the Future of Education, Global trends in Talent Development, and Global trends in Talent Management.

b. Cross-sectional survey: HEInnovate self-assessment tool

HEInnovate is a guiding framework for innovative and entrepreneurial higher education institutions developed as a collaborative effort between the European Commission, Directorate-General for Education and Culture and the Organization for Economic Co-operation and Development (OECD) through its LEED Programme (Local Economic and Employment Development). It is an internet-based platform that offers a self-assessment tool with instant reporting and downloadable guiding notes and case studies. Although HEInnovate is not intended to be a tool for benchmarking or scoring but rather a tool that promotes peer learning

and organizational development (OECD, 2015), its well structured and standardized design has worked well as an initial survey for the development of this study, especially its “group function”, because it allows the exploration of different perspectives within a higher education institution. This works particularly well with the maximal variation type of sampling that has been chosen for this phase of the research.

Survey research designs are procedures in quantitative research in which investigators administer a survey to a sample or to the entire population of people to describe the attitudes, opinions, behaviors, or characteristics of the population. In this procedure, survey researchers collect quantitative numbered data using questionnaires and statistically analyze the data to describe trends about responses to questions and to test research questions or hypotheses (Creswell, 2012). It is also important to note that surveys in this case do not intend to explain the cause and effect of the studied phenomena; instead, their aim is to describe trends in the data and learning about the surveyed population rather than offer rigorous explanations (Creswell, 2012). The HEInnovate self-assessment tool could be considered a type of cross-sectional survey aiming to examine current attitudes, beliefs, opinions and practices within the selected higher education institutions.

For this phase of the research, the overall sample selected among the three studied universities was fifty people, and the researcher tried to cover as many and diverse stakeholders as possible. The sample consisted of groups of Deans, professors, heads of faculty, directors, administrative staff, researchers, and students of each university. Details can be found in Table 1.

Table 1

Number of survey participants

	PUCP	UCAL	UPC
Dean/Vicerector	1	2	
Head of Entrepreneurship & Innovation	1	1	1
Faculty Dean/Director	3	2	2
Professor/Researcher	5	4	3

Administrative Staff		2	
Student	10	7	6

c. Interviews

A qualitative interview occurs when researchers ask one or more participants general, open-ended questions and record their answers. An open-ended response to a question allows the participant to create the options for responding. The researcher then transcribes and types the data into a computer file for analysis (Creswell, 2012). Interviews in qualitative research have both advantages and disadvantages. An advantage is that they provide useful information when observation of participants within the studied context is not possible, and they allow the participants to describe detailed personal information. Additionally, they also give the interviewers better control over the types of information received, because they can ask specific questions to gain deeper detail on a certain topic or fact. On the other hand, some disadvantages come from the fact that interviews provide information “filtered” through the lenses of interviewers, and they can also be deceptive and provide the perspective the interviewee wants the researcher to hear (Creswell, 2012). Nonetheless, in spite of the limitations, for this study this modality has been chosen as the one most in line with the needs and the results wanted to be obtained.

The kind of interviews used were semi-structured and one-to-one. One-to-one interviews are ideal for interviewing participants who are not hesitant to speak, who are articulate, and who can share ideas comfortably (Creswell, 2012). In total, a number of 15 one-to-one interviews were conducted, details can be found in Table 2. The interviewees were selected strategically from the pool of the 50 initial HEInnovate’s assessment tool respondents. Preference was given to respondents in strategic positions such as the heads of entrepreneurship and innovation departments, deans and directors. For students, professors, researchers, and administrative staff, the researcher tried to balance them accordingly.

Table 2

Interview participants

	PUCP	UCAL	UPC
Dean	1	1	
Head of Entrepreneurship & Innovation	1	1	1
Faculty Director	1		1
Professor/Researcher	5	1	1
Administrative Staff		1	

All interviews were held via the platform Google Meets, had an average duration of one hour, were recorded in video and then analyzed using the software Atlas.ti.

2.4. Data Analysis

The data analysis strategy used in this research is a mix between quantitative analysis and qualitative content analysis. The quantitative results were automatically retrieved using the HEInnovate platform, which gives a detailed view of the score each university got for all the eight dimensions of analysis; additionally, the author also made some crossings to gather specific information. These results helped to answer the research sub-question *"How do Peruvian HEIs rate in entrepreneurial capacity according to the HEInnovate framework?"*.

For the qualitative phase, the method for data analysis was the six-step process proposed by Creswell. First, collecting and organizing the interview videos into two level categories; the top level category is which university they represent, the sub-category is which role they play within that university. Second, uploading the interviews to the software Atlas.ti. After that, listening them so as to gain a general sense of the material and the main ideas. Then, the process of coding the data started. Descriptions were added to the codes, and seven categories were created:

- Factors limiting the Entrepreneurial Potential
- Factors supporting the Entrepreneurial Potential
- State of Entrepreneurship and Innovation in the university
- Efforts for 21st century Skills Development

- Efforts for enhancing student's Employability
- State of Digitalization in the university
- Ideas for ideal scenario

Finally, these categories formed themes to give answers to the research sub-questions a) *What are the factors supporting or preventing Peruvian HEIs to accomplish their entrepreneurial potential? b) What efforts are Peruvian HEIs making for developing 21st century skills, enhancing their students Employability, and accomplishing Digital Transformation? c) What measures could Peruvian HEIs take in order to maximize its entrepreneurial and future-proof potential?*

2.5 Limitations and further research opportunities

a. Limitations

In addition to the limitations of time, resources and geographic location, the limitations of this research are linked to the natures of the selected research methods. For the quantitative phase, the limitations are related to the sample size, which could be considered as small and centered only in Lima. However, given that the intention of this phase is not to present conclusive results or to establish a ranking of entrepreneurial capacity, but rather to explore the use of the HEInnovate tool applied in Peruvian universities in order to have a preliminary view that will later allow to investigate more about the detail of these results in the qualitative phase, it is considered that this limitation does not affect the study. For the qualitative phase, the limitations are that the information provided in the interviews could be biased by the interviewees' perspectives, views or intentions to present a certain image to the researcher. Here again, the researcher emphasizes the importance of not treating the results of this research as absolute, but as a first approach to the study of the entrepreneurial capacity of Peruvian universities.

b. Further research opportunities

Taking the aforementioned limitations as a base, further research opportunities arise for this topic. First of all, given the fact that this study focuses only on private universities, it would be interesting to examine how the entrepreneurial potential is perceived at public universities. Moreover, how it is perceived in provinces outside Lima. Finally, this research also opens a

window of opportunity for examining the entrepreneurial and future readiness of Peruvian higher education institutions at a national level.

3. CHALLENGES AFFECTING HIGHER EDUCATION'S FUTURE

As mentioned before, one of the most pressing issues being studied today within the Higher Education context is how the concept of "The Future of Work" is already transforming and forcing Higher Education institutions to rethink their own nature and essence, but this concept does not come alone. There are many implications being brought to the table as a result of this, some of them more urgent than others because they are every time more in the present than in the future. Gaining a deeper understanding of these implications is critical to comprehending why Higher Education needs to change and to which direction this change should point to. This study focuses on these most urgent issues; therefore, this chapter presents a literature review on how the concepts of The Future of Work, the Skills Gap, Employability, Digitalization, and lately but not least important, Covid-19, are currently affecting the global Higher Education landscape. In addition, it also presents some initiatives and recommendations given by experts at a global scale to mitigate these threats.

3.1. The Future of Work and its effects in Higher Education

The changing nature of work is "the defining economic feature of our era", according to former Treasury Secretary and Harvard University president Lawrence Summers (Selingo, 2017b). During the last years, the world of work has been changing massively. Entire occupations and industries are expanding and contracting at an alarming pace, and the skills needed to keep up in almost any job are increasingly churning at a faster rate (Selingo, 2017b). A large number of studies have been carried out in recent years in the context of the "Future of Work". However, despite a growing research in this area and despite the intensity of the debate, no commonly accepted vision on the future of work has yet been established. Nevertheless, most publications highlight the impact that the Fourth Industrial Revolution might have on the labor market (Balliester, 2018), more concretely, the impact of technology on automation and the rise of the gig economy are identified as two of the major megatrends that will revolutionize the future of work and skills.

a. Automation

According to the World Economic Forum, 65 percent of today's school children will graduate into jobs that do not yet exist (World Economic Forum 2016). A study by McKinsey & Company

suggests that by 2030 up to 375 million workers will need to switch occupational categories due to automation. While the percentage of jobs that may be automated is debated amongst scholars (an OECD study places the average amongst 21 OECD countries at nine percent), the fact remains the same: AI and automation will have a profound impact on the future of work (Selingo 2017b).

The advances in automation in the 21st century will not just affect low-skilled jobs. The World Economic Forum suggests that “as entire industries adjust, most occupations are undergoing a fundamental transformation. While some jobs are threatened by redundancy and others grow rapidly, existing jobs are also going through a change in the skill sets required to do them” (World Economic Forum 2018). At the same time, skills development is not keeping up with the speed of change and even now some of the technical skills employees do have are becoming outdated more quickly (European Commission 2017).

b. The Gig Economy

The gig economy refers to the shift away from traditional employment where workers are full-time employees of one employer to an economy where people are freelancers or working on contracts for multiple employers (D2L, 2018). The international gig economy is currently growing at approximately 14 percent annually (D2L, 2018). As of 2019, a third of the U.S. workforce was conformed by freelance workers and some estimated that it would grow to 43 percent during 2020 (OECD, 2019). If the trend in job growth continues to skew towards gig-type jobs, a large portion of the workforce could essentially become self-employed (D2L 2018). The McKinsey Global Institute estimates that 20 to 30 percent of the working-age population in the United States and the European Union is engaged in independent work. While some workers perform freelance work because they cannot find full-time employment, seven out of ten independent workers in the US choose to engage in the gig economy (Selingo, 2017b).

This shift represents an opportunity for many workers, but at the price of letting go of the certainty, opportunity, and protections that the traditional employment structure provides. Those within the gig economy framework are generally taking care of their own (Selingo, 2017b). In a gig economy, workers need to take entrepreneurial approaches to self-direct their own learning, a skill very few have absorbed in a lifetime of schooling where teachers, parents, professors, and even the course syllabus, laid out a learning pathway for students (Selingo 2017b). With skills being their most marketable commodity in a highly competitive marketplace, gig economy

workers will find it essential to adapt quickly and continually enhance their skill sets to meet the needs of the labor market on an ongoing basis (D2L 2018).

3.2. The Global Skills Gap

As the cost of postsecondary education has risen, its real value in the workplace is increasingly questioned as employers report having trouble finding qualified candidates for open positions (European Commission, 2017). This can be linked partly to a mismatch in credentials being earned versus those being sought after by employers, as well as outdated skills being taught for sought-after credentials (European Commission, 2017). This skills gap has affected more than a third of international companies. According to a 2014 report from the European Commission, the skills gap has bottlenecked growth in key sectors: including healthcare, information technology, and engineering. While these sectors require very technical skills, even basic skills such as critical thinking and emotional intelligence are in high demand (D2L 2018).

According to a report conducted by D2L in 2018, in the next few years, the skills challenges presented by various studies seem dire without action: In the UK, 21% of workers are in occupations likely to shrink or disappear by 2030 and need to reskill for the future. 44% of Europeans between the ages of 16 and 74 do not have basic digital skills. 65% of children entering kindergarten in 2020 will end up in jobs that currently do not exist. With such a rapid production of information, nearly 50% of the subject knowledge studied in the first year of a four-year technical degree will be outdated by the time the individual graduates and 65% of all jobs will require training after high school or a post-secondary degree (D2L, 2018).

The skills gap does exist not only in technical skills but also in soft skills, a term associated with how people get along with one another, communicate, and work in teams (QS Quacquarelli Symonds, 2018). Author Jeff Selingo (2017) states that “these skills should be called hard skills because they are difficult to teach”. According to a report published by Deloitte in 2018, the core 21st century skills needed for the Fourth Industrial Revolution can be grouped into 4 categories: 1) workforce readiness, 2) soft skills, 3) technical skills, 4) entrepreneurship. And the teaching and training methodologies to acquire them are team-based, project based, practical application, experiential, case simulation, business exposure, job shadowing, mentorship and coaching.

3.3. The Employability Issue

Employability is understood as an attribute enabling success within employment and also life more widely, hence employability skills being referred to as “skills for life” (Blackmore et al., 2016). Within this wider definition, employability is also considered in terms of its societal contribution and benefit to a range of stakeholders beyond the student, such as the workforce, community, and economy (Blackmore et al., 2016). Also, it is becoming a core issue in many countries, and increasing attention is being paid to the role of higher education in developing employability.

As research shows, the goal of obtaining a postsecondary degree for many students is to provide them with the necessary tools to thrive in the labor market (D2L, 2018). However, a 2013 McKinsey & Company study of youth, education providers, and employers in nine countries showed that while 72% of higher education institutions believe they prepare their students well for the workforce, half of the students are not sure if their credentials improve their opportunities at finding a job (McKinsey, 2013). This disconnect can also be seen in the private sector where only 11% of business leaders ‘strongly agree’ that students have the vital skills for the labor market, compared to 96% of chief academic officers who believed their institutions were either somewhat or very effective at providing the necessary skills to students (D2L, 2018).

While a post-secondary degree is still proven to be a career asset, the current level of disconnect between what employers want versus what is being taught must be addressed (McKinsey 2013). A report conducted by Deloitte in 2018 points out the barriers that youth has reported for getting the skills they need for the job they want. Among these barriers, “no opportunities” and “no relationships with employers” stand out among the most cited (Deloitte, 2018), and traditional universities are not giving them the tools to overcome them, therefore, a different approach is needed.

3.4. Digitalization

It is widely accepted that Digitalization, and more concretely, Digital Transformation is changing the job market and requiring new skill sets. Digital technologies offer new ways of learning and, to reap their benefits, education and training systems need to respond better to these changing realities (European Commission, 2016). This change is challenging for traditional HEIs at all levels, as stated by Rampelt et al. (2018):

> “Digitalisation of higher education is a transformative process that substantially influences all activities of higher education institutions. It permeates all processes, places, formats and objectives of teaching, learning, researching and working in higher education. This digital transformation includes the development of new infrastructures and the increasing use of digital media and technologies for teaching and learning, research, support services, administration and communication, but also the need of students and staff to develop new (digital) skills for their current and future workplaces.”

Additionally, according to the while paper “Bologna Digital 2020”, higher education is the domain where many aspects of change arising for the digitalization of the world come together, and there are four specific requirements for it (Rampelt et al., 2019):

1. Learners need to acquire new skills and competences, which enable them to fully benefit from the ‘digital dividends’ of technology.
2. Study programmes need to reflect on and react to the developments in society and the labour market.
3. Higher education institutions should be a place to consider and even practice future social reform, which can truly harness the benefits of digitalization for all.
4. The opportunities of digitalization for creating new learning spaces should be harnessed to improve the accessibility and quality of educational provision.

Therefore, building the capacities for successfully driving through the Digitalization process is crucial not only for ensuring HEIs future and sustainability, but to secure that HEIs continue having a relevant role in the betterment of their communities.

3.5. The Covid-19 pandemic

The COVID-19 pandemic arrived unexpectedly and changed the whole world from one day to the other. The overall impact of COVID-19 has been particularly complex in regions such as Latin America and the Caribbean, exacerbated by weak social protection structures, fragmented health systems, and deep inequalities (UNITED NATIONS, 2020). This, together with the unresolved challenges of the region’s Higher Education systems such as growth without quality, inequities in access and achievement, and the progressive loss of public financing are almost the perfect recipe for disaster. The UNESCO IESALC estimates that the temporary closure of HEIs affects approximately 23.4 million higher education students and 1.4 million

teachers in the region, which represents more than 98% of the region's population of higher education students and teachers[4].

Taking all of this into account, there is no doubt that this pandemic has infused an additional sense of urgency and complexity for the transformation of Higher Education, especially in Latin America, where the shift to virtual education has been a struggle given the region's little technical infrastructure and instructional support to move online, its high inequality rates, and the region's private HEIs high dependance on tuition fees (Bothwell, 2020). This last factor is particularly worrying for private HEIs given the effects of the crisis in Latin America's labor markets, which have contracted radically, causing that people really struggle with getting the money to pay high tuition fees. Nonetheless, if anything positive can be drawn from this crisis, is that it can be seen as an opportunity or catalizer to rethink and redesign the way higher education institutions currently work with a special focus on the future or the so called "new normality"[5]. In this context, working for solving the challenges of enhancing employability, skills development, and innovation and digital capabilities focused on contributing to the betterment of the society and the world economy become priorities, and much of this responsibility relies on higher education.

3.6. Proposed solution paths for higher education's challenges

Based on the context shown above, the only clear future path for higher education institutions is to transform the way they have been functioning and the value they bring to students. To this end, several experts and expert organizations have gathered a number of recommendations to be applied in higher education that can generate the expected transformation. These recommendations have been grouped into eight broad categories:

a. Rebuilding the Value proposition of Higher Education for the Future of Work

b. Adapting organizational design to the future of work

c. Embracing new pedagogical models for the 21st century

[4] UNESCO (2020). COVID-19 and higher education: Today and tomorrow. Impact analysis, policy responses and recommendations. IESALC.

[5] A new normal is a state to which an economy, society, etc. settles following a crisis.

d. Rethinking the roles of educators

e. Creating authentic learning experiences

f. Advancing digital equity

g. Improving digital literacy

h. Leveraging Industry as a partner

For reasons of space, the description of each category is not being elaborated, but a more detailed explanation can be found in Annex B.

4. THEORETICAL FRAMEWORK

As presented in the previous chapter, higher education's challenges are different and broad, but it can be said that the connecting thread between them is that they are essentially related to the future and the role that technology advancement is having in the transformation of the way humans learn, work, and live. These changes are forcing higher education institutions to navigate unknown territories at an alarming speed. To manage this complexity, higher education needs to prepare students who can navigate across disciplines and also have deep knowledge of individual subjects, thus higher education institutions need to become more agile, adaptive, and imaginative (Selingo, 2017a). Additionally, they need to focus on training their students to navigate uncertainty, to be self-sufficient and entrepreneurial in the case of facing an unfavorable job market scenario; as well as they need to advance their digital capabilities, for both the organizations' hardware and the people that conform them.

Given these needs of change, one of the best fitting frameworks for action and a good indicator of future-readiness is the Entrepreneurial University model, which initially emerged as a response to the needs of transformation of universities that were looking for innovative ways to become more sustainable, relevant, and active players in the betterment of their societies.

This chapter starts presenting the details of this concept and the rationale behind why it has been chosen as the guiding framework for this study, to then introduce the HEInnovate Framework, an adapted version of the entrepreneurial university concept taking into account the new role of higher education institutions in the 21st century.

4.1. The Entrepreneurial University concept

a. A brief historical overview of University Evolution

Universities are one of the oldest and most resilient institutions (Ropke, 1998), and during their long time of existence, they have undergone significant changes and reforms. They were first conceived as teaching-oriented institutions, where the main ideas behind their existence were "cultivating the mind" and "raising the intellectual tone of the society", especially in the medieval era. Additionally, they were considered elite institutions, only available for training selected members of the community (Geuna, 1996), and their focus was on education understood as teaching rather than research. This was the case for the first european universities, such as the University of Bologna and University of Oxford.

This situation continued until the beginning of the 19th century, when major reforms were introduced at the University of Berlin led by the Head of the Prussian educational administration, Wilhelm von Humboldt, who had the task of linking higher education with economic progress. (Altbach, 2011). Here is where the Humboldtian model was born, merging teaching, learning, and research into the core purpose and function of a university (Ash, 2006). This new model inspired other universities in Europe and even outside Europe to rethink their missions, and ultimately to adopt it as well, giving birth to what is known as the first academic revolution and the second mission of universities (Etzkowitzs, 2008).

In more recent years, the changes and challenges brought about by the Knowledge Economy induced a new transition for universities and higher education institutions in general. This was defined as the second academic revolution, the one that expands the purpose and function of higher education adding the pillar of Socio-Economic Development as the third-mission of universities (Etzkowitz & Webster, 1998). It is in this revolution that the concept of the Entrepreneurial University appears, with a focus on the role and responsibility that Higher Education has on generating positive societal impact, especially given the world's current challenges.

b. What is an Entrepreneurial University?

An Entrepreneurial University is, or should be, the normal model of a university in an Entrepreneurial Society. An Entrepreneurial Society refers to places where knowledge-based entrepreneurship has emerged as a driving force for economic growth, employment creation and competitiveness in global markets (Audretsch, 2007). As it is usual with relatively new concepts, there is still not a single one-size-fits-all definition of what is an Entrepreneurial University (EC & OECD, 2012); however, there are certain points in which all the existing definitions agree, for instance the university's role as catalyst for regional economic and social development through the spin-off of new and innovative enterprises that add value through knowledge creation, the need of universities to stop being ivory towers to become more involved and partner with the different actors of society such as the government and the industry, and also the need of generating diversified sources of income to ensure the institution's economical sustainability (Guerrero et. al, 2006). Additionally, some definitions also highlight the importance of intrapreneurship, a process that goes on inside an existing firm or institution and leads not only to new business ventures but also to other innovative activities and orientations such as the development of new products, services, technologies, administrative techniques, strategies and

competitive postures (Antoncic and Hisrich, 2001). Some of the different definitions and their authors of these concepts can be seen in Table 3 below.

Table 3

Principal definitions of Entrepreneurial Universities

Year	Author	Definition
1983	Etzkowitz	“Universities that are considering new sources of funds like patents, research under by contracts and entry into a partnership with a private enterprise”
1995	Chrisman , et al	The Entrepreneurial University involves “the creation of new business ventures by university professors, technicians, or students”
	Dill	“University technology transfer is defined as formal efforts to capitalize upon university research by bringing research outcomes to fruition as commercial ventures. Formal efforts are in turn defined as organizational units with explicit responsibility for promoting technology transfer”
1998	Clark	An Entrepreneurial University, on its own, seeks to innovate in how it goes to business. It seeks to work out a substantial shift in organizational character so as to arrive at a more promising posture for the future. Entrepreneurial universities seek to become “stand-up” universities that are significant actors in their own terms”
	Röpke	“An entrepreneurial university can mean three things: the university itself, as an organization, becomes entrepreneurial; the members of the university -faculty, students, employees- are turning themselves somehow into Entrepreneur; and the interaction of the university with the environment, the “structural coupling” between university and region, follows entrepreneurial pattern”
1999	Subotzky	“The entrepreneurial university is characterized by closer university-business partnerships, by greater faculty responsibility for

		accessing external sources of funding, and by a managerial ethos in institutional governance, leadership and planning".
2002a	Kirby	"As at the heart of any entrepreneurial culture, Entrepreneurial Universities have the ability to innovate, recognize and create opportunities, work in teams, take risks and respond to challenges"
2003	Etzkowitz	"Just as the university trains individual students and sends them out into the world, the Entrepreneurial University is a natural incubator, providing support structures for teachers and students to initiate new ventures: intellectual, commercial and conjoint"
	Jacob, et al.	"An Entrepreneurial University is based both, commercialization (customs made further education courses, consultancy services and extension activities) and commoditization (patents, licensing or student owned startups)".

Source: Adapted from Guerrero, M. et al. (2006)

To provide a global consensual definition of the term, interconnecting the thoughts of prominent authors like Clark, Kirby, and Etzkowitz, it could be summarized that an Entrepreneurial University is a university that has the ability to innovate, recognize and create opportunities, work in teams, take risks and respond to challenges on its own; that seeks to work out a substantial shift in organizational character so as to arrive at a more promising posture for the future. A university that is a natural incubator of innovation, that provides support structures for teachers and students to initiate new ventures: intellectual, commercial and co-joint (Guerrero, M. et al; 2006). To this makes sense to add the point of view of Röpke, which alludes to how entrepreneurialism should be lived in a holistic way within an entrepreneurial university, in its organization culture, structure and operation; in the people who conform it, be they students, academics, or administrators; and in the way it relates to its environment, promoting openness and synergies through entrepreneurial and innovative initiatives.

Another interesting definition that does not appear in Table 3, but that applies for the context of developing countries, comes from Doh (2012), where he refers to the role of entrepreneurial universities as active actors in combating poverty within their societies following

the Quadruple-Helix model of innovation[6]. Doh sustains that universities in developing countries could make meaningful contributions to sustainable socio-economic development by actively engaging with the rural community and other less formal and smaller groups in the society. Along these lines, the author of this research would add the responsibility of universities to promote the employability of their students, either by training them to become entrepreneurs and generate their own employment, or by creating alliances or strategies with potential employers. It should not be forgotten that, as mentioned in a previous chapter, employability has become a critical factor for universities. Moreover, given the COVID19 crisis, the responsibility of universities extends to contributing to the health sector, essential to maintain socio-economic stability and sustainability.

Given all the characteristics of what an Entrepreneurial University should be or represent, one could say that this is the model that universities should follow in order to be capable of tackling the challenges of the future; however, at the same time it becomes noticeable for anyone who knows at least a bit of how most universities function, that not many universities qualify to be considered entrepreneurial. Then, the next question that arises is why there are not many entrepreneurial universities, and how would it be possible to have more of them. Although these questions cannot be answered yet with certainty for every geographical context, there are some common enabling and inhibiting factors, as well as necessary or "irreducible minimum" (Clark, 1998) elements that have been proposed as enablers for Entrepreneurial Universities. Both concepts will be explained below.

c. Enabling and Inhibiting factors of an Entrepreneurial University

Many scholars have theorized about the factors and attributes that enable the existence and correct functioning of an entrepreneurial university. Among the most cited ones stand out: a strategic direction, distinctiveness, self-reliance, risk taking, proactivity, interconnectedness, diversification of funding, development periphery, entrepreneurial ethos, capitalization of knowledge, regional engagement and socio-economic impact (Diriba, 2016). To these, the author of this research would give special attention to the need of organizational structures able to create connections between teaching, research, and administration, to generate a shared vision where the university is more than the sum of different departments (Dearlove, 2002), such as business incubators and technology transfer offices that are support mechanisms in the

[6] The Quadruple Helix Model of innovation recognizes four major actors in the innovation system: science, policy, industry, and society. (Schutz, et al., 2019)

process of spin-offs creation (Guerrero M. et al, 2010); and of course, entrepreneurial managers and academics who are crucial actors for the transformation of traditional universities into entrepreneurial universities and that are able to create educational programs that provide teaching and learning methods oriented towards improving students' creativity and critical thinking, among other important 21st century skills. Managers with personal characteristics of innovative leadership that work full-time in the university to fulfil its mission (Dill, 1995, Sporn, 2001) and academics with an entrepreneurial DNA that can improve the educational quality and generate innovative research (Powers and McDougall, 2005).

On the other hand, despite the increasing ideological and practical support to make universities entrepreneurial, the reality is that most HEIs remain traditional in both cultural and practical aspects. In light of this, some factors that block the transformation and increase the complexity of the change can be identified. For instance, Shattock (2005), based on a case study in three universities identifies four intrinsic traits that prevent entrepreneurialism: the state, excessive bureaucracy, organizational culture, and the lack of a strengthened steering core. First, he refers to the need for financial flexibility and autonomy to be given by the state so that HEIs have the freedom to explore entrepreneurial pathways. Second, he mentions the existence of excessively bureaucratic procedures as a roadblock to entrepreneurialism in most universities, because they inhibit bottom-up initiatives that are critical factors for innovation. Third, he defends that top management support and the heartlands readiness are the essence for innovative practices to become the norm rather than the exception. Finally, he mentions the lack of a strengthened steering core as a common barrier to institutionalizing entrepreneurialism, and he advocates for a blend of managerial and collegial steering unit that promotes new and innovative approaches while keeping core academic values.

Likewise, other authors have referred to additional inhibiting factors for entrepreneurialism in universities such as academics' negative perception of entrepreneurialism in relation to the other core missions of a university, even seeing it as a "threat to traditional university values and curiosity driven research" (Currie et al., 2003); and lack of entrepreneurial competence, personnel rigidities and cultural differences with the industry (Lambert, 2009). On this point it is worth mentioning that there is an ongoing debate about whether entrepreneurialism is good or not for HEIs, in which authors who write about this refer to the term of academic capitalism[7] as a risk that should be controlled because it makes HEIs more

[7] Academic capitalism is defined as "market and market-like behaviors on the part of universities and faculty" (Slaughter and Leslie, 1997)

profit oriented instead of knowledge oriented (Slaughter, 2004). Nevertheless, despite being a very valid point of debate, the position of the author of this research is in favor of entrepreneurialism, mainly because she considers that the positive aspects that it can bring for the improvement of society far outweigh the negative aspects, as long as an ethical path is followed in making decisions about it. Furthermore, she considers that the existence of regulatory guidelines for entrepreneurship in universities could mitigate the risks of academic capitalism.

d. Elements of an Entrepreneurial University

As mentioned before, there is not one single definition of what constitutes an entrepreneurial university and several authors have written about it. Nonetheless, for the purposes of this research the elements proposed by Clark (1998) will be taken as the theoretical basis. Clark sought to explore the ways in which universities used innovation and experimentation to overcome the challenges brought about by a series of constant changes, including the growing student demand, the growth of the knowledge industry, a growing array of subjects and programmes, increased expectations of the government, and a decreasing governmental funding (Finlay, 2004). As a result, he came up with five categories that constitute the “irreducible minimum” of elements that enable universities to transform themselves to tackle these and other potential challenges.

The first element is the “strengthened steering core” which responds to the administrative backbone that must embrace both central managerial groups and academic departments (Clark, 1998). Clark states that the university should have the capacity to set its own direction and manage it effectively, therefore the autonomy of this steering core is a necessary condition for change. Additionally, he refers to the task of balancing new managerial values with the long standing collegial values that exist within a university, where academics, regardless of their position in the organizational hierarchy, consider each other as equals, in direct contrast to business organizations where there is a considerable recognition of authority along the chain of command.

The second element is a “stimulated academic heartland”, which corresponds to a motivated academic and student staff towards change and entrepreneurialism. According to Clark, the need for this feature corresponds to the usual bottom heaviness of academic institutions, where again, unlike business organizations, most of the power resides at the lower levels, i.e. faculties and departments within them (Clark, 1998). Given the amount of influence

academics have on HEIs makes having them as advocates for transformation and entrepreneurialism a critical element for success. Moreover, the role of students in the entrepreneurial transformation of universities is also recognized because in addition to being an excellent source of innovative ideas, they could play a key role in transforming the knowledge produced within the university into a real product or service which could ultimately benefit themselves, the university, and the community (Clark, 1998).

The third element is “the expanded developmental periphery”, which purpose is contributing to organizational sustainability, while at the same time embracing the relevance of the institution to external stakeholders (Diriba, 2016). In this sense, this element has two main functions: enhancing knowledge production within a university by promoting interdisciplinary collaborative research (Clark, 1998); and transferring the knowledge produced to key external parties such as the industry, the community and the government (Clark, 2004). If this is done correctly, it enables the university to diversify its funding base, which as mentioned before is an essential factor for entrepreneurialism. In addition to this, the expanded developmental periphery could contribute to the effective knowledge production within the university, where its members learn from the interaction with their counterparts from the industry and the community. As stated by Clark (1998), the university learns from the outside organizations and at the same time these learn from the university.

The fourth element is “the diversified funding base”, which represents a prerequisite for autonomy and adaptability, provided that the state has proved over time that it cannot be completely relied upon for financial needs of universities especially in the face of economic volatility (Diriba, 2016). As Clark (2004) mentions, state funding comes with many conditionalities attached, therefore, entrepreneurial universities need to find multiple streams of funding to fulfil their purpose and accomplish their goals and projects. There are three main streams of university income: the primary source is the state’s budgetary allocation, which is the most traditional one and the one that modern universities seek to move away from. The second stream is the one that comes from research councils or organizations, especially destined to be invested in research activities. The third stream is composed of a range of diverse sources such as public, private, for profit, non-profit, national, international, etc., and can be classified as “other organized government sources, private organized sources, and university generated income”, each coming with specific arrangements and needs (Clark, 2004).

Finally, the fifth and last element is “the integrated entrepreneurial culture”, which means setting a climate in which entrepreneurialism is embraced at all levels in the university (Clark, 1998). A culture that seeks to find and experiment in new pathways which could be risky but also potentially rewarding (Kwiek, 2013), that also seeks to collaborate internally and externally (Gibb, et al. 2012) and that is selectively responsive to environmental changes (Clark, 2004). Therefore, it could be said that the values that reflect an entrepreneurial culture are openness to change, risk taking, collaboration and responsiveness, being this culture the driver and the manifestation of the other entrepreneurial elements, which are expected to coexist in a mutually reinforcing and reciprocal relationship (Clark, 2004).

4.2. The HEInnovate Framework

In order to promote entrepreneurialism in HEIs, the European Commission’s DG Education and Culture together with the OECD created the HEInnovate self-assessment tool. The framework of the tool came from the need to define and identify the concepts and characteristics of entrepreneurial HEIs in a way that could be applicable to all HEIs. Therefore, in 2013 it was launched as a free self-assessment tool that could be used for all types of HEIs (Universities, Colleges, Polytechnics, etc.) to help them recognize their current entrepreneurial and innovative capacity, and also their readiness to engage in intrapreneurial activities (Henry, 2015). Additionally, the tool also provides advice, ideas and inspiration for effective management of HEIs and cultural change by sharing success stories and case studies of other HEI that have successfully accomplished entrepreneurial ventures (Arzeni & Tyson, 2018). Moreover, another nice feature of HEInnovate tool is that it allows for a decentralized evaluation of the HEI, because anyone, from leadership, staff and students, to representatives of the outside community and organizations can fulfil the assessment.

The HEInnovate assessment was chosen as the guiding framework for this study because in contrast to Clark’s model, in addition to the elements of an entrepreneurial university it also includes the dimensions of “Digital transformation capabilities” and “Entrepreneurial teaching & learning” (OECD, 2013), which have direct correlation with the challenges of the future that have already been described earlier in this paper. Each of these dimensions, their purpose and the questions that conform them can be seen in Table 4.

Table 4

HEInnovate's eight dimensions

Dimension	Purpose	Questions
Leadership & Governance	To explore and highlight the factors of the leadership and governance of a HEI that enable entrepreneurship and innovation, and strengthen an entrepreneurial culture.	1. Entrepreneurship is a major part of the HEI's strategy. 2. There is commitment at a high level to implementing the entrepreneurial agenda. 3. There is a model in place for coordinating and integrating entrepreneurial activities across the HEI. 4. The HEI encourages and supports faculties and units to act entrepreneurially. 5. The HEI is a driving force for entrepreneurship and innovation in regional, social and community development.
Organizational Capacity: Funding People and Incentives	To identify instruments in place to support entrepreneurial activities, such as financial strategies, staff recruitment, development and incentives policies, etc.	1. Entrepreneurial objectives are supported by a wide range of sustainable funding and investment sources. 2. The HEI has the capacity and culture to build new relationships and synergies across the institution. 3. The HEI is open to engaging and recruiting individuals with entrepreneurial attitudes, behaviour and experience. 4. The HEI invests in staff development to support its entrepreneurial agenda. 5. Incentives and rewards are given to staff who actively support the entrepreneurial agenda.
Entrepreneurial Teaching and Learning	To assess HEI's activities and methods that develop the entrepreneurial capacity of its students, graduates, and staff members.	1. The HEI provides diverse formal learning opportunities to develop entrepreneurial mindsets and skills. 2. The HEI provides diverse informal learning opportunities and experiences to stimulate the development of entrepreneurial mindsets and skills. 3. The HEI validates entrepreneurial learning outcomes which drives the design and execution of the entrepreneurial curriculum. 4. The HEI co-designs and delivers the curriculum with external stakeholders. 5. Results of entrepreneurship research are integrated into the entrepreneurial education offer.
Preparing and Supporting Entrepreneurs	To assess how the HEI prepares, stimulates and supports their members to start businesses, from the ideas to	1. The HEI increases awareness of the value of entrepreneurship and stimulates the entrepreneurial intentions of students, graduates and staff to start-up a business or venture. 2. The HEI supports its students, graduates and staff to move from idea generation to business creation. 3. Training is offered to assist students, graduates

	implementation.	and staff in starting, running and growing a business. 4. Mentoring and other forms of personal development are offered by experienced individuals from academia or industry. 5. The HEI facilitates access to financing for its entrepreneurs. 6. The HEI offers or facilitates access to business incubation.
Digital Transformation Capability	To assess the HEI's ability to integrate, optimize and transform digital technologies to support innovation and entrepreneurship.	1. The HEI fosters a digital culture as a mean for innovation and entrepreneurship 2. The digital infrastructure is planned, managed and continuously improved to align with the vision, mission and strategy of the innovative HEI. 3. The HEI is committed to digital teaching, learning and assessment practices. 4. Open science and innovation practices are widespread across the HEI. 5. The HEI has a dynamic digital presence supporting all its activities.
Knowledge Exchange and Collaboration	To examine whether the HEI is actively involved with external stakeholders to share, apply and exploit knowledge that support its third-mission.	1. The HEI is committed to collaboration and knowledge exchange with industry, the public sector and society. 2. The HEI demonstrates active involvement in partnerships and relationships with a wide range of stakeholders. 3. The HEI has strong links with incubators, science parks and other external initiatives. 4. The HEI provides opportunities for staff and students to take part in innovative activities with business / the external environment. 5. The HEI integrates research, education and industry (wider community) activities to exploit new knowledge.
The internationalized institution	To examine the HEI's links to the international surrounding and how these influence its activities.	1. Internationalisation is an integral part of the HEI's entrepreneurial agenda. 2. The HEI explicitly supports the international mobility of its staff and students. 3. The HEI seeks and attracts international and entrepreneurial staff. 4. International perspectives are reflected in the HEI's approach to teaching. 5. The international dimension is reflected in the HEI's approach to research
Measuring Impact	To assess the HEI's mechanisms to measure the	1. The HEI regularly assesses the impact of its entrepreneurial agenda. 2. The HEI regularly assesses how its personnel and

	effectiveness of entrepreneurial activities.	resources support its entrepreneurial agenda. 3. The HEI regularly assesses entrepreneurial teaching and learning across the institution. 4. The HEI regularly assesses the impact of start-up support. 5. The HEI regularly assesses knowledge exchange and collaboration. 6. The HEI regularly assesses the institution's international activities in relation to its entrepreneurial agenda.

Source: Own elaboration based on OECD HEInnovate's Introduction.

The assessment is available online on the HEInnovate website[8] and it is open for everyone for free. What is more, the feedback is instantaneous, including bar charts and spider graphs that provide an overview of the HEI's score in each of the dimensions.

[8] HEInnovate website: http://heinnovate.eu/

5. TO WHAT EXTENT CAN PERUVIAN UNIVERSITIES BE CONSIDERED ENTREPRENEURIAL?

This section begins with a brief summary of the current Peruvian university reality, followed by the results of the HEInnovate assessment and the in-depth interviews; finally it presents the analysis of the in-depth interviews conducted with relevant people from these institutions in order to understand in greater detail the results of the quantitative assessment and to be able to answer the research questions stated at the beginning of this document.

The final sample of the quantitative study consists of a total of 50 people from three private Peruvian universities: a Comprehensive University, a University of Applied Sciences and a University focused on Creative careers. For the in-depth interviews 15 of the 50 initial people were selected, the selection criteria was the role they played in these universities (priority was given to the most strategic positions and those who had a systemic understanding of the reality of each university), but also taking into account the need to have different roles, ergo different points of view.

Interviewees were asked about eight concepts in relation to the status of entrepreneurship and innovation in their HEIs. They were first asked about how they would describe the current state of entrepreneurship and innovation in their institution; after this they were asked about what they think are the enabling or stopping factors for entrepreneurship and innovation in their contexts. In addition, they also responded about the efforts -if any- their institutions are making in regards to 21st century skills, Digital Transformation, and Employability, three concepts that can be linked to three dimensions of the HEInnovate framework: Entrepreneurial Teaching and Learning, Digital Transformation and Capabilities, and Knowledge Exchange and Collaboration. Finally, they were asked about which measures or ideas came to their mind that would help increase the entrepreneurial potential of their institutions and the country. The results will be shown below. The content of their answers has been categorized to fit the eight HEInnovate dimensions.

5.1. Overview of the Peruvian Higher Education System

Peru is a country that has been undergoing major changes in higher education, most of these coming from the university reform of 2014. This reform focuses on ensuring minimum quality standards, both in teaching and research, for universities (SUNEDU, 2018). For the moment, it could be said that Peru is in a delayed situation compared to the rest of Latin

American countries in terms of higher education, since they are still focusing on the minimum indispensable, while other countries are already in more developed sights (SUNEDU, 2018). For the time being, the author's hypothesis is that most Peruvian universities are not yet prepared to become entrepreneurial universities, and at the same time the Peruvian Government is not prepared to assume the role of an enabler of entrepreneurial universities. This summary is important to understand the work dynamics of Peruvian higher education institutions, in order to understand more deeply the reason for the results of the HEInnovate assessment.

5.2. Peruvian Universities' state of Entrepreneurship and Innovation

This section shows the results of the HEInnovate assessment complemented by the in-depth interviews applied to three Peruvian universities, all of them based in Lima.

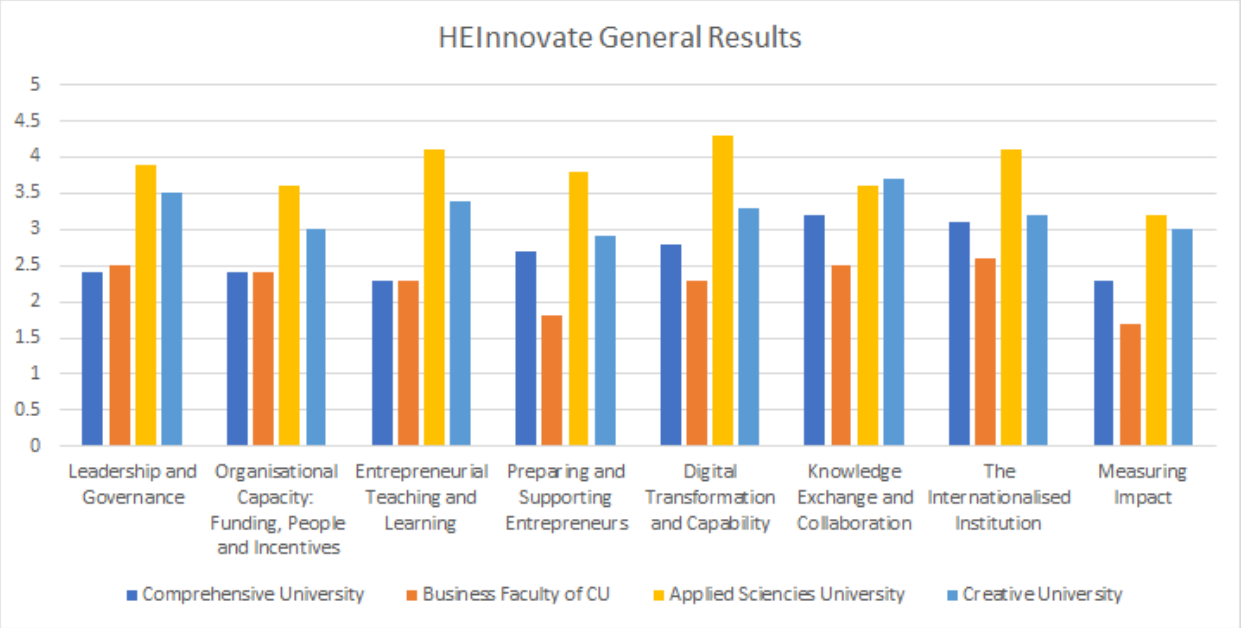
It is divided into two parts: first, the individual overall results of each assessed university; and second, a parallel of the results separated by each HEInnovate dimension. In total, four assessments were conducted for the following higher education institutions: 1) A Comprehensive University (CU), private non-profit, founded in 1917, which at the moment has around 25,000 undergraduate students divided among 13 Faculties and 16 Academic Departments ranging from Science and Engineering to Arts and Design, and that is characterized by a very high academic prestige, ranking 1° in the country, and a very traditional and political organizational culture. 2) The Business Faculty of the Comprehensive University (CUB), for which a separate assessment was made because in the CU interviews it was pointed out that this faculty had a quite different approach and culture in regards to entrepreneurship and innovation than the rest of the University, so the author wanted to verify this. Here it is relevant to mention that this is the second largest faculty by number of students at CU. 3) A University of Applied Sciences (ASU), private for-profit, founded in 1994, which at the moment has around 50,000 undergraduate students divided among 13 faculties and 46 careers, and that is characterized by its competitive nature and innovative approach. And finally 4) a Creative University (CreU), private for-profit founded in 2010, which at the moment has around 1600 undergraduate students divided among three faculties and 10 careers, and that is characterized by its creative and innovative potential.

It is important to mention that even though certain common points among the different studied institutions can already be appreciated, these results should not be taken or generalized as a final conclusion about the entrepreneurial capacity of the whole Peruvian university

ecosystem; instead, the author's intention is that these results serve as a baseline for further and broader research that can include a larger number of HEIs from different Peruvian contexts.

a. HEInnovate General results

Figure 1: HEInnovate General Results



Even though the intention of this study is not to make a hard comparison or raking between the studied higher education institutions, but rather try to better understand their current entrepreneurial potential and the factors enabling and stopping it, in general terms, the results of the HEInnovate assessment showed the following: on a basis of 40 points in total, the University of Applied Sciences got the highest score with 30.6 points[9]; the second highest belongs to the Creative University with a score of 26 points; the Comprehensive University comes in third place with a score of 21.2 points; and in the "last" place is the Business Faculty of the Comprehensive University, with a score of 18.1. For all the four analyzed institutions, the weakest dimension was "Measuring impact", with an average score of 2.44[10]; on the other hand, the strongest dimensions were "Knowledge exchange and collaboration" and "The Internationalized institution" both with an average score of 3.2, and "Digital Transformation and Capability" with an average score of 3.1. See Figure 1 for an overview of the mentioned results.

[9] The overall scores are calculated on the basis of 40 points.

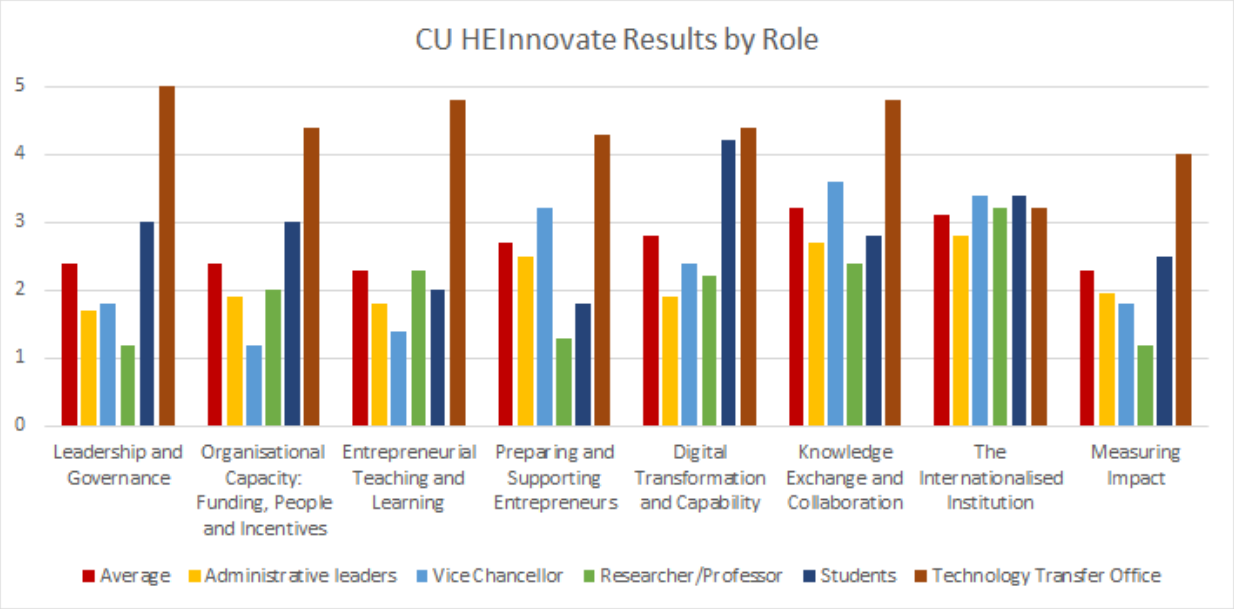
[10] The score of each dimension is calculated on the basis of 5 points.

b. Results by HEI

i. Comprehensive University

Regarding the quantitative assessment results of the Comprehensive University (CU), it is curious to observe the variation in the points of view of the diverse groups participating in the study (see Figure 2).

Figure2: CU HEInnovate Results by role



It can be seen that “Leadership and Governance” is the dimension where the scores differed the most among the respondents and “The internationalized institution” the one where most of them seemed to agree. Here it can also be noted that the most critical role regarding the current innovation and entrepreneurship capacity of this institution is the Researcher/Professor, which gave the CU a total score of 15.8. On the opposite site, the role of Technology Transfer Office gave it the highest score of 34.9.

The roles of Administrative Leaders, Vice Chancellor and Students seem to have a closer opinion to the Researcher, with total scores of 17.3, 18.9, and 22.7 respectively. Additionally, the average score of the CU’s eight dimensions was 2.6, which can be considered rather low, scoring the lowest in the dimensions of “Entrepreneurial Teaching and Learning” and “Measuring Impact”, with 2.3 in both cases, and getting their highest score in the dimension of “Knowledge Exchange and Collaboration”, with 3.2. Two more things are worth mentioning: 1) had it not been for the Technology Transfer role, two other dimensions with the lowest scores for

the CU would be “Leadership and Governance” and “Organizational Capacity”; and 2) Students seem to have a much higher opinion on the CU’s Digital Transformation Capability in comparison to the other roles; on this point, the author’s assumption is that this may be based on the final impression they got from the transition to online services caused by COVID19, especially in online learning, since they can only judge the outcome and not the process behind it.

Moving on to qualitative analysis, from the in-depth interviews it was possible to understand the details behind the quantitative results. The different interviewees were asked to express freely in their words how they would describe the current state of CU's innovative and entrepreneurial capacity, to which the response was almost unanimous: that although having an Innovation Hub for more than a decade, the CU is in a very initial state as far as entrepreneurship and innovation refers, and that, despite the fact that, due to COVID, greater efforts have been made in these instances, especially in the dimension of Digitalization, there is still a long way to go in comparison with other Peruvian universities, which may be “younger” and "less prestigious" than CU, but have very different governance models and leadership styles, which do allow for an innovative, agile and forward-looking culture. This is well explained in the words of CU’s Administrative Vicerector:

> “CU’s governance model, although being a private university, is more like a public university, and CU’s leadership style is a reflection of the people who conform the university and how Academics think. I don’t think this will change in the future, and if it does, it will take a long time. Therefore, although there are important efforts being made to achieve entrepreneurial capacity, it is going slow in comparison to other universities that have a different governance and culture. There are some faculties that are more advanced than others, for example engineering and business.” (CU’s Vice Rector, 2020)

Following this line, it is important to mention the accelerator impact that COVID has had in CU’s innovation related initiatives. In his interview, the Director of CU’s Innovation and Entrepreneurship Hub (2020) stated that “after talking about Innovation for more than 20 years, it was accepted in CU but it was not a priority” and that “innovation was not crucial because the risks of not being innovative were not evident”. He indicated that before COVID, several actors were trying to innovate from each of their fronts, but the impact was not expected to be very high because it was not part of the central core of CU, but rather an appendix of the academic curriculum. Supporting this point of view, CU’s Vice Rector (2020) also added that “without a

doubt COVID has propelled innovation and triple helix collaboration initiatives in the university". Moreover, the Researcher and Professor expressed that, in order to mitigate the impacts caused by COVID, CU's rectorate has recently established a consulting committee of innovation experts to help them understand the policy measures and changes they need to implement in order to boost innovation and achieve transformation, which suggests that this topic is finally being considered at a strategic level and that soon there could be more resources for it.

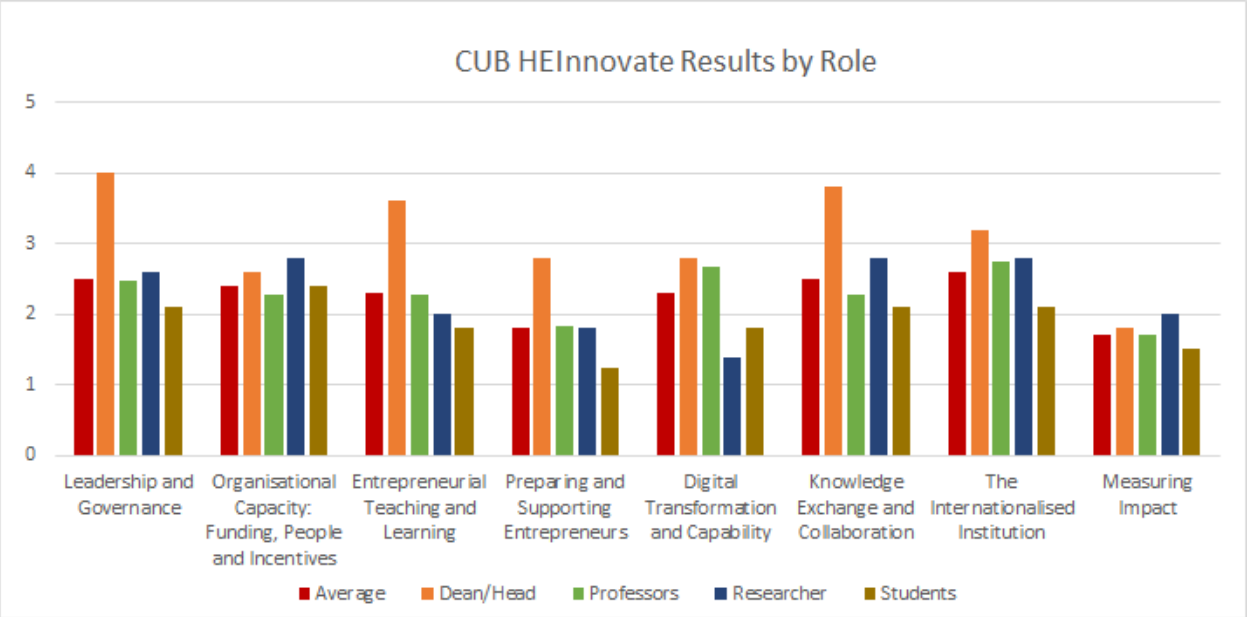
Nonetheless, all interviewees agree that CU needs a new organizational structure and also new people and leadership styles to really exploit its innovation and entrepreneurial potential. In this point, the Hub's Director (2020) suggested that the age of the decision-makers is a factor influencing university policies, because a large percentage of the leaders are older and more traditionally minded.

They also point out that the political position of the university, clearly more oriented towards society than business, plays against entrepreneurial initiatives, since "entrepreneurialism is understood as business-related, and business has a negative connotation within the academic environment" (CU's Researcher).

ii. Business Faculty of the Comprehensive University

In regards to CU's Business Faculty (CUB) quantitative results, it can be said that its score variation per role is not too prominent in comparison to the overall CU's results, except for the case of the Faculty Dean. As can be seen in Figure 3, Professors, Students, and Researchers share a somewhat similar perception about the faculty's entrepreneurial potential, giving it an average total score of 16.3; whereas the Dean gave it a total of 24.6. Even so, the average score of the CUB's eight dimensions was 2.3, exposing significant improvement opportunities in all areas, especially in Preparing and Supporting Entrepreneurs and in Measuring Impact, where the scores were 1.8 and 1.7 respectively. Nonetheless, it is valid to mention that they scored slightly higher than the overall CU in the dimension of Leadership and Governance, which may be an indication of the autonomous efforts that this Faculty is making in order to advance its entrepreneurial potential.

Figure 3: CUB



Moving on to the interview review, it is noted that the perception of the interviewees is that CUB, individually, has a high potential for entrepreneurship and innovation, because "being a manager is closely related to being an entrepreneur" (CUB's Dean), but it is strongly limited by the general characteristics of CU as an institution. In the words of CUB's Professor:

> "CU is like a corporation where you have organizations of different natures: social, public, business, etc. So one cannot and should not manage all of them in the same way. What is needed are good management skills and then letting each of these organizations that make up your corporation have autonomy to act. Because, of course, we as a faculty do the most unsuspected things to trick the system because they do not understand our needs." (CUB's Professor, 2020)

She states that CUB is not aligned with the whole CU in terms of Innovation and Entrepreneurship, which is a problem because at the end of the day CUB is only a faculty that is part of the university, and it has neither the power, nor the budget, nor the long-term vision that the university could have; so its capacity to innovate is quite limited to initiatives that can be held with limited resources. Precisely because of the lack of resources is that they do not have a specific strategy for innovation and entrepreneurship, nor a person who sees exclusively these issues. Instead, this role is diluted among several people in a rather informal way. They added

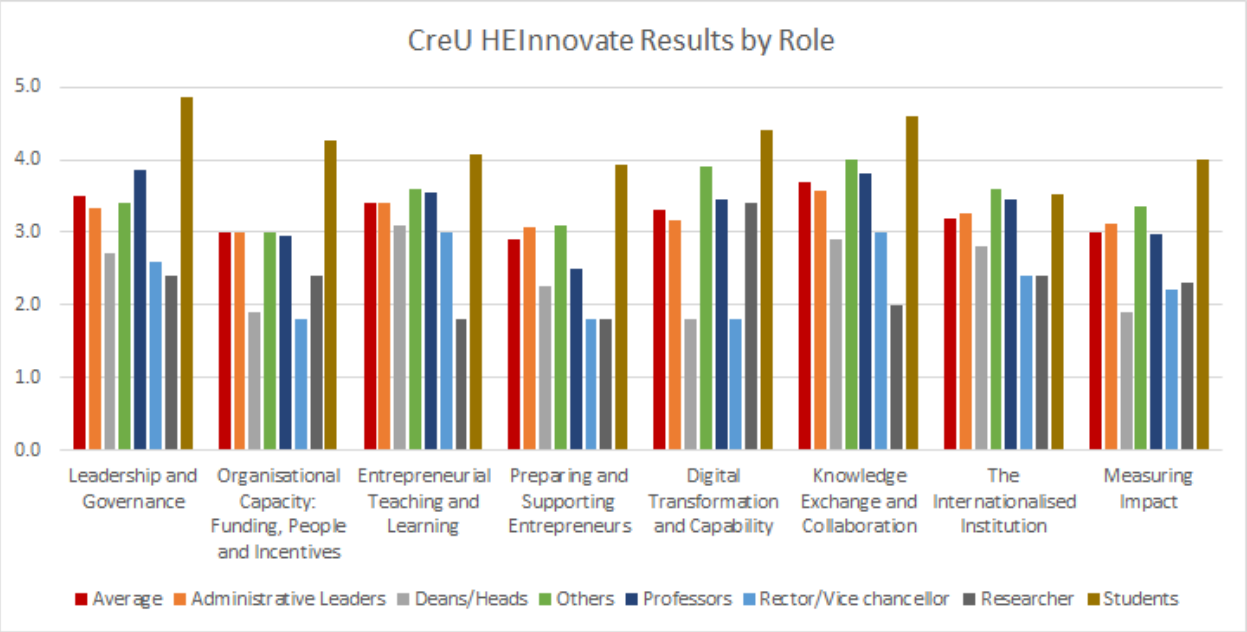
that the organizational structure of the university is problematic for innovation, because, unlike other universities where the Department is subordinated to the Faculty, they have equal powers with the Department of Business, which generates an internal struggle.

Interviewees stated that CUB works as a startup within CU, trying to give an entrepreneurial twist to the traditional guidelines, but with very limited impact due to the little political power they have in the university, because “a large part of the professors who lead it are in the Humanities faculty, a faculty that paradoxically seems to be the most traditional and reticent to change” (CUB’s researcher). CUB is one of the faculties with less years of existence in CU, however, they lead in number of students and in innovation initiatives, although, according to the interviewees, this is not reflected in either the power or the resources they are given. Nevertheless, they try to make the best out of it and have generated interesting initiatives of open innovation, challenge-based learning, relationship with industry and government, among others, which they have shared with the rest of the university. In this point they emphasize that the reaction of the other faculties towards their innovative initiatives has been diverse, but tending more towards indifference and disinterest. They mention that the faculty with which they best communicate on innovation issues is Engineering, who has shared and replicated some of their initiatives. They state that Engineering is the most powerful faculty of the university, both in political power and in number of students, but it works as a separate university.

iii. Creative University

Regarding the HEInnovate results, the Creative University (CreU) also showed some variation in its results (see Figure 4), where scores differed the most in “Digital Transformation Capability" and agreed the most in “Entrepreneurial Teaching and Learning”. Here the most critical roles were the Researcher, the Rector and the Deans/Heads, with total scores around 18.5, whereas the highest scores were given by the Students, with a total average of 33.7.

Figure 4: CreU HEInnovate Results by Role



The average score of the CreU's eight dimensions was 3.3, which is not low but still has important improvement opportunities, especially in the dimensions of "Preparing and Supporting Entrepreneurs", "Organizational Capacity", and "Measuring Impact", which got the lowest scores of 2.9, 3, and 3, respectively. On the bright side, CreU seems to be going in the right direction in the dimensions of "Knowledge Exchange and Collaboration" and "Leadership and Governance", which got the highest scores of 3.7 and 3.5 respectively. Finally, it is worth pointing that the fact the Students were the ones who gave the highest scores is very curious, considering that in general they are the most critical with the universities' services and capabilities. Having these results may indicate that despite the fact that there are significant improvement opportunities, the university "'customers" seem quite satisfied with its performance regarding entrepreneurship and innovation, which is already an advantage for the future.

Furthermore, the interviews revealed that the common opinion of CreU's members regarding its innovative and entrepreneurial capacity is that it is high due to factors such as its committed leadership, innovative culture and entrepreneurial spirit, but what brings them down is the lack of a clear strategy and resources to invest in initiatives that cause greater impact for the university, the students, and the society. Additionally, there are different opinions about the organizational structure, which has recently changed since the university was acquired by a

large investment group. While the Rector sees it as negative, the Head of the Innovation Hub and the Head of Marketing see it as positive. To this regard, the university Rector states:

> “We describe ourselves as a community of people obsessed with transforming society through education and innovation, when we recruit new people we look for this creative and innovative potential, therefore we used to function as a cell with a very intimate relationship. We interacted a lot based on the two critical areas for the success of the university: student attraction and student retention. I was in the middle of those cells, engaging them. Now we are facing an organizational change, since we are now part of a portfolio of 3 institutions that is placing efficiency as a priority. Due to this, corporate areas have been generated, involving the three institutions, so we are no longer autonomous and we have returned to the hierarchies. In less than a month of the implementation of this change you can already feel that there is much more distance between teams.”

On the other hand, the Head of CreU’s Innovation Hub, argues that entrepreneurship and innovation at CreU can be seen from two different perspectives: from the Hub, which has been working independently and does have clear goals and strategy, and the perspective of the whole university, where innovation has for long taken place “in a very Peruvian way: without a clear model or strategy, but by free trial and error”. Meaning that if something works, they pay attention to it. If it does not, the initiative dies. Therefore, he is hopeful that this organizational change will help make innovation and entrepreneurship a priority and that clear guidelines and resources will be generated at the institutional level. CreU’s Head of Marketing has a similar opinion, as she points out that what is missing is a better organizational structure, clear processes and more resources to be able to ground innovative initiatives.

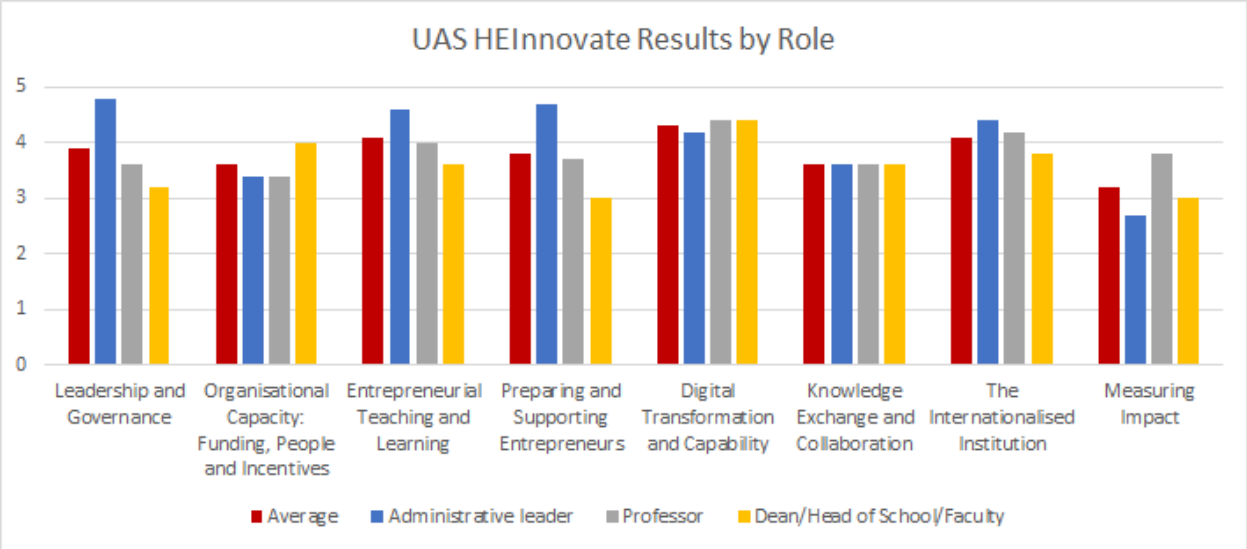
All interviewees recognize that although COVID has hit them hard, especially since their income depends mainly on student tuition, it has accelerated innovation efforts because now they need to be as much efficient as possible to survive, and it highlighted all the weaknesses they had especially in digital transformation and income generation from external projects. Additionally, they argue that although Entrepreneurial Training is currently not profitable for CreU, due to COVID, there is a high demand from students to get it, because many have found themselves in the position of needing to become entrepreneurs to help their family's economies and to support their own educational expenses. On this topic, they point out that the students' perception about the support to entrepreneurship and innovation at CreU is high because they

are more in touch with the Hub, so they assimilate the perspective of the Hub as the perspective of the whole university, even though it is not really like that.

iv. Applied Sciences University

The institution in which all the participant roles seem to agree in most of the cases regarding its entrepreneurial and innovative potential is the University of Applied Sciences (ASU) (see Figure 5), where the dimension of Knowledge Exchange and Collaboration was scored the same by every role, and the dimensions of Digital Transformation Capability, The Internationalized Institution, and Organizational Capacity were likewise pretty evenly distributed. The average score of ASU's eight dimensions was 3.8, situating it as the highest scoring institution from this research. The dimension on which it scored the highest was Digital Transformation Capability, with an average of 4.3, followed closely by Entrepreneurial Teaching and Learning, and the Internationalized Institution with 4.1 each. On the opposite side, its lowest score was in Measuring Impact, with 3.2. The roles that assessed it with the lower scores were the Deans/Heads of school, giving it 28.6, whereas the highest score of 32.4 was given by the Administrative Leader, which in this case is also the Head of the Innovation department. In any case, the gap between these two ratings is not as pronounced as in the other cases, which is a good sign. However, it is worth mentioning that a downside in ASU's assessment is that it does not include the points of view of Students, which the author considers of great importance for obtaining a comprehensive and balanced point of view of the university's situation.

Figure 5: ASU Results by Role



The quantitative scores are better explained with the insights retrieved from the in-depth interviews. From these, it is clear that the perception of all ASU participants is that ASU state and potential of entrepreneurship and innovation is among the highest of the country, but also recognizing that there are many areas in which they can improve to be among the best at an international level. All participants stated that ASU's DNA is based on innovation, that it is an institutional value and they continuously work on promoting it in all fronts: students, academics and administrative staff. Additionally, they sustain that change and a transformation culture are also embedded in the organization, and that despite that they can be shocking and disturbing, all the people within the organization know how to adapt.

They recognize the work of the organization's leadership in coherently promoting its innovative vision, represented in a clear innovation strategy, which dates back to 2013, when innovation and transformation were not buzzwords or highly relevant topics in Peru, even less so in educational institutions. Additionally, they acknowledge that one of their greatest strategic strengths in terms of innovation and entrepreneurship is their innovation ecosystem, made up of different bodies that together generate synergies that maximize their potential. This ecosystem is conformed by the Startup Incubator and Accelerator, the Fablab, and the Open Innovation Department, whose focus is to develop connections with the innovative and entrepreneurial ecosystem of the region and with stakeholders from industry, government and society.

In sum, the interviewees do not consider that the institution currently incurs in flaws that greatly attempt against innovation and entrepreneurship, but they do recognize that there are aspects that can be adjusted to achieve even better results. For example, they mention that more resources could be allocated to innovative initiatives, which exist but sometimes run short. Likewise, work also needs to be done to support entrepreneurs in terms of financing and scalability, for instance having an own department of venture capital, becoming a university who invests in their own startups, which would help them close their cycle of entrepreneurship support. They consider that the lack of sufficient funding for entrepreneurs is a latent and urgent issue, but they also attribute it to a systemic problem in the country and in the Latin American region. Finally, they also mention that another weak point to work in for enhancing ASU's innovative and entrepreneurial potential is academic culture. Similarly to what the other universities state, ASU's interviewees believe that something that plays against entrepreneurialism in the university is that academics do not think about business, and they are in general very harsh with innovation initiatives, because for them, innovation comes together with patents. "If there are no patents involved as innovation outputs they do not believe in it"

(Head of ASU's open innovation department). So work needs to be done to further develop the entrepreneurial mindset of this stakeholder group.

c. Results by dimension

After analyzing the assessment and interviews results by institution, this section will go into the details of each of the eight HEInnovate dimensions, mixing the quantitative and qualitative results in order to have a more detailed understanding of how each dimension is expressed among the four cases studied. As it was mentioned in the previous section, the dimension with the lowest average score was "Measuring impact", whereas the strongest were "Knowledge exchange and collaboration" and "The Internationalized institution"; nonetheless, these results alone are too superficial and a deeper look at each dimension is needed for a richer understanding. Each dimension is divided into five or six statements which will be described below.

i. Leadership and Governance

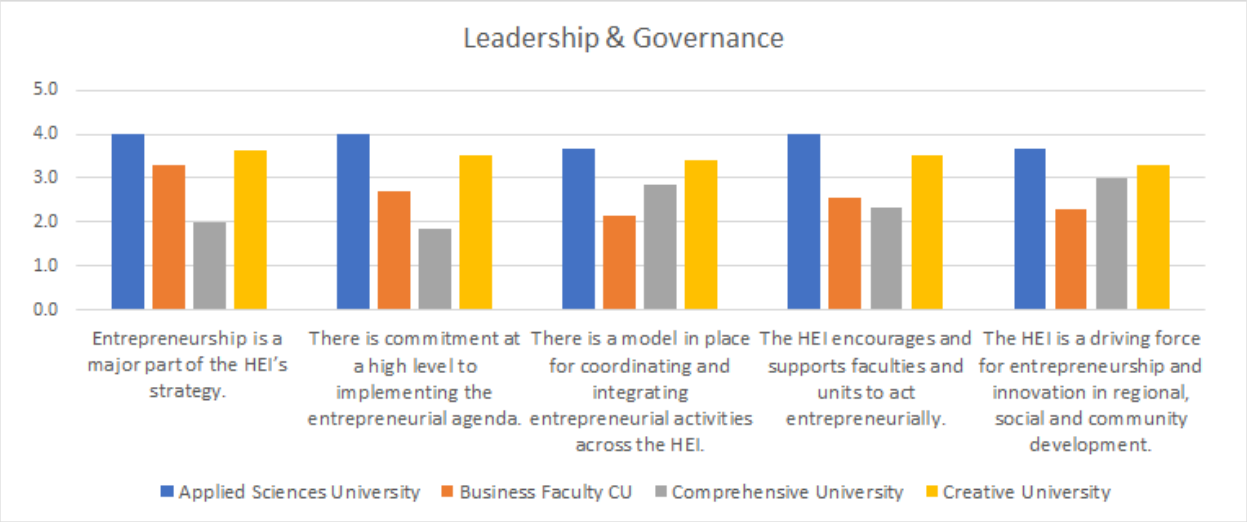
On the HEInnovate assessment, this dimension is divided into 5 statements and over a total score of 25 points. The highest total score was obtained by ASU with 19.3, followed by CreU with 17.4; the lowest scores were obtained by CUB and CU, with 13 and 12 points respectively. Moreover, the statement with overall better results was "Entrepreneurship is a major part of the HEI's strategy", while the lowest scores were noted in "There is commitment at a high level to implementing the entrepreneurial agenda" and "There is a model in place for coordinating and integrating entrepreneurial initiatives", which leads to think that despite the desire or willingness to be entrepreneurial, the problem lies in the management and implementation of the strategy.

Regarding ASU's results, it is the only university who got a score of 4 not only in one but in three statements, getting 3.7 in the remaining two, making it not only the university with the highest results but also a very consistent one. On a similar note, CreU's results also indicate that it is on the right track for this dimension, being its biggest improvement opportunity to have a major impact in its regional and community development, which is not utterly surprising given the fact that it is still a very small and young university. On the other hand, CU shows the biggest improvement opportunities, and its weakest area seems to be the commitment of its leaders towards implementing an entrepreneurial agenda. This is also not surprising due to the traditional nature of the institution, its size and the many faculties it contains, all of which have

different understandings of what innovation means, and therefore, different priorities. Finally, as would be expected, the results of CUB are in line with the results of CU, because they are under the same governance. Nevertheless, it is worth noting that its results indicate a higher commitment and strategic focus on entrepreneurship than the overall CU, but it seems to lack a model to coordinate these initiatives.

Next, the details of the quantitative results for each university will be complemented with the insights obtained from the in-depth interviews.

Figure 6: Leadership and Governance



Entrepreneurship is a major part of the HEI's strategy

Not surprisingly, in this section, ASU obtained the highest score in comparison with the rest of the institutions. From the in-depth interviews it was possible to learn that this is due to the fact that the innovative and entrepreneurial spirit is embedded in the DNA of the institution since its birth, and is what guides its strategy, since it is a relatively young university that had the need to differentiate from the beginning in order to gain a niche in the higher education market in Peru, competing with much older and prestigious universities. Therefore, the differential value they have always promoted was innovation, having the phrase "excel, innovate" as their slogan. In addition to this, their corporate and for-profit nature forces them to generate innovation in order to be as efficient and effective as possible to remain competitive and leaders in the market.

In the case of CreU, there are mixed opinions. On the one hand, the interviewees recognize that the focus on innovation and entrepreneurship are determinant for the university and that people act in an entrepreneurial way, although on the other hand they also recognize that for the moment there is no innovation strategy coming from the directors of the organization. Nonetheless, it is expected that this strategy will be formalized soon with the intervention of the new management of the university, which is much more business-oriented and focused on efficiencies and results.

The rating of CU, the lowest of the four, is coherent with the insights obtained from their interviewees. To begin with, for years they have made a clear differentiation between the concept of innovation and the concept of entrepreneurship. They mention that the university is and has always been focused on generating innovation that contributes positively to the development of society, but that most of its members do not relate innovation with entrepreneurship. Instead, they understand entrepreneurship as something highly related to mercantilism, something that as an institution they do not support because "it is what generates inequalities in society". CU's Rector explains:

> "Innovation" is difficult to accept by many educational institutions, especially when you have such complex universities as CU, where you have multiple inner discussions about what it means. At the same time, if the issue of Innovation is not sorted, Entrepreneurship seems more disjointed and more difficult to accept, because this is understood as more related to commercial, transactional and marketization activities instead of activities that are benefiting society. In this sense, for a traditional university it is much more difficult to accept that entrepreneurship should be a part of its ethos and mission".

CUB's interviewees agree with this statement, but they scored higher in this area because they made their rating thinking at a departmental level, where they believe that entrepreneurship and training an entrepreneurial mindset are key to success.

There is commitment at a high level to implementing the entrepreneurial agenda

Again, the best results were obtained by ASU. According to the opinion of the interviewees, this is because "there is total coherence between the innovative discourse of the institution's leaders and the actions that are finally implemented" (ASU's Startup Incubator Head). They highlight the role of the CEO and the CIO, who are strongly committed to

innovation, as they see it as a weapon to be more competitive. In addition, the decision-making process regarding innovative initiatives is agile and fast. In words of ASU's Head of Open Innovation:

> The CEO is a very competitive woman, she could be very busy doing something else but if she hears you mention the word "innovation" she will turn around to listen to what you have to say. She wants to innovate, she wants to be better. She questions everything, she listens, but she always asks why something is the way it is or why are you proposing something. She wants to be convinced, and she is always looking for a financial reward in every initiative we have. As well, as the CEO of a for profit organization, she is always looking for profit, whether it is in savings or earnings. If you come to her with an initiative that will bring that, plus innovation that will position you one step further than our competitors, she is totally in.

Moving on, in the case of CreU, although it scored somehow high in this section, some contradictions emerged from the interviews. On the one hand, the rector assures that the commitment of the leadership to innovation and entrepreneurship is very high, while on the other hand, the Head of the Innovation Hub maintains that "university leadership has not really promoted entrepreneurship and innovation, it was more a "facade for sales" and that "the word innovation was used because it was trendy". In any case, it can be concluded that at least Leadership was not a blocker, and as mentioned before, they expect that the real focus on innovation as a core strategy of the organization will come with the new management.

The case of CU is clear and unanimous: university leadership does not support entrepreneurial goals, as the majority of leaders for many years have seen entrepreneurship as "the devil" (Head of CU's Innovation Hub) and against the core mission of the university. Nevertheless, due to the economic pressure and the urgency for change generated by COVID, the new rectoral team is taking initial steps on this issue and has established a "Committee for structural reform" from which "they are gathering the knowledge and experience of the few members of the university who have been working on these topics for years" (CU's Researcher). Thus, at least, there is already a certain openness to dialogue on this issue, which in the opinion of those interviewed "is a small huge step that spreads some hope for the CU's entrepreneurial future" (CU's Professor).

Finally, in the case of CUB, the interviews indicate that "faculty leaders assume the role of intrapreneurs within the university" (CUB's Dean), since despite being constrained by CU

structures, they do promote entrepreneurship and “try to find the gray areas in the university norms in order to achieve it” (CUB’s Professor). Currently, they have been asked to join the university's structural reform committee.

There is a model in place for coordinating and integrating entrepreneurial activities across the HEI

Once again ASU was evaluated with the highest score in this section. ASU implemented an innovation framework in 2013, with the objective of transforming itself into a digital university, based on the pillars of learning, experience, efficiency and effectiveness. Over the years, this evolved into the innovation ecosystem they have today, formalized in 2019, which is made up of the Startup Incubator, the FabLab, the Open Innovation Lab, among other university assets that coordinate innovative initiatives from different fronts. Additionally, they have an Innovation Committee made up of senior managers from both the academic and administrative areas, which is responsible for articulating and leading all innovation initiatives that take place at the university.

In the case of CreU, despite that they did not score low in this section, it was confirmed that they do not have a clear model or strategy for innovation and entrepreneurship. While the head of the Innovation Hub states that, at a departmental level, the Hub does have a clear innovation strategy, he also points out that at an institutional level "innovation at CreU takes place in a very Peruvian way", which means it happens informally, without a clear structure and objectives. He exemplifies this with the fact that even the creation of CreU’s Innovation Hub happened “by accident and as a bottom-up initiative”, when he joined the university and realized that the innovation discourse was mostly image, and “decided to create something real”. CreU’s Rector recognizes this failure, and points out that it is due to the lack of resources and personnel to which this task is specifically assigned.

CU and CUB obtained the lowest scores. Despite having an Innovation Hub, established many years before than its competitors, CU does not have a model for integrating either innovative or entrepreneurial activities. As mentioned by all interviewees, the lack of articulation is one of the main stoppers of innovation at CU since "the university is managed by fiefdoms and the faculties do not communicate with each other" (Head of CU’s Innovation Hub), thus innovative initiatives are individual and isolated efforts of some actors that hardly reach a significant impact on the whole university and, even worse, often “cannibalize and generate internal competition and losses instead of positive impacts” (CUB's Professor). Additionally, they

point out that due to the political nature of CU's governance, "the authorities do not know how to make fast decisions, but always wait for consensual decisions (voting) to move forward" (CU's Researcher), which further reinforces bureaucracy and slows down processes.

In the concrete case of CUB, the Dean points out that although there is not a formal “Coordination of Innovation and Entrepreneurship”, because there is a lack of human resources to assume this role exclusively, the faculty guides its actions by its competency-based training model, which includes the promotion of innovation and entrepreneurship initiatives. Thus, for CUB this function is dispersed among several people, who do it “informally and off the record" (CUB professor).

The HEI encourages and supports faculties and units to act entrepreneurially

Leading in scores again, ASU respondents relate this point to putting innovation and entrepreneurship at the center of the university's strategy. It is because of this that the leaders of the institution promote an innovative behavior and mindset in everyone, administratives, academics and students. Additionally, they promote intrapreneurship, as they have launched the "ASU Open Ideas" initiative, where they collect ideas from their members on how to generate more innovation at the university.

In CreU’s case, it was confirmed by all interviewees that the university indeed promotes in university members the freedom to carry out innovation and entrepreneurship initiatives; however, they point out that without a clear strategy and enough resources, many of these initiatives do not generate a major impact.

On the opposite side of the coin, it is clear that the opinion of the interviewees of both CU is that it does not encourage nor support entrepreneurship at the institutional level. On the contrary, several consider it a "hostile environment for entrepreneurship, since the word Entrepreneurship, from the academic side, was linked to failure" (Head of CU’s Innovation Hub). It must be conceded that this is a particularly complex issue at CU because of its traditional nature and the characteristics that have formerly been described. The Vice Rector explains it in detail:

> “Impulsing an entrepreneurial culture in such a complex organization as the university requires committed leadership. If the government team does not clearly state that the university needs to promote entrepreneurship and innovation, it would be very complicated to change the culture. For instance, there will be subcultures like

Engineering or Business that take the challenge, but that then would clash with the bureaucratic structures of the university, which will cause a delay in the development of the institution's entrepreneurial capacity. So the Leadership/Governance team should be the first ones to commit to this end. Once this is done and they accomplish to convince other critical actors (or they might be already intrinsically convinced), it becomes much easier to establish policies and elaborate guidelines towards the goal of accomplishing entrepreneurialism in the organization"

Again, the CUB interviewees point out that although they do promote and support entrepreneurial initiatives at the faculty level, they come up against the giant barrier that is the university culture. They emphasize once again that CU rejects entrepreneurship because "it taints the art of teaching" (CUB Professor), and that it is seen as "something that is neither intellectual nor transcendent, and that is done because there is no other option" (CUB Researcher). To this they add that, despite being the faculty with the largest number of applicants and students, "the more purist faculties at CU see CUB as a second-class citizen, a faculty with a pragmatic and transactional view of the world that is deeply rejected by the Humanities" (CUB Professor).

The HEI is a driving force for entrepreneurship and innovation in regional, social, and community development

In this section, although ASU and CreU obtained the highest score, the interviews did not provide many details to explain why. It can be highlighted that they have close relationships with government agencies that promote entrepreneurship at a national level, but no impact at a societal level or with their community was detailed.

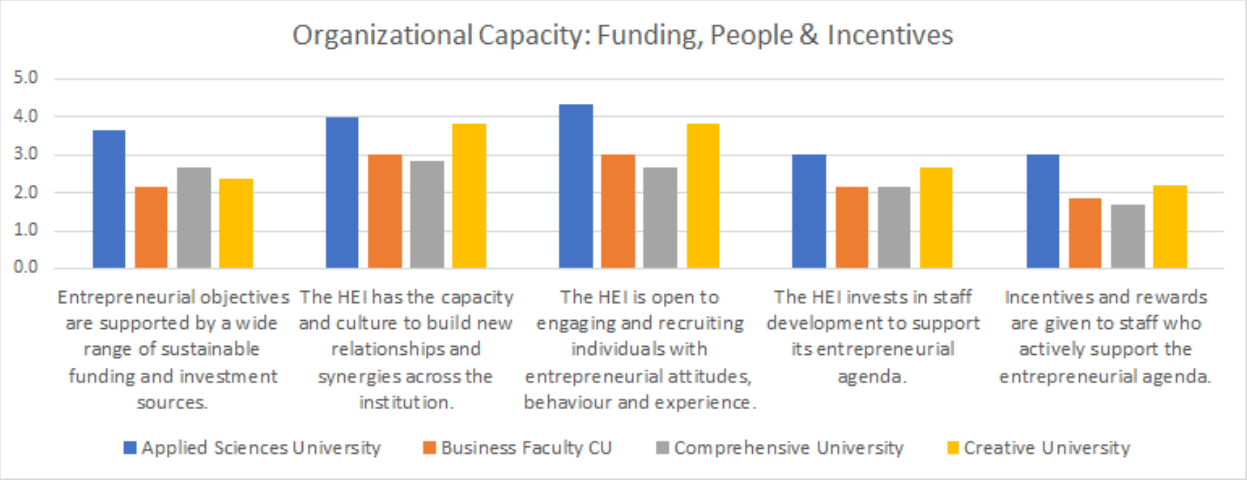
On the other hand, despite having rated it lower, CU interviewees did emphasize that one of the things they focus on and do best at the university is to generate a positive impact on society, especially in terms of promotion and application of science and research. They are currently involved in several projects with the Government and also with vulnerable communities. Most notably, as a result of COVID, they became a critical actor in the development of medical equipment that can help the country cope with the pandemic. The same applies to CUB, which, from its admittedly limited capabilities, collaborates with government agencies to promote innovation in the public sector and also to promote the employability of students.

ii. Organizational Capacity: Funding, People and Incentives

This dimension is also divided into five statements over 25 points. Again, ASU got the best results with 18 points, followed by CreU with 14.9. CU and CUB obtained almost the same score with 12 and 12.1 points respectively. Regarding the individual statements, there is a clear difference between the ones who involve culture, attitudes and behaviors, which hold the highest scores, and the ones who involve financial resources, which score significantly lower than the others. This suggests that financial resources are a common element with which universities struggle and which hinder their entrepreneurial capacity.

ASU's and CreU's scores suggest that their major strengths are in recruiting entrepreneurial individuals and having an entrepreneurial culture, but that they need to invest more in entrepreneurial staff development, incentives and reward systems. For CU and CUB the tendency goes in a similar way, although they both have overall lower scores than the first ones, and the crowning point for both is the system of incentives and rewards. This result can be easily linked to the ones obtained in the Leadership and Governance dimension, which showed that there is no commitment from the CU leaders to promote entrepreneurial initiatives, even though the CUB seems to be making slightly bigger efforts than the rest of the university.

Figure 7: Organizational Capacity



Entrepreneurial objectives are supported by a wide range of sustainable funding and investment sources

The interviews confirmed that the issue of budget and funding for innovation and entrepreneurship is a pain shared by all the institutions studied, although at different levels

ranging from "there is investment but it would be good to have more" to "there is absolutely no budget allocated to this topic". All the interviewees point to financing as a systemic problem at the national and even regional level in terms of promoting entrepreneurship and innovation, since Peru has one of the lowest levels of investment in STI in Latin America. Therefore, the sources of public investment, although existing, are very limited or are “involved in bureaucratic processes that make them unattractive” (CreU’s Rector). In addition, with respect to financing from autonomous organizations or international funds, almost no reference was made, so it is assumed that these are not relevant sources among the studied HEIs.

Regarding internal sources of financing, for ASU, which obtained the highest score in this section, there is indeed a designated budget for innovation initiatives, and more can always be obtained, as long as it is demonstrated to the university management that these will generate some type of positive return over investment for the institution.

For CreU, the lack of budget was identified as the main barrier to exploiting the innovative and entrepreneurial potential of the institution, despite the fact that these two characteristics are, at the same time, considered its pillars. They emphasize the need to have a "serious investment from the holding that allows them to build an innovation ecosystem" (CreU’s Rector) and that does not force them to "invest their creative abilities in finding ways to raise money" (Head of CreU's Innovation Hub).

For CU and CUB, the situation of little or no budget for entrepreneurship is similar, with the difference that this is not due to a lack of monetary resources from the university, “which do exist, but are not allocated to entrepreneurship because the leadership does not support it” (Head of CU’s Innovation Hub).

The HEI has the capacity and culture to build new relationships and synergies across the institution

Both ASU and CreU obtained high scores in this section. Their interviewees highlighted "Culture" as their main strength to achieve their innovation and entrepreneurship capabilities. "Flexible organization", "horizontal leadership" and "articulation of efforts" are some of the terms that have been used by representatives of both universities. In addition, despite their differences, both have in common that they consider innovation and entrepreneurship as strategic for their success, thus, organizationally, they have many facilities in this regard.

On the contrary, for CU and CUB, Culture was pointed out as the main innovation stopper. The interviewees pointed out that not only the leaders, but also the majority of people in the organization have a very traditional mindset that strongly rejects change. This, added to the feudal management of the institution, exacerbates the lack of communication and articulation between faculties, which, added to the high bureaucracy of the university, results in a hostile environment for innovation and entrepreneurship. Again, in the particular case of CUB, the interviewees mentioned that they do try to generate these spaces for collaboration and articulation with other faculties, but that they receive very few positive responses and interest.

The HEI is open to engaging and recruiting individuals with entrepreneurial attitudes behaviour and experience

Following the line of results, for ASU and CreU, hiring people with innovative and entrepreneurial DNA is key to their strategy. The rector of CreU points out that they "hire with Culture in hand", so for her the innovative spirit is an indispensable requirement. The same is true for ASU, where interviewees highlight the "innovative mindset, challenging the status quo, and adaptability to change" (ASU's Head of Open Innovation) that people who want to join the organization must have. In addition, both institutions highlight the value that intrapreneurship has had in their development as referents of innovation, and therefore promote it.

On CU's side, it is clear that recruiting innovative-minded people is not part of its strategy, but interviewees also mention that even if it were, CU would not be in any way attractive to that profile of people, precisely because of its extremely traditional reputation. In fact, what tends to happen if innovative-minded people enter the university is that “they are soon demotivated by the cultural barrier and the high bureaucracy” (CU’s researcher).

On the CUB side, they consider that, within its limitations, the faculty is friendly and is increasingly looking for disruptive profiles; and that they currently have both sides: on the one hand, people with an innovative mentality and questioning the status quo, and on the other hand, people averse to risk and change. The Dean points out that, in recent years, innovative people have been on the rise, but that they are still not enough to face the mass of people with a traditional mentality, although they point in that direction.

The HEI invests in staff development to support its entrepreneurial agenda

This section is among those that received the lowest score in all the HEIs studied, which was somewhat to be expected since, as mentioned earlier, the issue of investment and budget

is one of the common pains for all the institutions. With the exception of ASU, whose interviewees stated that the institution does invest in the development of innovation capabilities of its staff, although "it is not much compared to other leading universities in the region and could do much more" (ASU's Head of Open Innovation), all the other universities stated that investment in the development of entrepreneurship and innovation capabilities is almost nil, despite being greatly needed.

CreU interviewees mention that while the innovative DNA intrinsically exists in the institution, there is a lot of opportunity for improvement especially in developing the entrepreneurial skills of its academic members, but the rector states that this is impossible due to the current lack of budget. It happens similarly at CU and CUB, with the difference that this is not only due to lack of budget, but mainly because it is not considered relevant within the mission of the institution. This is exemplified in the case of CU and CUB by the fact that, following the sudden obligation to digitize teaching that occurred due to COVID, CU quickly allocated significant resources to train its faculty and staff members in digital skills, and invested in technological infrastructure so that operations could continue as normal. This fact is an example of what was pointed out by several interviewees from CU and CUB, that "the university only shows its agile capacity when it is at risk or there is pressure involved" (Head of CU Innovation Hub).

Incentives and rewards are given to staff who actively support the entrepreneurial agenda

This section received even lower ratings than the previous one in all HEIs with the exception of ASU. From the ASU interviews, it was found that the university does reward and provide incentives for its members to demonstrate their innovation and entrepreneurship initiatives. An example of this is the "ASU's Open Ideas" initiative, where they promote intrapreneurship and recognize those members who contribute with innovative ideas for the institution, creating a culture of constructive competition.

CreU's Rector commented that they do not have any incentive or reward program, again due to lack of budget, but she does not consider that this is a section that would generate much impact on the current situation of the university, since "people at CreU do not need incentives, because their motivation to innovate is intrinsic".

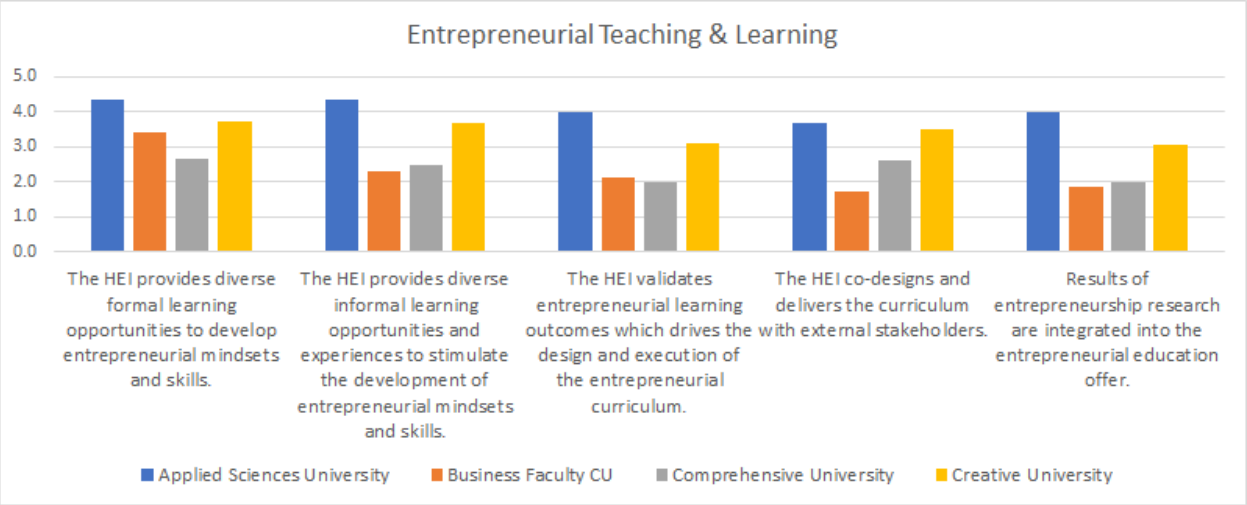
In the case of CU and CUB, the answer was the same: while there are some incentives for “innovative” practices, there are no incentives for entrepreneurship at the institutional level. "If anything, what exists are disincentives" mentions a CU researcher, who points out that on several occasions the university has "blocked his entrepreneurial initiatives, mainly because of its political stances". Similarly, a researcher from CUB points out that on more than one occasion his proposals for innovation projects have been rejected by the university because "they were considered too business-oriented". At the faculty level, CUB interviewees note that there are almost no monetary incentives for innovative or entrepreneurial initiatives, as they are limited by the university budget, but there are some informal recognitions of good practices.

iii. Entrepreneurial Teaching and Learning

For this third dimension, the best results were obtained again by ASU with 20.3 points, followed by CreU with 17.1, and the lowest scores came from CU with 11.8 and CUB with 11.4 points. The best results for every institution were on the statement “The HEI provides diverse formal learning opportunities to develop entrepreneurial mindsets and skills” while the lowest were in “Results of entrepreneurship research are integrated into the entrepreneurial education offer”, with the exception of ASU, who ranked high also in this one.

So far this is the best scoring dimension for ASU, who stands pretty high in all the statements, especially in providing formal and informal opportunities to develop entrepreneurial skills and mindsets. This is also the case for CreU, where the major opportunities seem to be in the validation of entrepreneurial learning outcomes and in integrating entrepreneurship research into its education offer. On the opposite side, this is the so far the lowest scoring dimension for CU and CUB, where the average result is 2.3 for both institutions. As in the case of CreU, but on a greater level, the crucial areas of improvement are the validation of entrepreneurial outcomes and the integration of entrepreneurial research results to the educational offer, but also, and especially in the case of CUB, in the co-design of the educational curriculum with external actors.

Figure 8: Entrepreneurial Teaching and Learning



The HEI provides diverse formal learning opportunities to develop entrepreneurial mindsets and skills

This is a section that received relatively good scores in all the HEIs. From the interviews, it was found that in the case of ASU, this is due to their strategy of establishing "Innovative Thinking" as a transversal competition to all their careers. "From medicine to business, all ASU students graduate managing business, entrepreneurship, design and agility concepts" (ASU's Head of Open Innovation) since one of its innovation objectives is to "break the myth that entrepreneurship only comes from management or engineering students" (Director of ASU's Entrepreneurship Incubator). Most of their courses apply project-based learning and design thinking, and "even the teachers of the most traditional humanities courses are concerned about giving it an innovative twist" (ASU's Head of Open Innovation). In addition to this, ASU has the only career in Peru in Entrepreneurship Management, which has a large technological component.

CreU has a similar case, since they have their own methodology, focused on developing innovation from a creative design process. They apply this methodology in all the processes of the university, and all its members are trained in this, students, administratives and academics. Additionally, the educational model they apply transversally to all their careers contains competencies such as "entrepreneurship" and "social innovation", and 98% of the courses they teach are challenge or project-based. However, it should be noted that while their strength relies on creative subjects, "they are lacking management and hard technological skills" (Head of CreU's Innovation Hub). Also, not much support is given to formal entrepreneurial training for their administrative staff members.

In the case of CU, interviewees said that entrepreneurial training is generally very low, except in the faculties of Management and Engineering, which was to be expected because "if the organization has a general prejudice against entrepreneurship, obviously it would not be taught to students" (Head of CU's Innovation Hub). However, due to academic freedom, professors who do favor entrepreneurship include it in their classes, although this is not standard practice. In light of this, interviewees said they recognize the urgency for this to change in the short or medium term, due to the increased demand for the so-called 21st century skills, and they point out that the relatively new Faculty of Interdisciplinary Studies would become an opportunity to ground entrepreneurship subjects.

Although getting a relatively high score in the assessment, interviews revealed that at the faculty level, CUB is making efforts to change most of its curriculum to a project- and challenge-based methodology, involving real cases from industry, government and society, but for the moment, the reality is that it is still formally a faculty that "does not give you training for entrepreneurship, but for working in a company" (CUB's Teaching Assistant). The dean recognizes that due to a lack of operational capacity, there is no formal articulation of the methodologies that the professors use, and that even though good practices are shared, they cannot guarantee that all professors follow them. Therefore, not all students receive the same learning.

The HEI provides diverse informal learning opportunities and experiences to stimulate the development of entrepreneurial mindsets and skills.

Regarding informal learning opportunities, several examples were received from the four institutions. ASU is the university that shows the most initiatives, leveraging on its innovation ecosystem. These include open innovation challenges involving all members of the university community, hackathons, FabLab activities that promote interdisciplinarity, and feedback programmes for business ideas, which are aimed at students from the 3rd and 4th semesters of studies. They point out that while they do not try to make all their members become entrepreneurs, they do make sure that the opportunity to learn how to become one is open to everyone in a flexible way.

In the case of CreU, they point out that there is a growing demand from students for these informal spaces, and almost all the initiatives are driven by the Innovation Hub and by the students themselves, who have often financed them with their own money. The rector emphasises that they try to incorporate mistakes as part of the learning process on all fronts

and that this is why these informal spaces are important, but that they would like to do more if they had more budget.

In the case of CU, interviewees pointed out that there are some spaces, but they are not widely spread or popular in the university, and that the participants are mainly from Management and Engineering. On the other hand, interviewees from CUB pointed out that their informal or co-curricular spaces are the ones that represent their greatest strength in entrepreneurial training, as they have the freedom to experiment outside the strict regulations of the university. Among some initiatives are innovation challenges involving external stakeholders and volunteering projects with communities. It is worth noting that several of the interviewees point out that, in the absence of the offer provided by the faculty, it is often the students themselves who take the initiative to create these spaces within their student organisations, which have been growing and becoming more empowered and entrepreneurial in recent years.

The HEI validates entrepreneurial learning outcomes which drives the design and execution of the entrepreneurial curriculum.

In this section, in the case of ASU and CreU, interviewees from both universities state that they have a competency model focusing on innovation and entrepreneurship skills that guides the design of their curricula. Although they do not say how regularly they measure it, they do indicate that it is measured. In the case of ASU, this measurement has led to the inclusion of the "digital savvy" competence, so that it will be included transversally in all courses in the following two years. In the case of CreU, the results of their measurement have led them to redesign the learning experience of their students.

CU interviewees did not mention any entrepreneurship skills measurement system. CUB interviewees, on the other hand, noted that they currently measure learning outcomes based on their competency model which, while not entirely focused on innovation and entrepreneurship, does have components that include them. In addition, the dean points out that they have designed an assessment model where students themselves can monitor their learning progress. However, it is worth noting that the assistant professor pointed out that from her four years of teaching experience, "the faculty does not monitor or control teaching results", and that she has had to proactively ask for feedback from her students.

The HEI co-designs and delivers the curriculum with external stakeholders.

Regarding the co-design of courses with external stakeholders, it is noted that it exists to a certain extent but with high growth opportunities. ASU points out that all its programs have an advisory committee from industry, which is in charge of ensuring the relevance of the programs and their courses. The Rector of CreU points out that some of their courses are directly related to solving challenges from external organizations, in which members of these organizations participate as evaluators of the final projects presented by their students. Something similar happens at CUB, where the Dean points out that they have developed a methodology to identify challenges in organizations and that their challenge-based courses actively involve representatives of partner organizations, although currently only 5 of their courses are formally included in this model. However, he assures that they are working on scaling up this practice, since it has given good results and they are also involved in research and thesis projects.

In the case of CU, interviewees agree that this is not a common practice, mainly because accreditation requirements for course delivery do not mandate the involvement of external organizations. However, the Researcher, who runs a startup, points out that including topics related to his business is a proactive practice that some professors engage in, although most prefer to avoid it so as to avoid generating friction and gossip with other more traditional professors. He also points out the important role this practice plays in increasing the employability of his students, several of whom he has hired for his business.

Results of entrepreneurship research are integrated into the entrepreneurial education offer

In this section, ASU interviewees point out that integrating the latest trends in skills demanded by the market and teaching methodologies is key to maintaining their competitive advantage as a university focused on innovation. CreU interviewees agree with this, however, they point out that they still have a long way to go in terms of research, management and hard-tech skills.

On the other hand, CU interviewees point out that, with some exceptions, such as in Engineering, where they are already updating their curricula with Digital Economy and Future of Work topics, they do not consider that the university as a whole sees as a priority to include these trends since Future of Work issues still do not have a strong impact in Peru, although

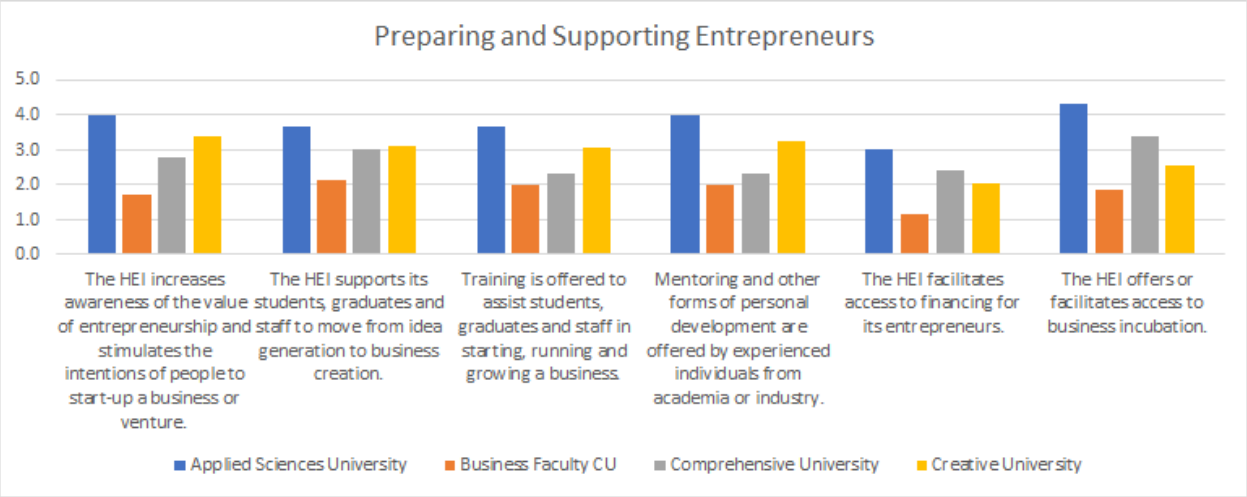
COVID has opened the doors for them to start discussing them more. On the CUB side, although the Dean points out that they design the curriculum based on the demands of society and the current labor market, the Teaching Assistant considers that the curriculum is not at all updated to current global issues, and that much of the literature they include "is from the time of the dinosaurs".

iv. Preparing and Supporting Entrepreneurs

This dimension is one of the lowest scoring for all of the studied HEIs, but the tendency of results continue: the highest result belongs to ASU, with an average score of 3.8, followed by CreU with 2.9, then CU with 2.7, and finally CUB with a score of only 1.8. Furthermore, whereas most of the institutions seem to be on the right track on stimulating entrepreneurial initiatives and facilitating access to business incubation, the area that is definitely in the weakest state is that of facilitating access to financing for entrepreneurs, where the average score of all assessed HEIs is only 2.2.

It is worth highlighting the results of CU and CUB, both of which are especially low. In the case of CU, it is somewhat paradoxical that it has the highest result in offering access to business incubation (3.4), whilst its lowest results are in training and mentoring of entrepreneurs (2.3). The case is even more acute in CUB, where the lowest results are in increasing awareness and generating stimuli for entrepreneurship (1.7), and facilitating financial access for entrepreneurs (1.1). What is more, since CUB belongs to CU, what would be expected is that both have similar results in the business incubation concept, since the business incubator of a university usually works transversally to all the faculties; however, CUB has a score of 1.9, which does not converge at all with the score of 3.4 that CU has in that same concept. This is a point that will have to be clarified in detail in the in-depth interviews.

Figure 9: Preparing and Supporting Entrepreneurs



The HEI increases awareness of the value of entrepreneurship and stimulates the entrepreneurial intentions of students, graduates and staff to start-up a business or venture.

In this section, it is important to begin by mentioning that all the institutions studied have an Innovation Hub and a Business Incubator; however, the interviews show that this is not necessarily an indicator that the institution promotes them. Additionally, all interviewees agree that promoting entrepreneurship is not profitable for the institution, but that its relevance is growing especially as a result of COVID, since it has generated in students the need of becoming entrepreneurs, and they are demanding this training.

On the side of ASU, it is clear that this is a priority and that "unlike other universities, the role of promoting entrepreneurship does not only belong to the Incubator, but to everyone" (Director of ASUS's Startup Incubator). The case of CreU is similar, here the Head of the Innovation Hub points out that "UCAL's innovation hub is not a department, it's a body/cell that promotes a helix effect towards the whole organization in order to promote innovation".

In the case of CU and CUB, interviewees from both sides point out that although the Startup Incubator has existed for many years and receives funds from the university, it does not promote the value of entrepreneurship throughout the whole institution, and the initiatives that exist have been in response to competition, not because of a real conviction that entrepreneurship is important. On the contrary, they point out that professors who have a company or a startup often try to keep it hidden, because " at CU, it is frowned upon to be an academic and an entrepreneur" (CU Researcher).

The HEI supports its students, graduates and staff to move from idea generation to business creation

Both ASU and CreU interviewees point out that both institutions support their members in turning their ideas into businesses, and that in several cases, the initiatives that reach the incubation phase started as ideas resulting from projects carried out in courses that are part of the curriculum.

On the CU and CUB side, the transition from idea to business is also formally the expertise/responsibility of the Incubator. However, on the side of CUB, the interviewees state that the Incubator does not articulate with all the faculties of the university, but carries out its activities in an isolated way. To this, the Head of CU's Innovation Hub, who manages the Incubator too, says that it is because "the incubator does not have the resources nor the outreach to articulate efforts throughout the whole university, instead, they work with people who proactively go to them".

Training is offered to assist students, graduates and staff in starting, running and growing a business.

In the cases of ASU and CreU, the interviewees indeed indicated that this is true; however, the interviewees from ASU did not elaborate on the extent to which this is the case, and the interviewees from CreU indicated that they often lack the capacity to meet all the demand they have from students. _CreU adds that they are sustained thanks to volunteer professors who are passionate about the subject, since formally there are formally very few people working on it.

On the side of CU and CUB, while the Director of the Innovation Hub points out that this training, although limited, does take place, the perception of the other interviewees is that " CU's Hub today is more focused on generating money externally than on developing entrepreneurship within the university" (CUB Dean), and that it even cannibalizes CUB's sales initiatives to external audiences, since both offer business courses, with the Incubator's courses sometimes outselling CUB's because they are "cheaper, more accessible and less academic than those of the faculty" (CUB's Professor). now . From CUB they also add that "since the Hub is not very involved, we, the professors who like the subject, voluntarily try to help as much as we can" (CUB Professor).

Mentoring and other forms of personal development are offered by experienced individuals from academia or industry.

Again, this is an area in which interviewees from ASU and CreU say they are on the right track. At ASU in particular, they claim to have the support of a network of highly capable mentors with long track records in the world of entrepreneurship. However, on the CreU side, the rector points out that, although they offer mentoring in the initial stages of the business, they do not have enough resources to continue to the next stages, so she considers that the support they provide is limited.

On the CU and CUB side, the comments are related to what was mentioned before: the Incubator has mentors, but they are not enough to attend the whole university. This causes people from other faculties to doubt their capacity and do not feel their support.

The HEI facilitates access to financing for its entrepreneurs

This is the section with the lowest score of the dimension, where the shared comment of all interviewees is that there is definitely a lack of support for venture financing at the national level. ASU is the one with the best score. They currently have connections to national and international investor networks, but interviewees comment that although they have some important assets already, some aspects are missing such an own department of venture capital, which would allow them to close their development and venture support cycle. For her part, CreU's president mentioned that this is their weakest aspect and that they need to improve their connections with investors.

On the CU side, the Research mentioned that "CU gives seed funding, but very limited", while the Director of the Innovation Hub mentioned that "it is not the function of the Incubator to seek funding for its initiatives". They agree that CU has considerable money to invest in ventures if they so decide, but that "in Peru the financing of innovation and entrepreneurship is not seen as an investment, but as an expense" (Head of CU's Innovation Hub).Finally, the Researcher interviewed from CUB points out that he has submitted many projects to different CU’s funding calls, but that many have been rejected for having a very entrepreneurial vision and lacking the social component.

The HEI offers or facilitates access to business incubation

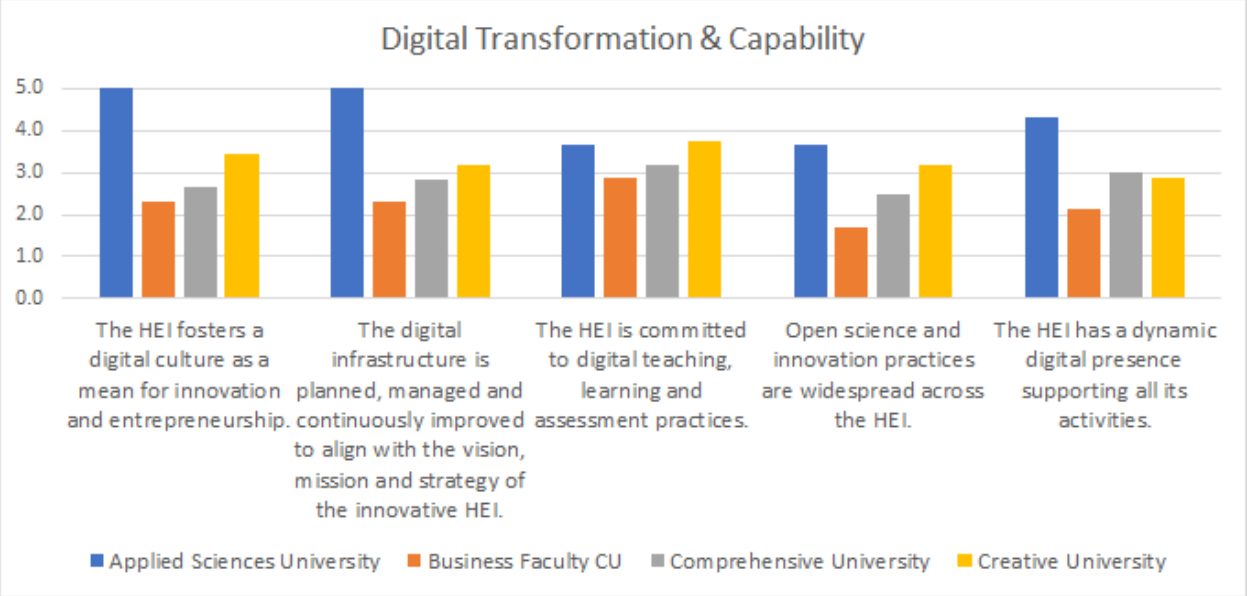
In this section all interviewees stated that their universities offer access to business incubation, but to different extents. ASU does it in a comprehensive manner, helping not only in incubation, but also in the development and scaling process. Both CreU and CUB only do so up to the early stages, as they do not have acceleration capacity. CUB as a faculty does not offer it, but relies on the CU Incubator.

v. Digital Transformation and Capability

This dimension is probably the most urgent to develop in current times, not only due to the influence of the Industry 4.0 and the advancements in technology, but even more due to the COVID-19 pandemic. Here again ASU scores the highest, with a 4.3, followed by CreU with a 3.3. CU and CUB come after with scores of 2.8 and 2.3 respectively. Not surprisingly, due to the fact that because of COVID every HEI was forced to embrace online learning as almost the only way of survival, the highest scoring statement for this dimension was “The HEI is committed to digital teaching, learning and assessment practices”. On the other hand, the common lowest scoring statement was “Open science and innovation practices are widespread across the HEI”.

Among the eight dimensions, this is the best scoring for ASU especially in the concepts of fostering digital culture and having a well planned and managed digital infrastructure, both in which it reached an average score of 5. In the case of CreU, scores are also promising, but it appears to need bigger improvement in developing its digital presence. For CU and CUB, scores are below 3 in most of the cases except for online learning, and they show to need major work on developing their open science and innovation practices, which in the case of CUB it scores only 1.7, the lowest score of this part of the assessment.

Figure 10: Digital Transformation



The HEI fosters a digital culture as a mean for innovation and entrepreneurship

This is a section in which, although the level of support for Digitalization varies among universities, all interviewees agree that COVID has been the push that was needed for it to become a priority and not just a "nice-to-have".

Reaching the highest score, ASU interviewees affirm that the organization has been committed to being a "Digital University" since 2013, which is why they have been directing all their efforts towards this goal, even more so since COVID began. Currently, they comment that structurally they are evaluating a 50% digital and 50% face-to-face operation, completely digitizing some of the roles of the university that used to be on-site, thereby they are returning some administrative office spaces that they will no longer need.

On the CreU side, the rector and the head of Marketing affirm that the digital culture is something that comes hand in hand with their innovative DNA, therefore they consider that it was always promoted at the university and that is why adapting to the COVID changes was relatively easy; however, the head of the Innovation Hub refutes that the "Digital transformation capability is low because of the need of Cultural transformation, since it is necessary to work on the mentality and capabilities of the people in the organization, especially on the academic side".

For CU, the importance of promoting digitalization and digital culture began as a result of COVID, since it was almost nonexistent before and still remains low today, mainly because of

cultural barriers, fear of change, lack of understanding and ignorance of the benefits it could bring to the university. In the case of CUB, they add that "before COVID, there was a small group of faculty members talking about digitization issues some time ago, but there was no time to prioritize these issues" (CUB Professor).

The digital infrastructure is planned, managed and continuously improved to align with the vision, mission and strategy of the innovative HEI

Again achieving the highest score, ASU interviewees point out that their digital infrastructure was well developed and integrated long before COVID, which gave them an advantage over other universities when, in the wake of COVID, all university services had to be digitized. In 2017, they took, based on data, the decision to digitize, through a chatbot, all their student support administrative areas. Although at the beginning the shock, resistance, and criticism were strong, the CEO did not change her decision because "what she wanted was to establish a cultural change" (Head ASU's Open Innovation). Once the storm had passed, they were able to prove again with data that they were on the right track, as their NPS had increased 26 points since the implementation of the chatbot.

In the case of CreU, they point out that the digital infrastructure still needs a lot of improvement, better planning and a bigger budget. The Rectora recounts that, for example, before COVID there were already some people doing remote work, but not many because CreU's ability to provide them with the necessary infrastructure was limited, so when COVID hit, the jump was turbulent as they had to improvise to do it with no budget available. On the positive side, they point out that as a result of this experience, corporate directors have now allocated budget to invest in digital infrastructure.

In the case of CU, there was no planned infrastructure either, and they have formally started the digital transformation with online learning. They note that, if only because of pressure, the responses at the university level have been positive so far, but that "the real test will come after the pandemic, to see if these initiatives are sustained" (Head CU's Innovation Hub). Likewise, from CUB they point out that they also did not have a Digitalization planning or strategy at faculty level, but that a good effort has been made with respectable results so far, the most important focus being to invest in tools and technology skills training for teachers.

The HEI is committed to digital teaching, learning and assessment practices

Again, as a result of COVID, all the interviewees affirmed that their institutions were already committed to this in some way, since in some programs they offered blended learning, half on-site, half online, but now they are prioritizing digital teaching. They also state that in several cases the resistance to this change has come mainly from the students, who do not consider that the quality of digital teaching is the same, therefore they criticize the fact that they have to pay the same fees for lower quality.

Likewise, they all point out that the main weakness in moving to online learning is the lack of digital skills of most of their teachers, so it has become urgent to invest in digital training for them, something that did not happen before COVID. They point out that age is an important factor in this issue, because while the younger ones have adapted easily, some older teachers had never taught an online class before, so they had to be trained from the very basics.

In general terms, most of the interviewees consider that they have been able to face this challenge successfully, managing to digitize most of the courses, except for those that need advanced technological infrastructure, as in some cases of engineering. They also add that they are "achieving in some cases better results in student satisfaction than before the Pandemics" (CUB's Professor).

In the case of ASU, who started with an advantage over the others, they are already discussing and taking steps towards the total digitalization of some careers. While CreU, CU and CUB point out that they still need much more investment in technological tools for digital teaching, since due to the lack of planning, they had to somehow compromise their teaching quality when they moved to online mode.

Open science and innovation practices are widespread across the HEI

This is the section that shows the greatest opportunities for improvement in this dimension. Formally, only ASU mentioned having an Open Innovation department, which is focused on seeking relationships with external stakeholders that can contribute to solving its internal challenges. Currently, together with their partners, they are implementing initiatives such as generating digital certificates using blockchain and are piloting initiatives with technologies such as VR, AI, IOT, among others. They also mention that their efforts and budget to carry out these pilots has been affected by the COVID, but they expect to return to normal next year.

On the side of the other universities, it is understood that it exists but not in a formal way, and not as a priority at the moment.

The HEI has a dynamic digital presence supporting all its activities

This is one of the sections that received the least detail in the interviews, so it is assumed that it is seen in most cases as not so relevant compared to the rest of the points or as something that is assumed to exist. At the university level, both ASU, CreU and CU stated that they consider that their digital presences are relevant and communicate their activities correctly.

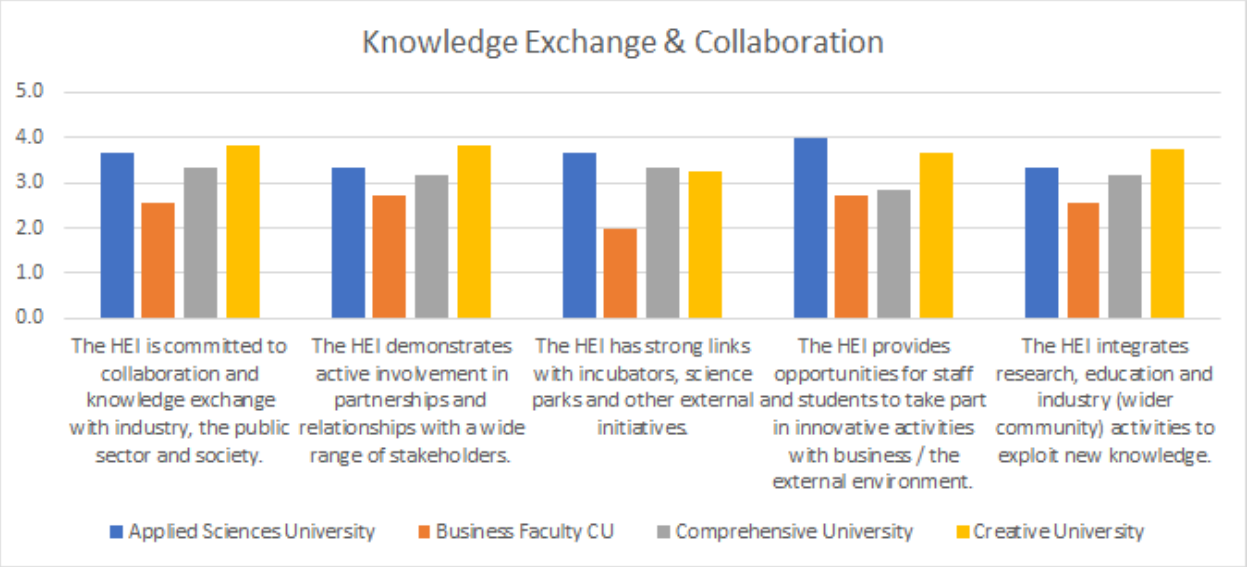
However, the most resounding comments came from the CUB side, where the interviewees commented that at the faculty level they have much room for improvement in terms of digital presence and that what is happening today is that student organizations are demonstrating to have a much better management and outreach with their digital channels than the faculty itself.

vi. Knowledge Exchange and Collaboration

This was one of the highest scoring dimensions for all four HEIs assessed. This time, CreU is the one who leads, with an average of 3.7 points, followed by ASU with 3.6. CU comes in third place with 3.2, and finally CUB stands with 2.5 points. All the statements were rated above 3 points on average, which indicates that this is a dimension that HEIs do recognize as something important to work on, being “The HEI has strong links with incubators, science parks and other external initiatives” the statement with the lowest score, but still above 3.

ASU has the best score on providing its students and staff with opportunities to take part in innovative activities with external stakeholders, while it has opportunities to improve in its partnership generation, especially to integrate research, education and industry to exploit new knowledge. For CU, this is the dimension with the best results from the assessment, but its principal area to work on is to provide its people with opportunities for innovation. Finally, CUB is the only institution that ranks below 3 in all of the statements, having great improvement opportunities especially in developing links with incubators and other external partners.

Figure 11: Knowledge Exchange & Collaboration



The HEI is committed to collaboration and knowledge exchange with industry, the public sector and society

The interviewees from the four institutions agree that knowledge sharing and collaboration with external stakeholders is an important point for their universities, although from different perspectives. For example, interviewees from ASU and CreU say that integrating the triple helix model is one of the objectives of their innovation and entrepreneurship organizations, and that they are fully committed to the relationship with the environment, especially with industry, as these contacts contribute positively to the employability of their students. The CU interviewees, on the other hand, consider that, although CU has a very good relationship and level of collaboration with the public, governmental and social sectors of the country, there is little enthusiasm for building relationships with big companies, and there is currently nobody in charge of generating these links. This is confirmed by CUB interviewees, who also add that CU's problem is that "it is an arrogant organization that for many years looked at its own navel and did not look outwards, towards the market, towards its users" (CUB's Professor). In the particular case of CUB, they do have a person dedicated to generating partnerships with organizations, although they point out that they only have him on a part-time basis due to organizational restrictions at CU, who do not understand the need for a role in that position and therefore do not approve the opening of a full-time position.

The HEI demonstrates active involvement in partnerships and relationships with a wide range of stakeholders

In the case of ASU, the answer is yes, although they point out that they are not yet fully integrated with the industry, but that they plan to organize a strategy around this soon thanks to funds they have managed to secure from the government for this purpose. In the case of CreU, they point out that they do this through their professors, directors and career advisory boards, who have close ties with industry or are part of it.

In the case of CU, they are strongly involved with government bodies, but they lack industry relations. CUB states the opposite: its current strength is its relationship with industry, and it has “more than 110 organizations involved with the faculty” (CUB’s Professor). In addition, interviewees point out that in some cases student organizations are doing themselves a better job in their relations with external stakeholders, and that at the faculty level they also need to develop stronger ties with their graduates.

The HEI has strong links with incubators, science parks and other external initiatives

All the universities studied have their own business incubator, although none, with the exception of ASU, indicated that they have relationships with science parks or other external initiatives. In the case of ASU, they also indicate that they are part of Innovate, which is the Peruvian government's network of incubators 2.0.

The HEI provides opportunities for staff and students to take part in innovative activities with business / the external environment

The most outstanding examples in this category come from ASU and CUB, where both have initiatives that generate direct networking between their students and organizations. In the case of ASU, they comment that the incubator engages with industry to propel the potential of its most promising startups, in some cases getting companies to integrate these startups into their operations. Additionally, some ASU careers have partnerships with important organizations such as SAP and LG, where students work on company challenges and in return receive training, mentoring and the possibility of working on joint research projects. On the CUB side, initiatives have also been generated with private and public companies, where students work on challenges of the organization and the best are hired as trainees.

On the CreU and CU side, initiatives in this regard are more traditional and do not have a model that focuses on increasing the employability of their students.

The HEI integrates research, education and industry (wider community) activities to exploit new knowledge

In this section there are diverse answers, but it can be concluded that the activities that generate third-stream income are not very common in the universities studied, instead they strongly depend on tuition income, with the exception of CU.

On the one hand, ASU comments that this integration does occur and that the creation of patents with external organizations is managed by the rectorate of Research, but they do not specify how relevant this is in their financial statements. In the case of CreU, they point out that when an external organization contacts them to carry out a research or entrepreneurship project, it is difficult for them to do so because they do not have the operational capacity to assign a person to work on it, although recently the Innovation Hub has begun to explore consultancy with the government.

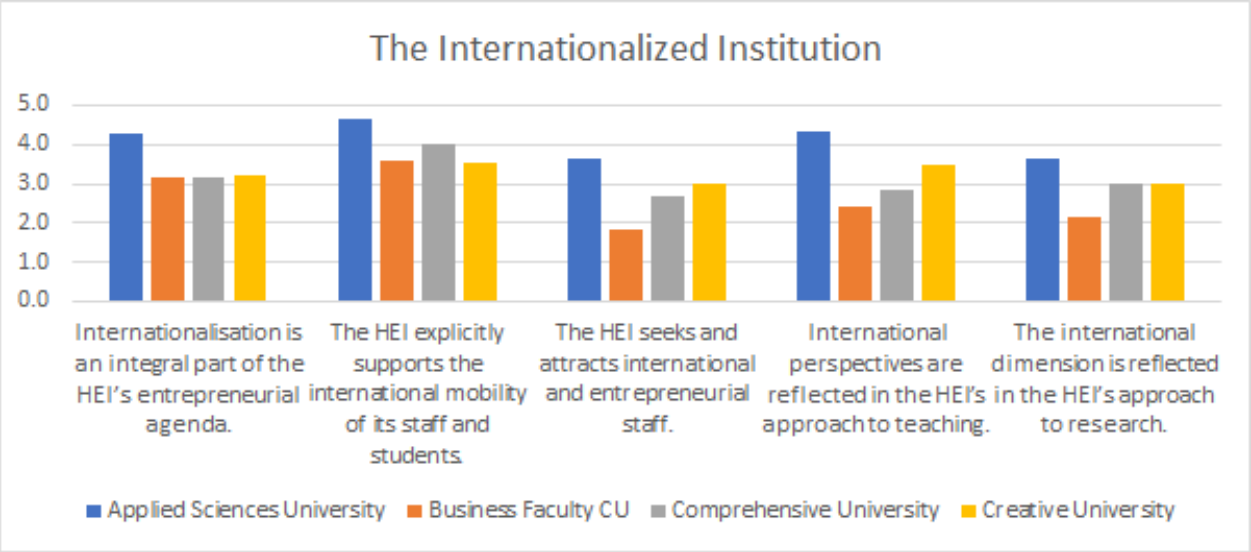
In the case of CU, although they say that they do generate joint projects with external stakeholders, they point out that there is a lack of articulation at the university level to be able to promote and scale them. Additionally, they say that the university representatives lack soft skills to attract and interact with people from companies, since they speak a different, non-business language. They also state that although CU has some spin-offs, in general it is problematic for them to adapt their legal structure for the creation of such ventures. Finally, on the CUB side, they confirm that most university spin-offs come from the Engineering department, as the Business Faculty is limited by the Business Department to do collaborative research projects with industry.

vii. The Internationalized Institution

In general this is a high scoring dimension for everyone, which comes at no surprise because Internationalization is an important area in which universities have been working to improve especially over the last years, however according to the assessment results, there is definitely more room for improvement in seeking to attract international entrepreneurial talent and giving an international dimension to research.

Regarding attracting international and entrepreneurial staff, the biggest improvement opportunity relies on CUB, which got the lowest score of the whole dimension, with 1.9 points only. In line with this result, this is also the biggest opportunity for CU, with a score of 2.7. As was mentioned in the beginning of this chapter, CU is characterized for its great prestige in the country and in the region, however it is also characterized for being a highly traditional university with a strong traditional culture, which may not be so attractive for professionals that seek to work in an innovative environment.

Figure 12: The Internationalized Institution



The topic of internationalization was not mentioned much in the interviews because it is something that is standardized as important for all the institutions studied. All the interviewees affirmed that their universities promote the mobility of their members and that they are concerned with generating partnerships with renowned international universities. However, the attraction of international talent is a common pain for all beyond their individual differences, since Peru is not an attractive destination for international researchers and academics, as it is one of the countries with the lowest investment in STI in the region. As a result, the reflection of international perspectives in both teaching and research is not utterly low, but limited.

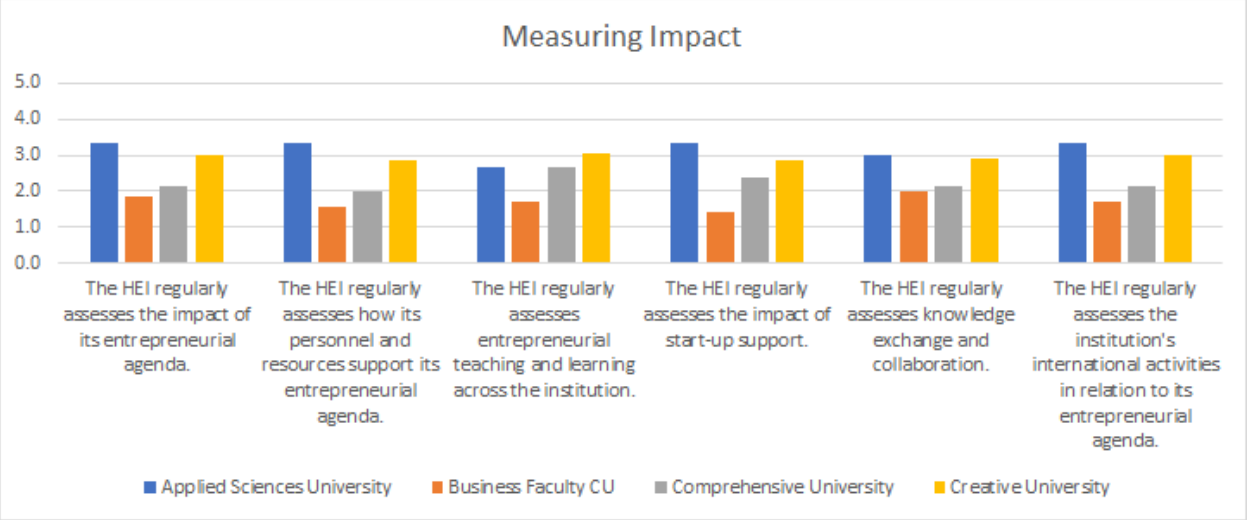
viii. Measuring Impact

On the opposite side to the dimension above, Measuring Impact is the lowest scoring dimension for all the assessed HEIs, having all its statements with average values from 2.6 downwards. The lowest scoring statement is "The HEI regularly assesses how its personnel and

resources support its entrepreneurial agenda", with 2.4 points on average. These results were to be expected since it can be seen that in general the assessed institutions are still in the process of developing and even starting to develop their entrepreneurial capacities, most of them still without a formally established strategy. Therefore, without a set strategy and objectives, measurement becomes more complicated and less likely to exist or be considered crucial.

CU and CUB are the most worrying cases in this dimension, with overall scores of 2.3 and 1.7 respectively. CUB is below 2 in all concepts, being the lowest one related to measuring the impact of startup support. ASU is the only university which scores above 3 in all the concepts of this dimension, with the exception of assessing entrepreneurial teaching and learning across the institution. Finally, CreU's scores are quite stable, with opportunities for improvement almost equally in all areas.

Figure 13: Measuring impact



Consistent with the quantitative results, the interviews revealed that measuring the impact of their innovation and entrepreneurship initiatives is not at all a focus for most of the institutions studied, with the exception of ASU, who did indicate that they place special emphasis on demonstrating with data that their initiatives produce results, since without this they would no longer receive funding from the university. In the case of CreU, they again mentioned that the lack of measurement is due to their lack of resources to allocate to this activity. In the case of CU and CUB, they mentioned that since innovation and entrepreneurship are not formal objectives of the university, it is not urgent for them to invest resources in

measuring their effectiveness. However, both CreU and CUB indicated that what they do focus on measuring is the effectiveness of their formative models, which include elements of innovation and entrepreneurship.

5.3. Enablers and Stoppers of Entrepreneurship and Innovation

From all that was expressed in the interviews, 25 concepts that influence, either positively or negatively, the innovation and entrepreneurship potential of each HEI were retrieved. These can be grouped into 5 key categories: 1) external, 2) leadership, governance and strategy, 3) culture, 4) budget, and 5) people, and are presented in Table 5 below.

Table 5

Enablers and Stoppers of Entrepreneurship and Innovation

Categories	Enablers	Stoppers
Systemic issues	**COVID (and risks in general)** Activate the survival instinct of the organization, therefore, when facing threats, even traditional universities develop overnight the flexibility, speed, abilities and mindsets required to overcome them.	**Perú's Systemic issues** - Low investment in STI - Low level of digital connectivity and digital culture - Poor articulation between government, academia and civil society - Misunderstanding of the concept of entrepreneurship
Culture	- Young, for-profit, results driven organizational nature - Organizational culture of openness and articulation.	- Academic Culture - Traditional university nature: slow, heavy, risk-averse, comfortable, against entrepreneurship. - Lack of articulation, cannibalization - Lack of interaction with external organizations and industry.
Leadership, Governance and strategy	**Leadership & Governance** - Committed, supportive, competitive and future-driven - Flexibility and fast decision making **Strategy** • Clear goals and planning for innovation and entrepreneurship strategy • I&E articulators:	**Leadership & Governance** - Lack of awareness of the value of entrepreneurship - Not relating entrepreneurship with innovation - Uncommitted and unsupportive of entrepreneurship - Lack of management skills - Bureaucracy and overregulation - Excessive fear of tainting

	● Innovation Hubs ● Innovation Committees ● Innovation Ecosystem • Focus on Triple Helix Collaboration	reputation **Strategy** - Lack of a strategy and planning for Entrepreneurship and Innovation - Lack of planning and investing in Digital Infrastructure - Lack of focus on staff development - Lack of interaction with external stakeholders
Budget		**Lack of Budget** - For staff recruitment and development - For incentives and rewards - For entrepreneurial support - For Digital infrastructure - For entrepreneurial support activities - For funding for entrepreneurs
People	- Entrepreneurial minded people - Intrapreneurship	- Lack of innovative skills and mindsets - Lack of digital skills - Lack of teachers entrepreneurial training skills - Age - Lack of industry relationship building skills - Lack of international perspectives

These categories relate to the first two dimensions of the HEInnovate framework: Leadership and Governance, and Organizational Capacity. Therefore, it is understood that these are the bases that in a way determine the scoring of the other dimensions.

The factor identified as the most influencing, either positively or negatively, the innovation and entrepreneurship potential of universities is the Culture, followed by the Leadership. In several cases, the same concept is an enabler for some and a stopper for others. For instance, when the culture is innovative, open and promotes communication and articulation, like in the cases of ASU and CreU, then it is an enabler that influences the entire organization. When the organization is driven by Academic Culture, closed, risk-averse and with a clear bias against entrepreneurship, like in the case of CU, then it is a stopper that negatively affects the rest of the dimensions. The same with Leadership: if the leaders of the university are committed and aware of the value of entrepreneurship, like in ASU and CreU, it can even turn

the academic culture in favor of it. If it is not, like in CU, it just enhances the hostile environment for entrepreneurship and kills the motivation and initiatives of the few people that promote it, which is what happens in the case of CUB, whose initiatives are constrained by CU's culture and leadership. At the same time, of the cases studied, it can be seen that the Strategy also makes a huge difference. ASU scores higher than the others in almost all dimensions, because it has a clear strategy, while in cases where the strategy is absent, innovation and entrepreneurship initiatives have less impact or simply do not occur because there is no articulation and resources.

Budget has been pointed out in all cases as a generalized stopper, even for organizations that have a pro-entrepreneurship culture and leadership, since without a budget they cannot carry out innovative initiatives, nor fulfill their entrepreneurship objectives. Furthermore, from the interviews it is understood that the institutions invest very little, or almost nothing, in incentives and in the development of innovative skills of staff, both academic and administrative. The focus of the responses of all interviewees was on students, therefore it is assumed that investment in staff is not a priority, which is a problem because it has also been noted that there is a generalized lack of innovative and digital skills, especially in teachers.

Regarding the People dimension, the stoppers that stand out the most, especially for academics, are the lack of innovative mindsets, the lack of skills to relate to the industry, the lack of digital skills, and the lack of international perspectives. Additionally, older age has been pointed out as a factor that enhances these stoppers. On the other hand, Intrapreneurship proves to be an enabler all the studied HEIs have in common, important in the absence of strategy, with the potential to influence the culture and influence the environment when it obtains good results.

Finally, all interviewees agree that COVID has been one of the main enablers, either to begin to take into account the importance of entrepreneurship or to reinforce the conviction that already existed. Especially in the case of CU, it has been the factor that has made the difference and has generated a window of opportunity for these issues to be integrated as strategic for the university. Along with this, COVID has also revealed common shortcomings, especially in the planning and investment in digital infrastructure. On the other side, Peru’s systemic issues**,** such as low investment in STI, low level of digital connectivity, poor coordination between government agencies, lack of communication channels between the state, academia and civil society,

misunderstanding of the concept of entrepreneurship, among others, have been stated as common stoppers for entrepreneurialism that affect all the studied HEIs.

5.4. Actions on 21st Century Skills, Employability, and Digitalization

From the interviews, it was also possible to determine what concrete actions the HEIs studied were taking in relation to the challenges of the future established at the beginning of this research. These challenges correlate with the HEInnovate dimensions of Entrepreneurial Teaching and Learning, Knowledge Exchange and Collaboration, and Digital Transformation and Capabilities. In terms of building 21st century skills, some are leveraging the use of agile methodologies and project or challenge based learning of both organizations and the community. A good practice of both ASU and CreU is that they are implementing these methodologies transversally to all their careers. In the same line, another good practice, also present in CUB, is the involvement with organizations to generate these projects, as this facilitates networking and early visibility of student talent, which also impacts on improving their employability. The negative side is that these practices are not mandatory or regulated, but are left to the academic freedom of the professor, as a result of which, in several cases, the curricula are still very traditional and old-school. Likewise, there seems to be very little measurement of their impacts, so there is not enough visibility to optimize them if required. In addition, there is a general lack of training in technological skills, even though they are recognized as crucial for the future.

On the Employability side, as already mentioned, the advantage is that relationships are being generated with external organizations, whether public, private or social, in order to generate interaction between them and the students. The negative side is that this is not a standardized practice, nor is it considered crucial in all institutions. In several cases it is done in isolation, at the will of the professor, without formally belonging to the employability strategy. Moreover, it is a practice that is just being explored, so its scope is still very limited. In general, the interviews give the feeling that what the institutions understand by actions that promote Employability is still linked to the traditional vision of having a job bank and organizing fairs or networking events.

Finally, regarding Digitalization, it seems that thanks to COVID this has become a priority and has been accepted as necessary even by the most conservative members of the universities. However, there are still doubts as to whether this will still be the case when the

pandemic is over, since only in the case of ASU have they indicated that structural actions are already being taken to digitize the operation of the university. In the same line, the lack of planning and investment in digital infrastructure has jumped out as the main weakness in this dimension, something that is expected to improve in the following years given the learnings from this pandemic. Moreover, there is still much work to be done to promote digital culture in all members of the universities, in fact, another common weakness to solve is the lack of digital skills of professors, which currently seems to be compromising the quality of students' online learning.

5.5. Ideas to maximize Entrepreneurial and future-proof potential

Respondents were asked to think of suggestions or actions to reverse the effect of the current stoppers on the entrepreneurial capacity of their universities. In total, 59 ideas were retrieved, which have been grouped and categorized according to the HEInnovate dimensions. These are shown in Table 6.

Table 6

Ideas to maximize entrepreneurial and future-proof potential

Dimension	Ideas
Systemic issues: Ideas for policy Action 17 ideas	**Generating Awareness and Industry pressure** - Generate awareness and promote in both, the Industry Sector and Academia, of the importance of Entrepreneurial Capacities, Digital Culture, and Triple Helix collaboration. - Raise awareness in the Productive/Industry Sector about the urge of Entrepreneurial Talent, so as to push universities to change in order to keep their students employable. **Ensuring Articulation of entrepreneurship and innovation initiatives** - Implement a government body that coordinates and articulates the efforts towards entrepreneurialism. For example a Ministry of Entrepreneurship and Innovation. - Ensure educational integration of innovation and entrepreneurship skills from school onwards. **Increasing Funding and Incentives for Entrepreneurship and Innovation** - Enhance the attraction of international private capital for entrepreneurship. - Establish incentives for Academia to develop entrepreneurial activities.

Leadership & Governance 11 ideas	**Reinforcing Leader capabilities and flexibilizing operations** - Enhance the management skills and innovative mindsets of university leaders. - Reduce bureaucracy and simplify administrative processes **Generating Awareness of the value of Entrepreneurship** - Leaders must have a clear understanding of how Entrepreneurship benefits society - For leaders who are pro-entrepreneurship, they should take the role of promoters of the value of entrepreneurial capabilities not only within the university but also in society. Training the government and the industry on ways of leveraging on them. **Focus on Strategy, Articulation and Empowerment** - Integrate entrepreneurship and innovation in the strategy, aligning Academic goals with Business/Organizational goals - Establish a body in charge of managing and promoting entrepreneurial initiatives. - Empower and give autonomy to faculties and departments to develop entrepreneurial capacities according to their strengths. **Creating safe spaces for entrepreneurship and innovation** - Generate “virgin” spaces, unbiased from academic culture, autonomous hubs for articulation and communication of entrepreneurial culture and best practices. - Promoting interdisciplinarity training towards entrepreneurship and innovation among university staff. Currently roles are way too specialized: research, teaching, and administrative.
Organizational Capacity 5 ideas	**Increasing Budget and Incentives for Innovation and Entrepreneurship** - Increase the budget for entrepreneurial initiatives and staff development - Establish incentives and rewards for entrepreneurialism among academics and administrative staff, whether they are monetary or reputational. **Developing People & Culture in entrepreneurial skills and mindsets** - Establish transparent communication channels for collaboration between different faculties and departments. - Destabilize Academic Culture by adding pressure on the completion of entrepreneurial objectives. - Prioritize diversity of views and backgrounds when hiring new faculty members
Entrepreneurial Teaching and Learning 10 ideas	**Sharing and Standardizing best practices** - Structure and standardize best entrepreneurial training best practices - Generate spaces to share best practices among teachers **Reinforcing interdisciplinarity, innovative skills and mindsets** - Generate spaces/labs for interdisciplinary training between teachers, students and staff. - Enhance the training in technological skills - Create a “digital creation department” transversal to the whole university. - Integrate business skills courses across all careers. - Exposition for teachers to real topics of innovation from the “outside world” - Enhance relationships with external stakeholders, especially industry, for designing and updated curricula.

Preparing and supporting entrepreneurs 3 ideas	**Increase financial support for startups** - Strengthen the attraction of investment and financing for startups. - Generate more connections with organizations for startup funding, for example venture capitalists.
Digital Transformation and Capabilities 2 ideas	**Planning and investing in Digital Transformation** - Invest more in digital infrastructure - Improve the planning and the processes of Digital Transformation - Hire more people dedicated to Digital Transformation - Enhance open innovation initiatives
Knowledge Exchange and Collaboration 9 ideas	**Establish coordinators of Knowledge Exchange and Collaboration** - Establish a Directorate for Relations with Civil Society in charge of promoting and coordinating the efforts for external collaboration - Establish a Head of relationships with industry that works at a university level - Stakeholder mapping of the allies of open collaboration **Innovating in Employability efforts** - Showcase student abilities and skills through university digital channels (LinkedIn for example) - Reinforce the relationship with alumni

Most of the ideas received revolve around how to solve the country's systemic stoppers and the importance of the role of the State in 1) generating awareness and pressure about the importance of entrepreneurship, 2) the articulation of efforts that currently come from different agencies, and 3) the increase of incentives and funding for entrepreneurship. This reaffirms that the perception of the interviewees is that the country's context regarding entrepreneurship is the baseline stopper that must be resolved for everything else to work. Additionally, they suggest leveraging on the pressure that the productive sector can generate on universities, since they are the main employers of their students, and one of the main motivations for students to enroll in universities is to become more employable.

The second category that received the most ideas for improvement is Leadership and Governance, in which the focus is on 1) strengthening the capabilities of leaders and reducing the bureaucracy of university processes, 2) generating awareness of the value of entrepreneurship both internally and externally, 3) ensuring the articulation and empowerment of entrepreneurship initiatives from the university's strategy, and 4) creating safe spaces for entrepreneurship and innovation. This also shows the perception of the interviewees that having a committed leadership and a clear strategy are the determining factors for increasing the capacity for innovation and entrepreneurship in their universities.

The rest of the ideas revolve around the stoppers of budget, culture and people, highlighting the need to obtain greater resources for innovation and entrepreneurship initiatives, greater investment in digital infrastructure and the development of innovative skills of staff, and generating a culture of collaboration and openness, both internally and externally. No ideas corresponding to the Internationalization and Measuring Impact dimensions were received, which also reinforces the idea that the perception of the interviewees is that the current situation of innovation and entrepreneurship capacity in their universities requires keeping the focus on solving the first level stoppers, since if these are not solved, any other initiative will not achieve the expected impact.

6. CONCLUSIONS AND RECOMMENDATIONS

The main question guiding this research is: *To what extent can Peruvian universities be considered entrepreneurial and ready for tackling the Challenges of the Future?* The Challenges of the Future are understood as the challenges generated by concepts such as The Future of Work, The Global Skills Gap, Employability and unexpected and destabilizing risks of the environment, such as COVID-19. And entrepreneurialism was considered as an indicator of future-readiness based on the concept of Entrepreneurial Universities. Since this was a difficult question to answer at the country level due to time and resource constraints, in order to reach an initial conclusion, a case study of three private Peruvian universities was carried out.

These universities were chosen for two reasons: 1) the researcher's access to information and 2) the different characteristics of the universities. A traditional, non-profit, long-standing and highly renowned Comprehensive University (CU), which was studied at the university level and also at the level of the Faculty of Business (CUB), and two for-profit universities, younger and with a more modern perspective: a University of Applied Sciences (ASU) and a Creative University (CreU). These universities were studied based on 4 research sub-questions: 1) How do Peruvian HEIs rate in Entrepreneurial Capacity according to the HEInnovate framework? 2) What are the factors supporting or preventing Peruvian HEIs to accomplish their entrepreneurial potential? 3) What efforts are Peruvian HEIs making for developing 21st century skills, accomplishing Digital Transformation, and enhancing their students Employability? and 4) What measures could Peruvian HEIs take in order to maximize their entrepreneurial and future-proof potential?

The research methodology used was mixed, applying first a quantitative assessment and then complementing the results with in-depth interviews. Having carried out the analysis based on these 4 questions, the conclusions are:

1) The young, modern and for-profit universities show a higher entrepreneurial capacity in comparison to the older and traditional university. The key differential factors of their entrepreneurial potential lie in the dimensions of Leadership and Governance, and Organizational Capacity: Funding, People and Incentives.

2) The factors that influence, either positively or negatively, the entrepreneurial potential of the HEIs studied are 1) systemic problems, 2) culture, 3) leadership, governance and strategy, 4) budget and 5) people.

3) Common stoppers are 1) systemic problems such as low investment in STI, low development of digital culture and digital connectivity, lack of articulation between government, academia and civil society, lack of awareness of the social value of entrepreneurship, 2) Academic Culture, which reinforces the traditional vision of the university, bureaucratic, closed to interacting with members of the ecosystem both internally and externally, risk averse and which sees entrepreneurship as a factor that plays against its reputation, 3) a lack of strategy, planning and measuring the results of entrepreneurship and innovation, 4) a lack of budget that affects all innovation and entrepreneurship initiatives, and 5) a lack of people with entrepreneurial skills and mindsets, especially in academics.
4) Common enablers are: 1) Risks that generate opportunities, such as COVID that has propelled the need for entrepreneurship in the country, and has activated the survival instinct of universities, 2) Intrapreneurs, 3) Innovation promoters and articulators, such as Innovation Committees and Innovation Hubs.
5) Leadership and Culture are stoppers for the traditional university, whereas they are enablers for the younger and modern ones. The leadership is a reflection of the culture, however it also has the power to change it.
6) Leadership as a stopper is driven by Academic Culture: unaware of the value of entrepreneurship, not committed to entrepreneurial initiatives, lacking management skills, feeding bureaucracy and afraid to take risks that may affect its reputation.
7) Leadership as an enabler is competitive, open and results-oriented, that recognizes the value of entrepreneurship and therefore promotes it on all fronts, in the strategy, in the culture and in the budget.
8) The nature of the organization seems to be an aspect that can be a stopper or an enabler of entrepreneurialism, even in spite of the academic culture. From the cases studied, the for-profit universities tend to demonstrate greater entrepreneurial capacity precisely because of their inherent spirit of competition and search for efficiency.
9) While some efforts are being made, there is still much opportunity for improvement in developing 21st century skills, strengthening student employability, and planning and investing in Digitalization.

In sum, it can be concluded that the answer to the main question is: the Peruvian universities studied are still in an initial state of innovation, entrepreneurship and future-readiness. Although some show more progress than others on the road to becoming

entrepreneurial, especially those with a committed leadership, a clear strategy and a culture of open innovation, they are all affected by systemic problems in the country. As long as these problems continue to exist, even universities that demonstrate high potential and motivation will continue to be limited, since these shortcomings have direct effects on their leadership, culture, budget and talent.

6.1 Recommendations for Policy Action

1. Generating awareness and pressure for Entrepreneurship and Innovation

- Generate awareness of the social importance of Entrepreneurial Capacities, Digital Culture, and Triple Helix collaboration in both, the Industry Sector and Academia.
- Raise awareness in the Productive/Industry Sector about the urge of Entrepreneurial Talent, so as to push universities to change in order to keep their students employable.

2. Ensuring Articulation and Entrepreneurial Skills Development

- Implement a government body that coordinates and articulates the currently disjointed efforts towards entrepreneurialism. For example a Ministry of Entrepreneurship and Innovation.
- Integrate the training of innovation and entrepreneurship skills from school onwards.

3. Increasing Funding and Incentives for Entrepreneurship and Innovation

- Enhance the attraction of international private capital for entrepreneurship.
- Increase incentives for Academia to develop entrepreneurial activities.
- Increase incentives for the Productive sector to engage with Academia.

6.2 Recommendations for universities

1. Improving Leadership and Governance

- Generate awareness of the value of entrepreneurship internally and externally.
- Strengthen the innovative and management capabilities of leaders.
- Reduce the bureaucracy of university processes.
- Include entrepreneurship and innovation as a key part of the HEI strategy.
- Develop a strategy for Entrepreneurship and Innovation.
- Ensure the articulation and empowerment of entrepreneurial initiatives.
- Create safe spaces for entrepreneurship and innovation

2. Improving Organizational Capacity

- Increase the budget for entrepreneurial initiatives according to the strategy.
- Invest in staff entrepreneurial skills development.
- Establish incentives and rewards for entrepreneurialism among academics and administrative staff, whether they are monetary or reputational.
- Establish transparent communication channels for collaboration between different faculties and departments.
- Destabilize Academic Culture by adding pressure on the completion of entrepreneurial objectives.
- Prioritize diversity of views and backgrounds when hiring new faculty members.

3. Enhancing 21st century skills development through Entrepreneurial Teaching and Learning

Sharing and Standardizing best practices

- Structure and standardize entrepreneurial training best practices
- Generate spaces to share best practices among teachers
- Standardize project/challenge based learning across all curricula

Reinforcing interdisciplinarity, innovative skills and mindsets

- Generate exposition for teachers to real topics of innovation from the “outside world”
- Generate spaces for interdisciplinary training between teachers, students and staff.
- Enhance the training in technological skills
- Integrate business and digital skills training across all careers.
- Enhance relationships with external stakeholders, especially industry, for designing an updated curricula

4. Enhancing Employability through Knowledge Exchange and Collaboration

Establish coordinators of Knowledge Exchange and Collaboration

- Establish a Directorate for Relations with Civil Society in charge of promoting and coordinating the efforts for external collaboration
- Establish a Head of relationships with industry that works at a university level
- Identificate and leverage on the university allies of open collaboration

Innovating in Employability efforts

- Showcase student abilities and skills through university professional digital channels
- Reinforce the relationship with alumni

- Generate more joint projects between students and industry partners

5. Planning and investing in Digital Transformation

- Improve the planning and the processes of Digital Transformation
- Increase investment in digital infrastructure
- Hire more people dedicated to Digital Transformation
- Increase the awareness of the importance of Digital Culture
- Enhance open innovation initiatives

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Annex A

Impacts of the Covid-19 pandemic in Latin America and the world

As if the previously mentioned challenges were not serious enough for higher education, in early 2020 the COVID-19 pandemic struck all the countries of the world in areas that go beyond health, hitting especially hard the economy, productivity, and employment of nations. As stated by UNESCO, the current impacts of the crisis on higher education are easily documented, but it is debatable which ones will leave their mark on the different actors in the medium and long term mainly because there are lack of references of similar crises that would enable reliable predictions of what could happen in the future. Throughout the world, the most immediate impact for students has been the closing of universities, the cessation of face to face teaching, and the obligatory adoption of online learning; for teachers, it has been the demand of the continuity of teaching activity using a virtual modality and increasing rates of unemployment due to the terminations of some temporary contracts. For non-teaching staff, unemployment has been the main issue, due to the financial effects of the crisis in the cash flow of HEIs, caused mainly for the reductions of student enrollment during the months of the crisis (UNESCO, 2020).

The overall impact of COVID-19 has been particularly complex in regions such as Latin America and the Caribbean, exacerbated by weak social protection structures, fragmented health systems, and deep inequalities (UNITED NATIONS, 2020). This, together with the unresolved challenges of the region's Higher Education systems such as growth without quality, inequities in access and achievement, and the progressive loss of public financing are almost the perfect recipe for disaster. The UNESCO IESALC estimates that the temporary closure of HEIs affects approximately 23.4 million higher education students and 1.4 million teachers in the region, which represents more than 98% of the region's population of higher education students and teachers[11]. Education has been disrupted throughout the region and more than 171 million students in Latin America and the Caribbean are currently out of school. Schools have instituted distance learning initiatives, but existing inequalities in study devices can exacerbate inequalities in education; furthermore, significant losses in learning and human capital development risk widening inequalities in the long term (UNITED NATIONS, 2020). To deal with these disruptions, most of the countries have limited to three areas: a) administrative measures to safeguard the operation of the system; b) financial resources; and c) the availability of

[11] UNESCO (2020). COVID-19 and higher education: Today and tomorrow. Impact analysis, policy responses and recommendations. IESALC.

resources to give continuity to the training activities. Chile has been the only country to develop a comprehensive national action plan to deal with the consequences of COVID-19 in higher education (UNESCO, 2020). As expected, the primary area of work within the governments of the region has been to favor the implementation of emergency technological solutions for teaching continuity, focusing attention on making technological mechanisms and resources for teaching distance courses available to HEIs that lack their own virtual education platforms. This has been the case for example, of Argentina, Brazil or Chile.

It is important to take advantage of the lessons learned from the sudden intensive need and use of technology in the educational field, leveraging on its potential for equity and inclusion, particularly in the Latin American region. Additionally, as proposed by UNESCO, coordination mechanisms need to be established between governments and HEIs that allow joint participation and prevention measures in the case of future crises, involving students, and teaching and non-teaching staff in designing the responses that emergency situations demand. Following this line, UNESCO has established some general guidelines of action for both governments and higher education institutions. For governments the recommendations are: 1. Include higher education in the stimulus plans for economic and social recovery; 2. Forge a national consensus for a strategy for fostering recovery and innovation in higher education; 3. Provide a clear regulatory environment when reopening of classrooms that generates security; and 4. Commit to international cooperation. On the other hand, they recommend HEIs to: 1. Anticipate a long-term cessation, focusing efforts on ensuring teaching continuity and guaranteeing equity, generating governance mechanisms, monitoring, and efficient support; 2. Design pedagogical measures to evaluate training and generate mechanisms to support learning for disadvantaged students; 3. Document the pedagogical changes introduced and their impacts; 4. Learn from mistakes and scale up digitization, hybridization and ubiquitous learning; and 5. Promote internal reflection on the renewal of the teaching and learning model (UNESCO, 2020).

Taking all of this into account, there is no doubt that this pandemic has infused an additional sense of urgency and complexity for the transformation of Higher Education, especially in Latin America, where the shift to virtual education has been a struggle given the region's little technical infrastructure and instructional support to move online, its high inequality rates, and the region's private HEIs high dependance on tuition fees (BOTHWELL, 2020). This last factor is particularly worrying for private HEIs given the effects of the crisis in Latin America's labor markets, which have contracted radically, causing that people really struggle with getting the

money to pay high tuition fees. Nonetheless, if anything positive can be drawn from this crisis, is that it can be seen as an opportunity or catalizer to rethink and redesign the way higher education institutions currently work with a special focus on the future or the so called “new normality”. In this context, working for solving the challenges of enhancing employability, skills development, and innovation and digital capabilities focused on contributing to the betterment of the society and the world economy become priorities, and much of this responsibility relies on higher education.

Annex B

3.6. Proposed solution paths for higher education's challenges

Based on the context shown above, the only clear future path for higher education institutions is to transform the way they have been functioning and the value they bring to students. To this end, several experts and expert organizations have gathered a number of recommendations to be applied in higher education that can generate the expected transformation. These recommendations have been grouped into broad categories and will be shown below.

a. Rebuilding the Value proposition of Higher Education for the Future of Work

While it is true that higher education institutions do not want to be seen only as a tool or fuel for the industrial economy, the need to align educational expectations with the needs of the job market is undeniable, even more so given the effects of massification or "democratization" of higher education throughout the world and the changes in society caused by the COVID-19 crisis. However, universities should not make the mistake of creating highly specific educational programs that correspond to jobs that, while in high demand today, are also highly likely to be automated in the not-too-distant future. Instead, college graduates also need to have a broad perspective to constantly maneuver through an uncertain economy in the future. "The question is how humans are going to add value to work" (Selingo, 2017a). Thus, programs and credentials must be developed with the needs of the labor market in mind while also building upon both the skills sought by employers at the moment and the future-proof skills that will endure and transcend jobs (D2L, 2018). This "mixed future-proof skillset" credential is the added value that universities must provide today.

b. Adapting organizational design to the future of work

The attention on the need for organizational higher education structure to better align with the practices of the 21st-century workplace is increasing. Technology, current fast-paced societal demands, and evolving faculty roles are forcing institutions to rethink the traditional functional hierarchy. Therefore, higher education institutions must adopt more flexible, team-based, matrixed structures to remain innovative and responsive to campus and stakeholder needs (New Media Consortium and Educause, 2018). Here, cultural change is one of the most critical aspects to accomplish, and it becomes imperative to generate strategies to overcome the common steep learning curves and resistance among staff.

c. Embracing new pedagogical models for the 21st century

As the era of the "sit down and learn" educational model is over, to remain relevant in today's world higher education institutions must adopt instructional models that are learner-centric, flexible, responsive, and adaptive. For example, models such as competency-based education, blended learning, work-integrated learning, and online education have allowed students to leverage their existing knowledge and skills to expedite the learning process and have shown they are equipped to address issues of access, affordability, personalization, time to completion, and quality, especially in underserved areas (D2L, 2018). Higher education must also start reimagining the structure of traditional degree programs, given the fact that micro-credentials create the building blocks for recognition of lifelong learning and allow individuals to acquire the specific skill sets they need to advance in their careers in a more affordable way (D2L, 2018). As mentioned, flexibility, accessibility, and adaptability are the central tenets for new pedagogical models to redefine the way students learn, centered around the learner's experience, and the educational technology that can be accessed today is the best ally for personalizing the learning experience while making it accessible and scalable (D2L, 2018).

d. Rethinking the roles of educators

The shift to a student-centered learning approach no longer requires the know-it-all-lecturer traditional teacher model, instead, it requires instructors that can act as guides and facilitators. This shift in the role of teachers and educators is particularly challenging for HEIs because educators are now increasingly expected to employ a variety of technology-based tools, engage in online discussions and collaborative authoring, and they are tasked with leveraging active learning methodologies such as project-and problem-based learning for which most of them are not yet well prepared (New Media Consortium and Educause, 2018). In this sense, many institutions are rethinking the primary responsibilities of educators taking into consideration the implications of societal changes and evolving faculty models.

e. Creating authentic learning experiences

Including learning experiences that connect students with real-world problems within the curricula is not a practice that is widely generalized in higher education institutions yet. Authentic learning is an umbrella concept for a series of pedagogical strategies that aim to

connect students with environments where they can gain highly practical, lifelong learning skills, such as apprenticeships, vocational training, scientific inquiries and community projects (New Media Consortium and Educause, 2018). Every time there are more institutions that have begun bridging the gap between academic knowledge and on-field applications by establishing relationships with local organizations and the industry, in that way, students can get a real insight into how their future careers outside campus would be like.

e. Advancing digital equity

Initiatives to close the digital gap at the global level have been promoted in recent years, becoming one of the top priorities of many governments. In 2017, UNESCO reported that 41 percent of the population in developing countries was online, and a 2018 International Telecommunication Union report stated that all 47 least-developed countries have launched 3G services and over 60% of their population are covered by a 3G network (New Media Consortium and Educause, 2018). Although generating greater access to the Internet is perhaps the first step in closing the digital divide, there are other factors that must also be considered and mitigated in order to achieve full participation, communication, and education within a global society, such as the quality of the connection, the inequality in access produced by socioeconomic differences, etc. Considering that online learning is enabled by high-speed internet access and the bring your own device (BYOD) movement has widened the access gap because not all students have the technology (smartphones, tablets, and laptops) needed to participate, this is a major challenge to be solved for higher education innovation (New Media Consortium and Educause, 2018).

f. Improving digital literacy

In the 21st century and given the immediate effects of the COVID-19 crisis, the use of technology is vital for professional and citizenship success. Digital literacy is not only about knowing how to use technology but more about generating a deeper understanding of the digital environment, enabling intuitive and discerning adaptation to new contexts and co-creation of content (New Media Consortium and Educause, 2018). It is the role of institutions to promote digital citizenship among students, which includes the responsible and appropriate use of technology. The concept of digital competence is influencing curriculum design, professional development, and student-facing services and resources. As stated in the Horizons report, due to the multitude of elements of digital literacy, higher education leaders must obtain

institution-wide buy-in and provide support for all stakeholders in developing these competencies (New Media Consortium and Educause, 2018).

g. Leveraging Industry as a partner

The dissociation between knowledge and work stems partly from the faculty who, in general, do not necessarily envision their scholarship and specialization within a discipline as having anything to do with training students and equipping them with specific skills for the workforce (Christensen and Weise, 2014). However, including industry partners in the design and execution of educational programs is essential to ensuring the alignment of skills taught to skills sought. Meaningful involvement of the industry can also give additional validation to credentials, improving their value to students as well as employers not involved in the program (D2L, 2018). Direct partnerships that lead to employer-certified learning experiences have the potential to create a separate and possibly even more powerful value network that supersedes the signaling effect of a degree (Christensen and Weise, 2014). Additionally, hands-on learning opportunities in college allow students to apply their knowledge in real-time and see how their classroom work plays out in the real world (Selingo 2017a).

It is proven that one of the most efficient ways to reinforce the employability of university students is to relate their learning to industry. Likewise, experiential learning has an empowering effect on graduates' careers: the Gallup-Purdue Index surveyed some 30,000 bachelor’s degree recipients to measure their well being in life and career, and the result was that graduates with outside-the-classroom experiences were twice as likely to be engaged in life and work after graduation, meaning they were curious, interested, and had a passion for what they were doing (Selingo, 2017a). Undoubtedly, the future of work demands that higher education not be a bifurcated experience for students, where learning is followed by working. In this sense, university-industry relationships provide the dose of reality that allows students to learn about the workplace norms and responsibilities, find mentors and build networks that will be key to them in finding a successful career (Selingo, 2017a).