Exploring Pathways to Innovation and Entrepreneurship in Georgian Higher Education Context

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submitted by

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Statutory Declaration

I, Nino Popkhadze, hereby declare,

1. that I have written my Master's thesis myself, have not used other sources than the ones stated and moreover have not used any illegal tools or unfair means,

2. that I have not used my Master's thesis or parts thereof as an exam paper in my domestic or any foreign country in any form to this date,

3. that, in case my master's thesis concerns my employer or any other external cooperation partner, I have fully informed them about title, form and content of the Master's thesis and have his/her permission to include the data and information in my written work.

Acknowledgement

Once, Dr. Elene Jibladze told me that one must fancy the topic to embark on the challenge of writing a master thesis, as it is draining, yet creative process. And she is right, I am lucky that I chose the topic I am passionate about and curious enough to indulge. Universities fascinate me, reading the earlier works about their transformation was an absolute pleasure. I believe in the capacity of Georgian higher education institutions, and I hope this research will play a role in the discussion and have an added-value in current discourse.

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Abstract

The paradigm of innovation and entrepreneurship impacted universities and their transformation. Consequently, the roles, missions, and functions of the universities have changed over the years. This paper intends to unveil the current situation of Georgian higher education institutions and their pathways to become entrepreneurial and innovative. Besides, the paper explores the feasibility and possible application of the HEInnovate tool in the Georgian context.

The study favors qualitative research design. Interviews and extensive document analysis were conducted to portray the current picture of the Georgian HE context and respective challenges. The researcher deployed the scenario planning technique as a part of foresight methodology to create three possible futures based on the identified trends. Scenario planning paved the way for the recommendations and this method allowed the researcher to reflect creatively.

A broad spectrum of challenges has been identified through the document and interview analysis, the challenges have been clustered under the broad themes: Context, Funding, STI management, and Procedural framework. The results suggest that the idea of innovation and entrepreneurship looms large on the political agenda. Although the ecosystem is at a nascent stage, it lacks the build-up and cross-sectoral cooperation. The universities have a long way ahead to position as flagships for economic development. Nevertheless, strengthening the focus on applied research, both from donors and universities, could be a great starting point for societal engagement. The paper presents five respective recommendations which build on the scenario propositions and try to capitalize on the existing resources and complement already started processes for better optimization.

Keywords

Ecosystem, Entrepreneurship, Foresight, Georgia, Higher education, HEInnovate, Innovation, Scenario planning.

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Abbreviations

BTU – Business technology university

Covid-19 – Coronavirus 2019

EBRD – European bank for reconstruction and development

EUA – European university association

GDP – Gross domestic product

GEL – Georgian currency 'Lari'

GENIE – National innovation ecosystem project

GITA - Georgia's innovation and technology agency

GTU - Georgian technical university

HE – Higher education

HEI – Higher education institution

IBRD – International bank for reconstruction and development

ISU – Ilia state university

IT – Information technology

KTI - Knowledge transfer and innovation center

LLPL – Legal entity of public law

MES – Ministry of education and science

NCEQE – National center for educational quality enhancement

OECD – The organization for economic co-operation and development

PhD – Doctor of philosophy

R&D - Research & development

Res - Respondent

STEM- Science, technology, engineering and mathematics

STI - Science, technology and innovation

TSU – Tbilisi state university

WIPO – World intellectual property organization

Chapter 1

1.1. Introduction

> "The university is among the most traditional of all the institutions of our society, and at the same time it is institution most responsible for the changes that make our society the most changing in the history of men".
>
> Father Theodore M. Hesburgh
> (As cited in Clark, 1983, p. 182)

In the aftermath of technological transformation and the fourth industrial revolution the changes happen more frequently than they used to do, which accelerated the pressure upon the universities and their responsiveness. Therefore, the stakeholder's expectation increased comparatively (Reichert, 2019), especially when it comes to regional development, universities are anticipated to be the flagship of innovation and socio-economic development. Universities found themselves at ubiquitous crossroads between opposing opinions, such as current discussions about identity crisis or natural evolution of the universities, losing the soul or having many souls, guarding the traditions or meeting societal expectations, commercialization their research output or promoting open science. Several global trends are shaping the future of education and as stated in the report of OECD, "urgent" actions must be taken by the educational sector (OECD, 2019). Nowadays, higher education institutions struggle to stay relevant, besides teaching and research, they need to sustain themselves and innovate to keep up with the pace. As the period of turbulence has accelerated in the field of higher education, there are even some doubts that the status quo is not tenable anymore (Tierney & Lanford, 2018). Therefore, succeeding in only two out of three missions of the university is barely enough, the pressure and expectations have incremented (Martin & Etzkowitz, 2000).

All major stakeholders, such as government, students, academia, society, enterprise, and international organizations have their perspectives and expectations. Thus, universities are required to be responsive to all the needs, meanwhile, these environmental factors affect the agenda-setting processes within the universities. Environmental factors differ according to higher education systems and their context. On the one hand, it gives higher education institutions a unique niche for championing societal development, but on the other hand, the uncertainty and ambiguity are growing, which alters the natural habitat of the universities.

1.2. Significance of the Study

It deserves an ode to describe how resistant and flexible are universities at the same time. There have been several references to describe its unique nature. "Foreign ministries, universities, and cemeteries are notoriously hard to move – in part for the same reasons "(as cited in Gornitzka, 1999, p.11), this remark from Maurice A. East describes well the resisting nature of universities.

Gornitzka (1999, p.11) compared universities with organizations that are "in a pathological predicament suffering from institutional sclerosis". At the same time, Kerr (2001, p.1) depicts the evolution of universities and the path from a single community of masters and students to a multiversity, which highlights the change and its sui generis.

In the 19th century, the university had a primary focus on teaching and research, as the main strategic domain of its purpose. Later, perfect equilibrium was broken by the emergence of the university's third mission, which became an indispensable feature for higher education institutions. Thus, teaching, research, and practicing third mission used to stand as an orthodox model for higher education institutions, but the picture has changed nowadays as it is not enough, universities are required to perform beyond this orthodox model and beyond three missions. The same rationale was developed under the premise of "Fourth Generation University," which navigates in collaboration with partners and carries flexible nature and high autonomy. And this densely networked process of knowledge creation is the result of systematic institutional transformations (Reichert, 2019).

It is worth noting, that higher education institutions have been in turbulence for a while already and the rhetoric of university adaptation is hardly a novel matter. Almost 20 years ago, Sporn (1999) explored the concept of adaptive universities and she analyzed environmental pressures that affected institutional responses, such as globalization and international competition, scarcity of financial resources, shifting demographics, information technologies, and changing role of the state. In the same period, Martin and Etzkowitz (2000, pp.9-1) also drew attention to environmental factors that would affect university modality, such as threats to autonomy, changes in knowledge production, technological advances, globalization, emerging lifelong learners, focus on applied skill, the phenomenon of publish or perish.

20 years later, these trends remain valid and influencer of institutional responses. According to the latest OECD report, exogenous trends can be categorized under the five clusters: Globalization, Democracy, Security, Ageing, and Modern cultures (OECD, 2019). Each cluster represents the umbrella concept for interrelated trends, whereas they are divided into sub-trends. To address all the challenges and become "super universities," they need to take a non-linear path that is closely and densely intertwined with stakeholders, especially government. This proposition stands between Triple and Quadruple helix theories as a perfect illustration, whereas the former explained interaction between academia, state and industry (Etzkowitz & Leydesdorff, 2000), the latter added another dimension known as civil society, democracy and art-based research, as paramount parts of synergic interaction (Carayannis & Campbell, 2014).

1.3. Research Gap

A comprehensive study about entrepreneurial universities by Rothaermel et al. (2007) showed that environmental context plays a major role and university entrepreneurship is embedded in the networks of innovation. Although the topic is very pervasive and omnipresent, still economic, cultural, and geographical context matter for many reasons, especially when it comes to innovation and regional development. Economic development and culture may significantly

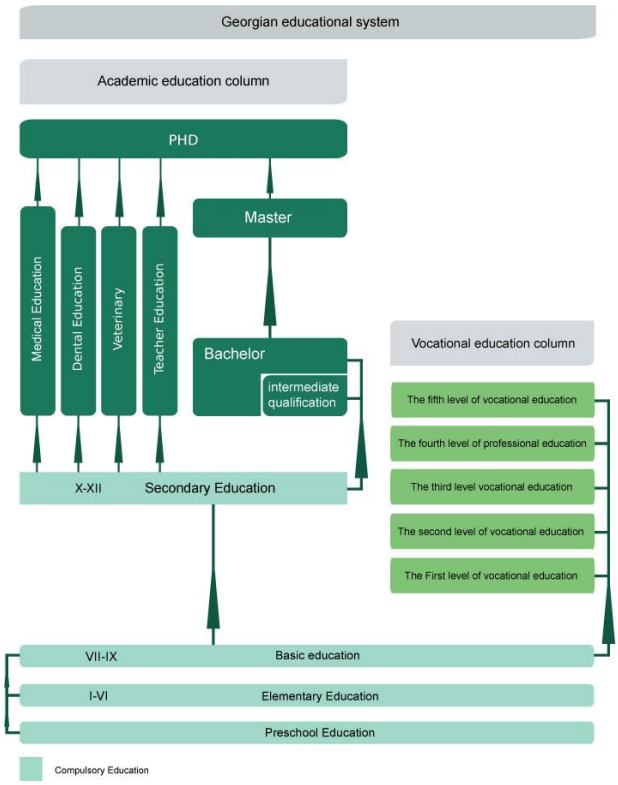
impact the entrepreneurial path and patterns of the university (Rothaermel et al., 2007, p.777). A fairly large number of publications has studied entrepreneurial universities and their innovation path in the United States or Europe, despite the popularity and widespread attention of the topic, still little is known beyond Europe and the USA. Pinheiro (2016, p.303) highlighted the importance of local relevance and the necessity to inquiry how the "global script" of entrepreneurial universities is translated, adopted and adapted in local circumstances. These widely covered topics still have embryonic nature in most of the developing countries and Georgia represents one of them. The information about entrepreneurship and innovation in the Georgian higher education system is very scattered among different laws and strategy documents, which makes it difficult to provide a robust account. Thus, the gap calls for a situation review and in-depth analysis.

1.4. Georgian higher education context in a nutshell

Georgian higher education system was rebuilt in the mid-2000s, thus institutional memory of the system and the art of doing things are not long-standing and persistent. Although, throughout this period Georgia used the window of opportunities and has implemented radical reforms in a timely fashion, especially Bologna-led reforms deserve the special tribute. A recent report by Bochorishvili and Peranidze (2020), highlighted that these reforms have contributed to the managerial and financial autonomy of the institutions, reinforced the overall system, eliminated corruption, and expanded access to education.

Picture 1

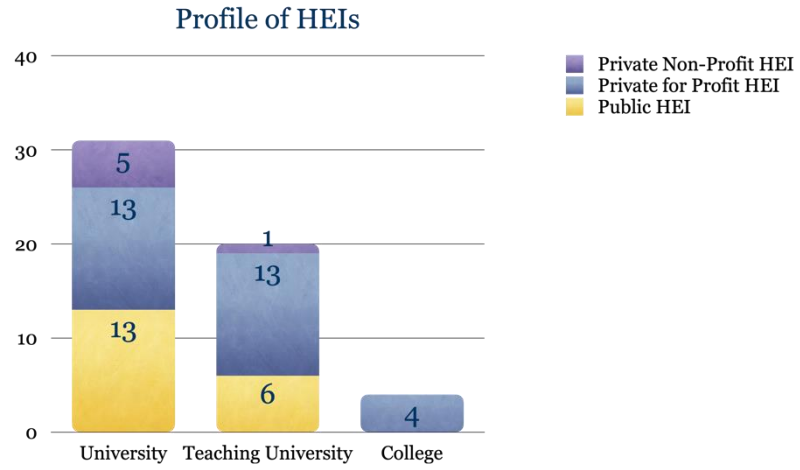
Georgian higher education system (Ministry of Education, 2020)



According to the official statistics of the Ministry of Education, the current higher education system accounts for 30 universities, 22 teaching universities, and 4 colleges. Out of 56 institutions, there are 18 public institutions, 33 private for-profit institutions, and 5 private not-for-profit institutions (Ministry of Education, 2020). Even though private institutions outnumber the public ones, according to Bochorishvili and Peranidze (2020) most of the enrollment represents the public sector around 64.6 %.

Graph 1

Profiles of Georgian HEIs. Author's interpretation based on EQE data, May 1, 2020



1.5. Research Purpose & Question

Entrepreneurial universities face different types of barriers and follow different patterns of respective environmental contexts (Rothaermel et al., 2007, p.738). Since universities from developing countries and their entrepreneurial activities are not under the same spotlight as universities from developed countries, subsequently less is known about this matter, and it needs to pay greater attention. Therefore, the purpose of this thesis has twofold nature, the first one is to shed light on innovative and entrepreneurial activities in the Georgian higher education context. And the second one is to bring forward and enable discussion by tracing existing potential and respective challenges in Georgia. For this purpose, special attention will be paid to inquiry how HEInnovate tool can be tailored for Georgian higher education context.

- What is the current situation regarding the innovation and entrepreneurship in Georgian higher education context?
- What are current challenges and opportunities for Georgian higher education institutions to innovate and pursue entrepreneurship?
- How could the HEInnovate approach contribute to the higher education system in Georgia?

1.6. HEInnovate

Measuring or evaluating the entrepreneurial and innovative capacity of the country and the university is never an easy task, as there are multiple variables to consider. The former needs to have a macro-outlook and the latter needs a meso, institutional perspective. Despite the complex nature, there is a self-assessment tool that helps universities to examine their entrepreneurial capacity. HEInnovate is an initiative between European Commission and OECD Local Economic and Employment Development Program. HEInnovate targets higher education institutions and covers eight dimensions for self-assessment: 1. Leadership and Governance; 2. Organizational Capacity: Funding, People, and Incentives; 3. Entrepreneurial Teaching and Learning; 4. Preparing and Supporting Entrepreneurs; 5. Digital Transformation and Capability; 6. Knowledge Exchange and Collaboration; 7. The Internationalized Institution, and 8. Measuring Impact (Heinnovate, 2021).

Under each dimension, representatives of higher education institutions can rate the statements from not applicable, 1 to 5 the highest point. It is underlined that it should not be treated as benchmarking tool. The HEInnovate website is user-friendly and interactive, it provides a training package for interested parties and related documents, available in 24 languages (not in Georgian). Under the resource section, multiple case studies and user stories are accessible. The website collects and publishes a large number of cases about the above-mentioned dimensions and spreads the word regarding the good practices among various stakeholders. Thus, the tool can be used independently by one or a group of people to assess the overall institutional capacity or the specific department.

Yet another interesting deployment of the HEInnovate tool is to conduct a country review report, which studies the overall situation of the higher education context in terms of innovation and entrepreneurship. Thus, several country reports have been published: Ireland (2017), Hungary (2017), Poland (2017), Netherlands (2018), Romania (2019), Croatia (2019), Italy (2019), and Austria (2019). This type of review not only studies the existing situation but also provide respective recommendations. Austrian country review report stated that HEInnovate is a starting point for governments and higher education institutions to identify its strengths and avenues for further development (OECD/EU, 2019). Therefore, the HEInnovate tool could serve as a basis for policy dialogue, and to raise awareness about challenges or areas that need better attention to build a stronger ecosystem.

The third research question aims to probe the ground whether the HEInnovate tool could contribute to the Georgian higher education context. As currently there is neither institutional study nor country review available. As it was highlighted, changes and challenges are ubiquitous for higher education institutions from all over the world, although, the institutional responses and the approaches to develop immunity towards this turbulence could be diverse. The geography of the higher education system matters for various reasons and so does the nature of higher education institutions as well. Even though there are some similar trends traced related to these ever-present challenges and university transformation, the context plays important role.

Especially, a reality in developing countries offers promising research avenues, in line with global and local challenges, it remains to be thoroughly examined.

1.7. Structure of the Thesis

The paper is organized into five chapters, the present chapter intends to set the general scene. The reader will have the chance to get to know the state of the art, the research questions, a brief introduction to the Georgian higher education context. Also, it explains the HEInnovate tool and its application for institutional mapping and country review. The second chapter introduces the literature review in chronological order, first, the transformation of the universities is discussed, which leads to the entrepreneurial transition and universities shifted modus operandi. At last, it ends with discussing innovation and regional development, and universities' role in it. The third chapter describes the research design and the research approach. Besides, the data collection process is explored, with the reference to the implication of the Covid-19 on the data collection process. This chapter ends with a discussion of the validity and limitations. The fourth chapter unfolds the findings and builds the story to understand the innovation and entrepreneurial ecosystem in Georgia. This chapter introduces the findings from the comprehensive context analysis. The penultimate chapter is dedicated to the challenges and current practices that emerged from the interview analysis and reinforce the findings from the document analysis. The fifth chapter ends with a short summary to recap the research question and link the dots from the documents and the interviews. The final chapter offers scenario propositions and provides respective recommendations which build from the challenges and try to capitalize on the existing resources and complement already started processes. The chapter ends with the conclusion and recommendation for further studies.

Chapter 2

2. Theoretical Framework and Literature Review

2.1. Transformation

> "These several competing visions of true purpose, each relating to a different layer of history, a different web of forces, cause much of the malaise in the university communities of today.
>
> Clark Kerr, 2001, p.7
> The Idea of a Multiversity

The universities are one of the long-standing and successful institutions, they have undergone various changes in the past and they will continue adapting as the context they exist is dynamic and volatile. The higher education institutions can be identified as the most complex institutions, but never static ones (Altbach, 1991) they have proved their durability over the centuries. As Clark (1983) explained, higher education represents a mature system, which is distinguished by its greater stability of character, thus developed systems have their constraints upon the change. Some universities are more welcoming to changes than others and the degree of their responsiveness differs, which defines their adaptive character at the end. The patterns of resistance and the reason for change were explored by Clark (1983), and he gave a detailed analysis of how bureaucratic, oligarchic, political, and market systems promote change and constraints at the same time within universities. Besides transformation, criticism has been a longtime companion of the universities. Traditionally, the chain of change of higher education institutions has been observed by several scholars from different stances (Flexner, 1925; Ben-David & Zloczower, 1962; Clark, 1983; Kerr, 2001; Etzkowitz, 2003; Scott, 2006), and despite of all controversies, the current reality keeps close ties with past and exhibits the logic of transformation.

In retrospect universities have common historical roots, although they reflect their societies, they have served different interest groups during a different period of times, from elite to disenfranchised groups, and nowadays they are one of the most important institutions, which create and distribute knowledge (Altbach, 1991, p.293). The universities as we know today, have changed their mission, purposes, and targeted audience over time. It is worth noting that as Kerr (2001, p.1) described, the universities have emerged as a single community of masters and students, whereas the main idea was to transfer the knowledge since this phase university transformation has caused ambivalent attitude among scholars and the public. Each phase of university transformation had its guardian, for instance, Newman believed that "the idea of a university" was training and teaching liberal studies, for Flexner it was the pure research, and for Kerr, it was the place for multiple purposes, known as multiversity (Scott, 2006, p.3).

Etzkowitz (2002) referred to the changes the university as academic revolutions. According to him, the first academic revolution happened in the 19th century when research appeared legit on the horizon. The second revolution took place when the university became economic development enterprise, to stimulate employment and productivity growth. Etzkowitz also expressed that all these academic revolutions were accompanied by resistance among academicians. Etzkowitz (2002) identified the entrepreneurial role of the university as the latest step in the evolution of a medieval institution. Today, almost 20 years later, this perspective is even better crafted and claimed, it has its proponents and opponents, as the interested parties have grown, so did the conflicting interests. According to these authors, it could be postulated that universities went through several phases, such as classical, modern, and post-modern.

In 1852, Newman (as cited in Kerr, 2001, p.3) denoted the Humboldtian model as a new model, whereas science and research were becoming paramount constituents of higher education. This type of evolution caused the "academic ladder", the proliferation of departments and institutes within the university, which was stranger for preceding modality. Later, Flexner (1925) explored the concept of "Modern University" and eloquently described the transition from thinkers to researchers. According to him, freedom for searching the truth was the keynote of the modern university. Therefore, it is interesting fact that the research as deemed a critical and integral part of the contemporary university, not so long ago used to be innovation and deviation from the norm as well. Kerr (2001, p.8) introduced "The idea of a multiversity", its genesis goes way back to Greek origins, evolving into a medieval institution and finally meeting the patterns of the contemporary university.

European universities from the late 18th century were compared to "castles without windows, profoundly introverted" (Kerr, 2001) which loudly resonates with the well-known concept of "Ivory Tower". According to Kerr (2001, p.8) the rebirth of the university happened in Germany in 1809 in line with the establishment of the University of Berlin by Wilhelm von Humboldt, which introduced the notions of freedom to teach (*Lehrfreiheit*) and freedom to learn (*Lernfreiheit*), which was later applied in the United States by John Hopkins University. Since this new wave, universities renewed their contracts with society and adopted new habitats.

Kerr (2001) presented the concept of the modern university by portraying features of Multiversity, as a place of multiple communities, various stakeholders, many ends, fuzzy edges, and deeply extroverted nature, which has more than one soul, sometimes often conflicting ones and it is a bastion of several principles. The idea of multiversity is worth exploring and noting, as it is extremely relevant for the current reality. Unlike Flexner, Kerr believed that multiversity was not an organism, but rather a mechanism, a loosely-couple system, whereas new parts could be added or subtracted easily, without interfering with the whole dynamic.

For Ben-David and Zloczower (1962) transformation of the modern university into a multipurpose system and catering to the needs of diverse classes, was originated in England. And, according to them, the same pattern was adopted in the United States, when the practical usefulness of science became important and utilitarian influence led to the establishment of the institutions. Therefore, innovation in 19th century had different meaning in a different system,

German universities were committed to pure science, whereas English ones were teaching it and American universities combined not only teaching and creation of new knowledge but the application of it (Ben-David & Zloczower, 1962).

The multiplicity of the missions of the university subsequently is not a surprising fact, Scott (2006) summarized its transformation from Medieval to Postmodern, which accounts for more than 850 years. Nowadays, almost all higher education institutions have mission statements as a symbol of distinctive identity, but overall, nevertheless how dynamic and fluid they sound, all of them are based on the triad missions of the university: teaching, research, and public service (Scott, 2006). As Scott highlighted, throughout the mission transformation, one thing remained intact and that is service, and the target audience of the service has been proliferated over time.

Even though there is cogency in the transformation, yet institutional mission and role of the universities are still highly debatable topics, and depending on the historical interpretation, there will hardly be concord in this regard. The retrospective description of the transformation of the universities aimed at illustrating that the similar dynamics and patterns in these ongoing changes can be traced, which has not started yesterday and will not pause tomorrow either, change and stability are organic features for higher education institutions, and their ability to balance made it through the history of mankind. Clark (1983, p.182) raised a question and called it the "Hesburgh paradox" which is still valid as of today, perhaps it remains a mystery how systems, as sluggish and heavily resistant to change as universities, still somehow can produce revolutionary change.

2.2. The rise of entrepreneurship

The conservatism of higher education is contextual (Clark, 1983), thus when context changes, one can expect subsequent alterations. The entrepreneurial paradigm in higher education stemmed from different environmental factors and contextual change. Clark (1998) started the discussion about "The Demand-Response Imbalance" 22 years ago and he speculated that demands and expectations on university would outrun their capacity to respond. He recognized several important streams of demand which led to demand and expectation overload, such as a shift from elite to mass higher education and non-traditional students, meeting the market demand and retraining, proliferation of stakeholders and patrons, and most importantly, knowledge production and distribution became boundless (Clark, 1998, p.130). 22 years later this is reality and stream of demand became significantly broader and more diverse. Sporn (1999, p. 23) explained changing environment for higher education and summarized five transnational trends: restructuring of national economies, the changing role of the state, shifting demographics, new technologies, and increased globalization, and as a consequence all these push factors navigated institutional change towards entrepreneurial behavior. Therefore, it is not a surprise that many scholars (Sporn, 1999; Sporn, 2001; Gibb, 2012; Gibbons et al., 1994; Van Vught, 1999) underline the importance of environmental constraints and refer to the push factors. As the Demand-Response imbalance continues, one can say that during this turmoil it is a silver lining and safety net for universities to become entrepreneurial.

The rise of discourse regarding university entrepreneurship in developed countries accounts for40 years, in the United States, it started in 1980 when the Bayh-Dole Act was adopted and later, the same trend was observed in Europe through the European Commission directives (Rothaermel et al., 2007, p.695). Rothaermel et al. (2007, p.696) conducted a comprehensive literature review study about university entrepreneurship between 1980-2005 to depict the research progress, they reviewed 173 articles in total, whereas the vast majority was published since 2000, which explains how interest increased respectively. Even though innovation and entrepreneurship in higher education are rather recent phenomena, it can be argued that these issues are addressed by various researchers and by the growing body of literature (Guerrero-Cano, Kirby, & Urbano, 2006). Several scholars tried to formulate the essence of entrepreneurship in higher education, but it is worth noting that the first academic reference was made by Henry Etzkowitz in the 1980s regarding North American Universities and entrepreneurship (Pinheiro, 2016). As for Europe, first publications related to university entrepreneurship are traced the back to the early 1990s by Maasen and Van Buchem about the University of Twente (Pinheiro, 2016, p. 294). Later, Clark (1998) wrote the pivotal book which added a significant degree of weight to the concept of entrepreneurial universities.

According to Etzkowitz, the process of becoming an entrepreneurial university is fairly natural, he perceived it as a part of its evolution and further stage of its development (Etzkowitz, 2013). Etzkowitz's model identified three stages and phases of the university as an entrepreneur. The initial phase corresponded to the agenda-setting process within the university, where universities start scanning the environment and a process of diversification. In a second phase, the university is actively engaged in commercializing the intellectual property (IP) derived from its human resource (staff, students, etc.) which could be also illustrated by opening up technology transfer offices (TTO). The third phase emphasized the university's proactive role in regional development in collaboration with the government and industry (Etzkowitz, 2013). Etzkowitz defined that these stages frequently occur in the given order, although there was a possibility to take place in any sequence or simultaneously. Previously, indirect contribution to the local economy and society was fairly common to claim decent performance under the third mission, but nowadays that is not enough, and expectations have grown (Etzkowitz, 2016).

According to Etzkowitz, the entrepreneurial university model could be expressed in four interrelated propositions (Etzkowitz, 2013, p. 491-492): 1. Interaction; 2. Independence; 3. Hybridization and 4. Reciprocity. The first one as the title pinpoints, described university-industry-government close interaction, which also relates to Triple Helix (Etzkowitz & Leydesdorff, 2000). The second one illustrated its independent nature, the third one united interaction, and independence to realize both objectives at the same time. The last one stood closest to the idea of a responsive university, as it portrays the renovation of internal structures to ongoing changes. Due to Etzkowitz's point of view, propositions one and two could be attributed to research and teaching-oriented universities, whereas entrepreneurial universities only existed when they had the confluence of all four elements in them (Etzkowitz, 2013). Etzkowitz (2017; Etzkowitz et al., 2019) proposed the table which illustrated the difference

between “Ivory Tower” and Entrepreneurial universities, which gave the possibility to visualize the differences. Although it has to be noted that the given table implies the extreme endpoints.

Table 1

Contrast between Ivory Tower and Entrepreneurial University, developed by Henry Etzkowitz (Etzkowitz, 2017) (Etzkowitz et al., 2019)

Table 1
Contrast between Ivory Tower and Entrepreneurial University.

No.	Spectrum category	Ivory Tower University	Entrepreneurial University
1	University-society link	Isolated from the society	Open and serve to the external society
2	Teaching location	Teaching on campus	Teaching on/off campus
3	Knowledge mission	Knowledge production for own sake	Polyvalent knowledge, theoretical and practical, simulaneous
4	Research	Meandering stream of basic research	Multiple sources of input into research direction
5	Knowledge-related intention	Useful knowledge as accident	Useful knowledge sought
6	Technology and innovation transfer to industry	TTO, administrative unit with limited outreach No 12 Entrepreneurial University	TTO, Incubator integrated into innovation strategy to foster start-ups
7	Disciplines organization	Discipline-based Departments as primary units	Departments and Inter-disciplinary Centres have equal status
8	Stakeholders	Single internal stakeholder	Multiple Stakeholders –internal and external
9	Source of university administration	University administration only from academia	University administration from multiple sources, including industry and government
10	Perception towards funding	Funding as matter of right	Funding as matter of exchange, something to be earned
11	Contribution point	Operation for self-sustainability	Make significant contribution to regional development as well
12	Mind-set	Only academic mind-set	With entrepreneurial ethos

The emergence of entrepreneurial universities has several effects not only on the institutional level but also on the conception of the university itself. It can be noticed that the notion of “Ivory Tower” is fading day by day. Discussion upon entrepreneurial universities would be inadequate without referring to Clark’s pivotal piece. The quest for institutional balance was questioned by Clark while exploring the Entrepreneurial Universities. At the end of the 20th century, Clark raised issues that are still relevant and problematic. He argued that universities got caught up in contradictions, whereas universities were required to perform much broader and better with less available funding, expectations and demand were proliferated by multiple stakeholders, and all these were leading to an overstressed situation (Clark, 1998, p. 146).

After thoroughly studying the following five cases: the University of Warwick, University of Twente, University of Strathclyde, the Chalmers University of Technology, and University of Eastern Finland (Joensuu), Clark identified the entrepreneurial response as the institutional leverage to handle the imbalance and turbulence (Clark, 1998). Therefore, he offered the concept of Entrepreneurial University by introducing five main characteristics. While addressing Entrepreneurial University, Clark underlined the idiosyncratic nature of the higher education institutions and explained that per se universities were bottom-heavy which made them reluctant to changes and transformation. According to Clark, five constituents of Entrepreneurial Universities are a strengthened steering core; an expanded developmental periphery; a diversified funding base; a stimulated academic heartland; and an integrated entrepreneurial culture.

The first one – the strengthened steering capacity referred to increased managerial capacity, whereas unlike traditional universities, they had stronger autonomy to make flexible and agile decisions in response to environmental demands. Clark underlined the importance of

harmonization between managerial and academic values, as it had an impact on daily processes. The second one - the expanded developmental periphery pinpointed the extended outreach, where besides the ultimate missions, universities were portrayed as service providers, whereas universities aimed at contracting research, education, and consultancy. This element illustrated demand-response dynamics, that pushed universities to extend their outreach through various ways and units, for instance: science parks and technology transfer offices. Clark pointed out that enhanced development periphery could compromise university interests unless it was carefully and well-managed, although the second element was one the most significant element in addressing the external demands (Clark, 1998).

The third one – the diversified funding base emphasized the financial autonomy and diversification of income sources. This latter was divided into three as such: 1st stream source - governmental funds; 2nd stream source - research grants and contracts, and 3rd stream source – income from services, intellectual property, student fee, alumni fundraising, and so on. The light motive for this element was that higher functioning costs for universities altered their resource-dependence dynamics, whereas they started to respond proactively and boosted the discretion. The fourth characteristic – the stimulated academic heartland argued that different departments and faculties showed different degrees of flexibility and resistance, thus departmental entrepreneurship varied notably. According to Clark, this element was related to collegial attitude and openness, as an enabler to introduce new programs and innovate in that respect. The heartland itself was explained as the main guardian of the traditional academic values, on the one hand deep-seated, but on the other flexible enough to accept the changes, were entrenched.

The last one – the integrated entrepreneurial culture was identified as a crucial but most challenging element at the same time. The entrepreneurial culture was defined embracing the change without resistance. It has to be mentioned, that Clark drew attention to these characteristics as connected and somewhat mutually inclusive, moreover, he explained that the four elements are working in tandem, which at the end determine whether beliefs and values are transformed or not. Furthermore, as he noted down, it was rather easier to track and observed the first four elements, than the culture itself.

Clark underlined, that his book became somewhat controversial (Clark, 2004, p. 3). The most common fear is “losing the soul of the university”, which has been guarded for centuries. In response to the criticism, Clark (2004) drew attention that the opponents of the entrepreneurial universities feared that commercialization would divert the natural habitat of the university, and the market would dictate its agenda and rules of the game. Clark also underlined that state money was considered as a “clean and safe” money, despite the constraints the state would impose on universities and its governance (Clark, 2004, p.3). Clark made a quite striking point at that time, that deserves attention, what if universities had many souls and adaptive characters, and this was a new normal.

Even though Etzkowitz connected entrepreneurial university with three phases, and Clark described it by providing five characteristics, it can be argued without a shadow of a doubt that

at the end they referred to similar traits and they are conceptually interconnected. The recognized way to activate the entrepreneurial response in the university lays in institutional capacity, which is context-sensitive. Furthermore, it is posited that Clark's five characteristics are projected and embedded into eight dimensions of the HEInnovate tool.

2.3. Innovation Ecosystem: research universities, economic growth and regional development

Lundvall (2010) described a national system of innovation as a dynamic social system, which consists of different elements and their relationships. Even though universities have lived long life, it can be stated that they have obtained strategic importance at the end of the 20th century (Whitley, 2008), and the rise of knowledge-based and the knowledge-driven economy put political and economic pressure and interest in higher education, thus demand and expectations multiplied. Martin and Etzkowitz (2000, pp.23-25) identified external and internal driving forces that intensified the instrumental view of the university at the end of the 20th century. The external factors included technological advances and their connection with a knowledge-based economy, globalization, competition, the global market, financial constraints and growing focus on accountability. As for the internal drivers, interdisciplinary research and the pressure for more teaching concerning massification were highlighted. All these factors have prepared the ground to change the perception for universities and their social contract, as integral elements of the systems of innovation.

Wagner (2018, p.5) describes the transition of science, from the experimentalists in the 17th century, to laboratory-based research in the 18th century. From 19th century onwards, science became important as it was tied to national prestige, service of war, and economic growth. Wagner (2018, p.6) compares the current phase of science as "a fourth metamorphosis in the twentieth-first century", which is characterized by global networks and transdisciplinary interaction. The leading role of universities in stimulating innovation and economic growth has become a central theme in innovation and science policy (Hughes & Kitson, 2012). This fact is also connected with the changes in the research system which put extra weight on the research-intensive universities. The basic research model of science was rising from mid-19th to the mid-20th century (Etzkowitz, 2002), Rip (2011) observed the transformation of the research market from the early 1980s onwards, how strategic science became a new pervasive regime for research-intensive universities, thus the relevance of research qualified as paramount.

One of the major concepts reflecting the practical role of the science was the concept of Mode 2 research developed by Gibbons et al., in 1994. The need for this type of research was explained by the massification of higher education and by the fact that higher education institutions lost their monopoly over research. The Mode 2 research portrays the idea that research should be carried out in the context of the application and it should be socially accountable and reflexive. The Mode 2 research is characterized as interdisciplinarity, heterogeneity, heterarchical and transient, whereas Mode 1 research is qualified as monodisciplinary, homogeneity, and hierarchal (Gibbons et al., 1994). Therefore, this concept attracted the interest of many diverse

groups, as it manifested the importance of usefulness for various stakeholders: government, business, and society and echoed the demand-supply process. The social accountability within Mode 2 research is a noteworthy fact, back then it was not a prevalent concept, but nowadays the idea of socially responsible universities is widely promoted. Besides, it was related to innovation as Mode 2 research was projected as cause and consumer of the innovation (Gibbons et al., 1994, p.14). Martin and Etzkowitz (2000, p.12) labeled it as "blurring boundaries" within the traditional sectors, although interestingly enough they questioned the novelty of Mode 2 based on the argument that these two modes were traceable back in the 17th century.

Yet another important concept that was initiated in 2000 was the Triple Helix model, it denotes the dynamic interaction among government, industry, and universities to achieve synergy. The Triple Helix looks at the universities as important of innovation systems in knowledge-based societies. Etzkowitz and Leydesdorff (2003) discussed different models of helix systems and the evolution of innovation systems. Different national systems exhibit different patterns, for instance, there is an "etatistic model" when government directs and controls industry and academia fully and there is almost no interaction. A "laissez-faire" model, when there is limited interaction, but each sector has strong borders. And lastly, the Triple helix model, which is distinguished with hybrid and overlapping organizations, whereas interaction is dynamic and permeable. Authors underlined that the apparent legitimation of science was lying to its contribution to the economy and regional development, which would be a source for competition (Etzkowitz & Leydesdorff, 2000, p.117).

The Mode 2 research and the Triple Helix concepts were developed further by Carayannis and Campbell (2012), they underlined that resource scarcity and competitive rivalry were equally important and relatable to developing economies as to developed ones. Therefore, science and technology, through technology transfer, market-driven research, and commercialization, were becoming leading elements to leverage competition and acquire advantage. They introduced add-on concepts of Mode 3 research and Quadruple-Quintuple helices. Whereas the former is explained as "nexus or hub, where people, culture, and technology meet and interact to catalyze creativity, trigger invention and accelerate innovation" and, this interaction entails cross-sectoral cooperation and co-creation which is driven by policy, as well as top-down and bottom-up approaches (Carayannis & Campbell, 2012, p.4). As for the latter, the authors described the Quadruple Helix as an addition to the Triple Helix, with special attention to the integration of the civil society. The emphasis was on the media and culture-based public as knowledge and innovation users, since innovation implies application element. The Quintuple Helix added the element of environment – a missing piece to the previous contextualization (Carayannis & Campbell, 2012, pp.17-18), which carried the message that in line with progress, social ecology, and sustainable development had to become subject of interest.

The changes in the research system were also portrayed by Stokes back in 1997, when he offered the "Pasteur's quadrant" approach, whereas the main idea of the approach was that he divided research among pure basic (Republic of Science), pure applied (The Realm of Technology) and user-inspired research. This latter was a merger of basic and applied research (Hughes & Kitson, 2012, p.728-729). It is also important to mention that Stokes's approach was mainly meant for

natural sciences and technology-based subjects, such as STEM, so it is not surprising that in a meantime, science policy frameworks started to promote STEM-based subjects. Besides, Martin and Etzkowitz (2000, p.14) highlighted that due to the circumstances the social contract was changing among the following stakeholders: science, university, society, and state. In retrospect, the former social contract was reflected through Bush's pivotal report in 1945 about the science and linear model of innovation, whereas basic research fueled by public money was in the vanguard of developments with plausible application elements. Interestingly enough, even though the concept of linear innovation is connected with Bush, there was no explicit indication throughout his report (Bush, 1980; Carayannis et al., 2013, p.167). Later, since the 1980s, when the value for money and the needs of local users became paramount, subsequently it altered the social contract.

User-inspired research resonates well with what Etzkowitz (2002, p.109) referred to science as an alternative engine of economic growth. Additionally, production of research hardly stayed within the borders of universities, nowadays non-traditional institutes, organizations, and laboratories, are engaged with research as well. This development of events alarmed the scholars and sparked the fear of universities losing their monopoly and privilege over knowledge production (Rip, 2011). In the light of the concerns, Etzkowitz (2002, p.112) evoked the observation, that universities are per se the cradle of innovation for the sake of their basic features. He explained that university is natural incubator, as its human capital is the source of potential inventors, and its engagement with interdisciplinary scientific fields and industry exhibits the university as a potential seedbed. Pressure for economic development was converted into the commercialization of research and transfer of technology into administrative function. This shift raised questions about the legitimacy of the university's interest in commercialization and making a profit out of science (Etzkowitz, 2002, p.116), even though many scholars have tried to answer the questions, this issue remains the subject of dissent.

University technology transfer is a multifunctional platform for universities, as it is used as evidence of the contribution of universities to the local and regional economy, it brings revenue and it can be used as a marketing tool as well (Friedman & Silberman, 2003, p.17). In the United States, patent policy relates to the Bayh-Dole act, which was enacted in 1989 (Feldman et al., 2001; Jankowski, 2001; Friedman & Silberman, 2003) and encouraging commercialization of patents by removing restrictions on university licensing. Friedman and Silberman (2003) defined technology transfer as the process whereas invention or intellectual property from academic research was licensed or conveyed for-profit entity and eventually commercialized, it fostered interaction with industry. The success factor of technology transfer offices does not depend on the university only, but as empirical research suggests spillovers from the industrial sector and geographical concentration matter as well (Friedman and Silberman, 2003; Feldman & Desrochers, 2003).

Being porous and ambidextrous has become paramount for universities, especially for research universities (Rip, 2011; Carayannis & Campbell, 2012). This latter is believed to be one of the main conditions for successful local economic development (Miner et al., 2001, as cited in Feldman & Desrochers, 2003, p.5). It is noteworthy that just being a research university and

having a technology transfer office, doesn't make output by itself, some mutually exclusive conditions create synergy in terms of innovation and entrepreneurship, which contributes to the local economy. According to Feldman and Desrochers (2003, p.5), factors as the university founding mission, institutional context, academic culture, and prior experience with commercial activity affected university-industry interaction and capacity to impact the local innovation ecosystem. Besides, attributes of the region play a great role in spillover absorption, such as industrial composition, characteristics of the labor force, and social capital variables (Feldman and Desrochers, 2003, p.5). That was the result that scholars came up with when they studied why John Hopkins University had not generated highly visible economic benefit for the local area. The different understanding was emerged by Guerrero et al. (2015, p.756) regarding university contribution to the economy. It was posited that whether this commercialization narrative is embraced or questioned by academic society, it is fact that outcomes of research and entrepreneurial university activities have a positive effect on economic development.

This chapter tried to depict the nature of university transformation from a retrospective outlook. It was highlighted that universities experience classical, modern, and post-modern phases, whereas the classical period was characterized by the teaching mission of the university. The modern phase introduced the research domain, which was considered as innovation and deviation from the norm at that time, and at last, the post-modern phase recognizes the third mission, entrepreneurial and innovative activities of the universities. The missions, roles, and functions of the universities have changed over time, and it happened for a reason. Therefore, as history is repleted with examples universities have experienced acceptance and criticism since the beginning, and probably that will remain constant especially when the future holds a new phase of university transformation.

Chapter 3

Methodology

3.1. Research Design and Approach

The title of the thesis suggests that the study has explorative nature, as there is little know about innovation and entrepreneurship in the Georgian higher education context. Thus, to explore the pathways, the study will analyze few universities in Georgia. Taking into consideration the research problem and the approach, the study favors the qualitative research method, as it carries various characteristics of the qualitative research, such as collecting, analyzing, and interpreting data (Creswell, 2013). Additionally, this paper tries to get data from words rather than numbers and it aims to answer the question of what the current situation in Georgia is and what are the challenges universities face in terms of innovation and entrepreneurship, thus it can be easily categorized under the qualitative research method according to Frankel and Wallen (2009). The data collection was organized through analyzing documents and interviewing participants and aimed to learn about the views of the respondents and assess the process. This study could have been developed by choosing the mixed methods as well to get a bigger picture, but given the time constraint, the qualitative research method corresponds the best to the purpose of the paper.

The qualitative research approach of this paper is a case study. The rationale behind is that case studies can analyze situations and phenomena in ways, which are not always possible by numerical data (Cohen, Manion & Morrison,2007). As Yin (2009) notes down, case study can be applied in many situations to understand complex social, political or organizational phenomena. Also, it allows the researcher to understand the various contexts better, deeper and much more broadly (Cohen et al, 2007). The case study makes it easier to approach and focus thoroughly on one or several cases, which is a convenient approach at this phase, and it can provide a more or less holistic overview of the phenomena. Nevertheless, it has to be mentioned that the research questions represent "what" and "how" types of questions, whereas the former has exploratory nature, and the latter one is more explanatory. Thus, as Yin (2009) explains, for "what" questions many types of methods could be applied, such as surveys, case studies, experiments, for the "how" questions, case studies, experiments or histories are more appropriate. According to Clark, when there is an interest to probe complex organizations and determine how they change, the case-study approach is one of the most powerful methods, its findings lead to understanding and contextual use (Clark, 2004). Therefore, using Yin's (2009, p.18) technical definition as a guiding foundation, this research is an empirical inquiry to investigate the contemporary phenomena (innovation and entrepreneurship) in-depth and with real-life context (in Georgian higher education context).

Besides, the researcher used the scenario planning technique to transit to the recommendations section. As Martin (1995) describes, foresight helps to systematically look into future and has unique visionary feature, and scenario planning is considered as one of the methods. Scenario

planning technique has been actively applied by practitioners and academicians to facilitate strategic planning and deal with a broad spectrum of uncertainties (Martin, 1995; Schoemaker, 1995; O'Brien, 2003; Iversen, 2006; van't Klooster & van Asselt, 2006; Ejdys et al., 2019; Leitner et al., 2019; Stolze & Sailer, 2020). Besides, the researcher believes that it allows to express creatively and think out of the academic box.

This method of reflection aims at providing images of the future and organize multidimensional information about future possibilities into storytelling. The process of constructing a scenario has its build-up and steps to follow, which involves defining the scope, timeline, trends; constructing the themes and scenarios, checking for internal consistency and plausibility, and then applying the scenarios for the initial goal (Schoemaker, 1995; O'Brien, 2003; Stolze & Sailer, 2020). The researcher tailored the process to fit the purpose of the paper, the key trends were chosen based on the interview, literature, and document analysis. Therefore, informal and qualitative methods were adopted (Martin, 1995). Consequently, themes for the scenarios were decided intuitively.

3.2. Data Collection

As Creswell (2013) defines, there are several characteristics of the case study approach regarding the data collection, in which the researcher gains access through the gatekeeper, typically documents and interviews are the main types of information, and information is being recorded via interviews or observations, and sorted by field notes or transcripts. Yin (2009) states that documents are very important to strengthen the evidence from the other sources, while interviews represent an essential part of the case study. Consequently, data collection is based on primary and secondary sources. Primary data collection involved 12 interviews with 14 participants. As the aim of the project is to explore the pathways to innovation and entrepreneurship, representatives from various representatives of the university, governmental agencies, and related stakeholders were interviewed. The purpose to analyze documents and conduct the interview was to use the triangulation method and to corroborate findings, besides to see to what extent innovation and entrepreneurship are lived in practice beyond policy papers. Besides, it has to be underlined that the data collection process took place during September and October 2020, whereas the research did not manage to travel to Georgia as originally intended and interview participants face to face. Thus, Covid-19 has relatively impacted the communication and interviewing processes, although all the initial goals were still achieved.

The researcher communicated with potential respondents via emails and social media (Facebook, LinkedIn) throughout August 2020, and agreed upon the interview date and time. Before the interviews, researcher prepared and sent via emails the interview protocols respective of the interviewees and consent forms (see Annex I, II) both in English and in Georgia languages. Creswell's (2013) guiding steps were used to plan the interview process, such as formulating the research questions in a way to serve the purpose of the research and understand the central phenomena in the study; The right interviews were identified who could provide relevant information, thus four types of stakeholders were interviewed; Due to circumstances, all

interviews were organized through Zoom and Teams platforms, the interviews were recorded and interviewees were informed in advance via consent forms submitted prior and by a verbal note before the start of the interview; The pilot interview took place to reframe and redesign questions in a way, that they serve the best interest of the research. Nevertheless, each interview was unique and had its distinctive flow, in some cases, the interviewer managed to ask all the questions according to the protocol, however as participants knew the questions prior to the interviews, some of them covered some topics without even asking the questions as planned.

3.2.1. Participants

Similar to most of the qualitative research, this study is also based on a purposive sampling design, although during the research process snowball sample emerged as well. As Creswell (2013) expresses, during case study bounded systems such as processes, activities or events are studied, thus, to portray the existing situations regarding innovation and entrepreneurship in the Georgian higher education context, several stakeholders were identified, such as representatives from universities, governmental agencies, and related stakeholders. First of all, currently, there are 56 higher education institutions in Georgia, and according to Georgian law on Higher Education, 31 out of 55 institutions can be regarded as universities. A university is an institution which implements educational programs of all three cycles of higher education and scientific research (Law on Higher Education, 2004). Keeping in mind the time constraint and capacity, the sample was narrowed down to three universities. The original plan was to contact one public, one private and one non-profit research-intensive university, however, the researcher did not manage to get in touch with the representatives from a non-profit institution, thus at the end, two public and one private research universities' representatives were selected.

In the end, three university representatives have been interviewed: Ilia State University, Business and Technology University, and Tbilisi State University. The rationale for targeting these universities is the following: Ilia state university (hereinafter ISU) is research-intensive and comprehensive university; ISU's mission is to convey and create applied knowledge to contribute to society. It has 26 research institutes, a technology transfer office, a business incubator and a center for graduates' entrepreneurs (Iliauni, 2020). Business Technology University (hereinafter BTU) is a new private entity in the Georgian higher education context, which was established in collaboration with the "Silicon Valley Tbilisi" center, BTU prioritizes and has a special niche space for innovation and entrepreneurship (BTU, 2020). Tbilisi State University (hereinafter TSU) is the oldest and largest research university in Georgia, which covers 16 research universities, and a recently established knowledge transfer and innovation center. Therefore, it is believed that these universities exhibit entrepreneurial activities and behaviors to different degrees and their somewhat in-depth stories could help to seize the picture and to understand the central phenomena of the study (Creswell, 2013).

A purposeful sampling method was utilized for choosing information-rich respondents, who could provide relevant information regarding the research topic. The researcher intended to interview representatives who relate to universities' entrepreneurial and innovative activities,

serve as head of special units' or as vice rector in that direction. Besides, to explore the stakeholder's perspective and expectations, interviews with governmental agencies are deemed crucial, hence interviews were conducted with the representatives of the Ministry of Education, Culture, Science and Sport of Georgia (hereinafter, Ministry of Education and Science), Georgia's Innovation and Technology Agency (GITA), Shota Rustaveli National Science Foundation of Georgia (Rustaveli Foundation), and National Center for Educational Quality Enhancement. All of them have vested interests and represent strategic actors in this regard. Besides, as third research question aimed to see whether HEInnovate could contribute to the higher education system, thus international perspective was high at research agenda, for this purpose three international respondents were selected to share their stance about HEInnovate tool, its customization in the Georgian context, and about universities' role in the innovation ecosystem. Based on the snowball principle, international actors emerged as potential participants, such as British Council and World Bank, as they play important role in funding Georgian innovation and entrepreneurial ecosystem. Despite the effort, the researcher did not manage to interview World Bank representatives, although the interview was conducted with 2 respondents from British Council. Finally, one independent expert was interviewed, who represents a collaborative platform - ICT Cluster works at several universities and has expertise in the field of innovation.

The researcher had the intention to involve more participants from Georgia to depict the situation better, although due to different circumstances and the covid-19 induced implications, only 12 interviews took place with 14 participants. Each interview lasted around one hour, with international experts it lasted approximately 30-45 minutes. The planning and communication process went smoothly, all interviews were scheduled in a decent amount of time, although the attempt to arrange interview with the representative of the Ministry of Education and Science, was rather time-consuming, the waiting period to book the meeting lasted more than a month. Although organizing online interviews exhibited some degree of flexibility, the intention to establish rapport with interview participants and to create a convenient environment were not guaranteed.

3.2.2. Document Analysis

As for the secondary source of data collection, a desk study was applied, in which legal framework, strategies, and policy documents were extensively analyzed to describe trends and ongoing challenges for the Georgian higher education system in general (Frankel & Wallen, 2009). All policy and strategy documents were taken from official sources. Moreover, content-related reports were analyzed to grasp its standpoint towards innovation and entrepreneurship. The purposeful statistical information was obtained from several sources, such as the website of respective governmental institutions, and the National Statistics Office of Georgia. Besides, World Bank and UNESCO Institute for Statistics possess some respective data in regard to STI in Georgia.

3.3. Data Analysis

As it is qualitative research and methodology, it carries descriptive and interpretive nature, therefore numerous information needed to be processed. As was mentioned above, all interviews were recorded, and later verbatim transcripts were provided. All 12 interviews lasted nearly an hour, 9 interviews were transcribed in Georgian, and 3 interviews were transcribed in English. Initially, the inquirer intended to translate all transcriptions into English, although it turned out to be time ineffective, as each transcription took up to 8 hours. As participation in the research project was guaranteed confidentiality, transcription was done via coded name to avoid disclosing the respondents. Table 2 below shows the coded name of the participants who participated in the research. The given names were applied for both, transcribing and later analyzing. Out of 14 participants, only two requested to review the transcriptions, thus analyzing part started once respondents returned their reviewed parts.

Table 2

Research Participants and related information. Author's Interpretation

Respodent	Institution	Occupation	Stake in Research	Timetable	Coded Name
Respodent 1	NCEQE	Acting Head of QA Unit	Governmental Stakeholder	22.09.20	Res.1
Respodent 2		Deputy Director			Res.2
Respodent 3	GITA	Chairman		06.10.20	Res.3
Respodent 4	ISU	Vice Rector	University Representative	28.09.20	Res.4
Respodent 5	BTU	Head of Research Centers		09.10.20	Res.5
Respodent 6	TSU	Head of Knowledge Transfer and Innovation Center		30.09.20	Res.6
Respodent 7	RSF	Head of Science Department	Governmental Stakeholder	02.10.20	Res.7
Respodent 8	WPZ Research	Senior Researcher	International Stakeholder	24.10.20	Res.8
Respodent 9	EUA	Senior Policy Coordinator		14.10.20	Res.9
Respodent 10	OECD	Project Leader		26.11.20	Res.10
Respodent 11	British Council	Project Manager	Internal Stakeholder	08.10.20	Res.11
Respodent 12		Project Coordinator			Res.12
Respodent 13	Independent Expert/Professor	N/A		28.09.20	Res.13
Respodent 14	MES	Senior Specialist (Department of Science and Technology)	Governmental Stakeholder	02.11.20	Res.14

Interview and document analysis was done through Atlas.ti program. Descriptive coding was applied to classify and organize data better, and later to translate codes into clustered themes (Saldana, 2011). Atlas.ti also helped to track the similarities and differences. As for the analytic technique Explanation Building logic was developed by Yin (2009). The rationale to use this analytical technique was to explain the phenomenon and connect causal links. Besides, the findings gradually unfold and build the story about current context and challenges to innovation and entrepreneurship. This logic has the danger to drift away from the central point of the research, although constant reference to the original purpose was maintained while analyzing and reporting the findings.

3.4. Validity & Trustworthiness

Validity is the essence of qualitative research, as often there are no quantitative data used throughout the research, it makes it less possible to replicate the study, therefore the qualitative data has to be authentic. Validity is often associated with appropriateness, correctness, meaningfulness, and usefulness (Frankel & Wallen, 2009). Qualitative research carries many implications and threats when it comes to validity and reliability. Throughout the research, external and internal validity was ensured. The researcher involved the supervisor in every phase to make sure that the design of the instrument and questions would yield the best results for this paper. There are several validation strategies identified by Creswell (2013), and triangulation is one of them, which will be applied in this case. This strategy involved cross-checking and endorsing the information from primary and secondary data collection. Also, Stake's "critical checklist" (as cited in Creswell, 2013) and Creswell's criteria were customized and utilized at the end to assess the research.

As for reliability, consistency was ensured while conducting interviews and collecting the data. In general, the study poses no ethical problems, however, some precautions were undertaken at various stages. Ethical constraints were assured from the very beginning by designing the content form, active communication with potential respondents, informing regarding the usage of the information, and interview recording. The content forms were sent in advance and the inquirer announced the information beforehand regarding the recording process. Additionally, the possibility to read the transcripts and confirm was offered, although only two participants requested it. This assures that extracts from the transcripts are accurate and could be used as an argument to back up the findings. All the records are kept on various cloud and hard drive servers. Besides, Table 1 identifies the position and institution of the respective participants, this information was deemed important by the researcher, to serve the purpose of the study, this may result in some insiders being able to infer their identity. Nevertheless, to protect against that risk the real names and surnames of the participants are treated as classified information, neither transcripts nor research itself discloses their identity. Privacy and confidentiality were guiding principles for the researcher. Regarding scenario planning, the developed scenarios meet Schoemaker's (1995, pp.29-30) internal test for consistency, plausibility, and relevance. First, the selected trends are compatible within the time frame, second scenario outcomes do not contradict, third scenarios reflect present concerns and challenges, forth they are archetypal, as they describe different future and not the variation of the themes.

As for the secondary data, the researcher analyzed the documents and reports which are public and accessible from the official website of respective governmental agencies. The governmental documents, such as strategy and evaluation reports, were taken from the official website of the Ministry of Education and Government of Georgia (http://mes.gov.ge/; gov.ge). Respective legal documents were obtained from the legislative herald of Georgia (http://matsne.gov.ge/) and various reports were taken from international and local organizations, such as EBRD, WIPO, Galt & Taggart, and National Erasmus + Office. Therefore, the sources of information will reinforce content-related evidence of validity.

3.5. Researcher's Role and Bias

Yin (2009) explains that especially case study design carries the threat of bias, as a researcher is the one who crafts the study out of the qualitative data. In this case, the background of the inquirer was related to Georgian higher education context, as she graduated from the participant universities and she worked at one of the participant governmental agency. Furthermore, the inquirer knew some respondents from her previous working experience. Thus, the researcher had the professional interest and motivation to explore the innovative and entrepreneurial activities in Georgia, and to add value for political discussion. Although to eliminate the risk of her bias, the researcher used several techniques. She did not exclude or include anyone intentionally, purposive sampling served to interview information-rich participants, the research and interview questions did not favor any involved party in the research. Similarly, during document and interview analysis, she did not exclude any information intentionally. Additionally, the researcher kept the voice diary, in which after each interview, she was recording her thoughts, feelings, and insights. This helped her to be grounded and remained impartial.

3.6. Limitations

In the beginning, it was mentioned that ideally study could have been conducted through mixed methodology, to strengthen the findings with surveys and questionnaires. This research paper involves few university cases; therefore, the researcher is aware of the limitations of drawing wider conclusions about entrepreneurial characteristics of Georgian universities or exploring the innovative ecosystem holistically. It is not sufficient to generalize outcomes for all authorized universities in Georgia, although the gathered information elicits important and relevant discussion, and paves the way for multi-level dialogue. Also, as it was mentioned before, themes for the scenarios were decided intuitively, and as Iversen (2006, p.8) describes it was indeed "intuitively appealing" to choose the strongest trends as the backbone of the scenarios, although the application of other techniques such as the priority matrix would have been interesting as well, especially to deal with wildcards and weak signals.

Besides, research was developed and crafted during the ongoing world pandemic, known as the novel coronavirus, which affected the process in different ways. To begin with, the initial plan to travel to Georgia and interview respondents face to face. Consequently, this pandemic and force major situation impacted the communication and data collection process, it was relatively complicated to set up meetings and explore the country context remotely. Yet another important detail is a shortcoming of the bilingual study. Even though it was offered in English, all interviews with Georgian participants took place in Georgian. Also, due to the limited time frame, transcriptions were done in Georgian and the coding in English. Therefore, there is a minor chance that translation might have affected the coding process.

Chapter 4

4. Results

4.1. Georgian Higher Education Context Overview

Georgia is one of the three South Caucasian post-soviet country, located on the eastern coast of the Black Sea. Georgia has made tremendous progress to detach itself from the soviet legacy and expressed Western aspirations. Chakhaia and Bregvadze (2018, pp.176-180) well described the patterns of the higher education system of Georgia before and after it gained independence, especially after the Rose Revolution. The transformation was multidimensional and complex, as a process of reclaiming the independence back was accompanied by grave socio-economic and political problems, which evolved into crisis. In line with ongoing problems, the lack of experience in the planning and managing higher education from governmental and institutional sides contributed to the inertia of the higher education system, main discourse was to adapt the system, not to mention its development.

The major reforms in the 1990s were privatization of higher education institutions, disciplinary diversification of specialized HEIs, and introducing tuition fees. The subtle genesis of institutional autonomy could be traced during that period, such as designing programs, curricula and introducing tuition fees as noted by Chakhaia and Bregvadze (2018, p.184), although it was de-facto autonomy as there was no guiding legal framework to count on. One more detail, that severely imprinted the Post-soviet Georgian higher education system, was omnipresent corruption. Thus, Georgian higher education was struggling with a vast array of problems at the beginning of the 2000s. All the other reforms took place after so-called the Rose Revolution when the new government implemented radical reforms in every direction, which yielded economic growth and eradicated corruption. Besides, the adoption of New Public Management was apparent by introducing deregulation, liberalization, marketisation, privatization, and increasing efficiency in all public sectors. As for the education sector, the government used a "window of opportunity" and remade the higher education system.

To follow western aspirations and become part of the Bologna process, there was an urgent need to have a legally sound framework, therefore the law on Higher Education was adopted in 2004. Later in 2005, during the Bergen summit, Georgia joined Bologna Process, which became a cornerstone for change. On that note, the transformation and harmonization of the Georgian higher education system have started. Georgia has used the Bologna process as a tool to tackle the existing problems and to leverage change towards modernization. Even though Georgia was regarded as a "late-coming" country, soon its enthusiastic endeavors and political commitment were acknowledged as inspirational case study and, was internationally praised (Crosier et al., 2007; Westerheijden et al., 2010). Yet another important milestone for Georgia was signing the Association Agreement with the European Union, which stipulated binding obligations for the Georgian government in the field of education (European Union, 2014). In 2018 Ministry of Education and Science issued a decree and renewed standards for accreditation and authorization based on European Standards and Guidelines for Quality Assurance (ESG), NCEQE became part of the European Association for Quality Assurance in Higher Education

(ENQA) and European Quality Assurance Register for Higher Education (EQAR) in 2019, which was a step forward in terms of quality assurance (NCEQE, 2020). As it was discussed above, the nature of change was top-down, all the reforms were initiated by the government and the related agencies.

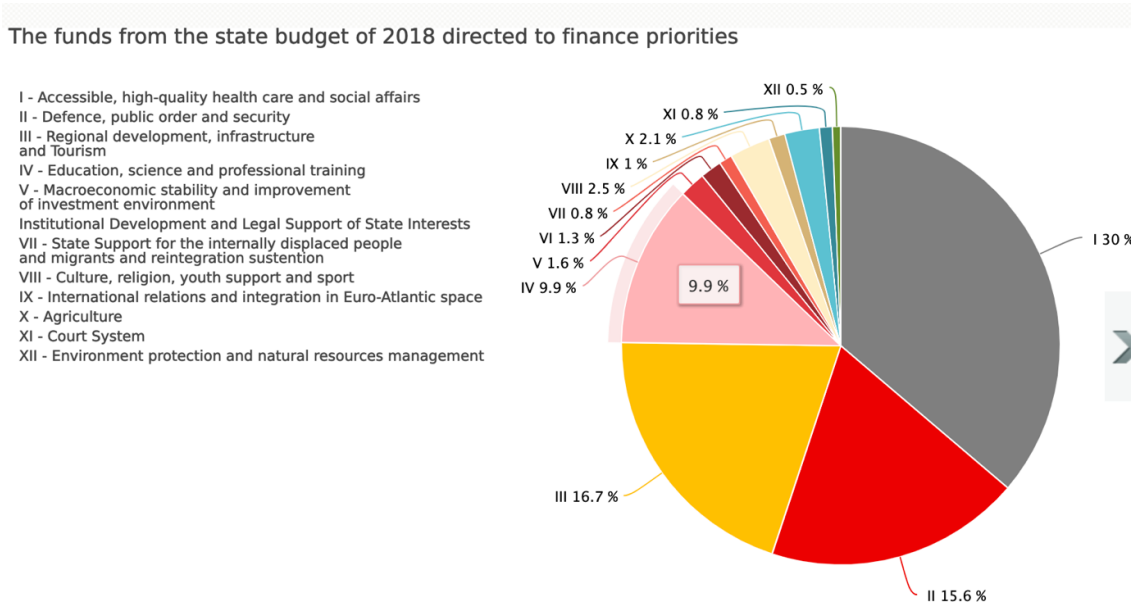
4.2. Policy Documents Findings

4.2.1. Governmental Vision and Priorities Review: Facts & Figures

The previous section set the important scene as the reader shall see the Soviet heritage has impacted the further development of the system, especially when it comes to science and commercialization. As presented earlier, on behalf of the government, the Ministry of Education, Science, Culture and Sport (hereinafter Ministry of Education and Science) is responsible for higher education. Although the main architect of finances is the government, which decides the budget and the ministry has the power to manage the public purse according to its priorities. Overall government expenditure on education is relatively high, which is illustrated by raw numbers of the total budget and by share percent of GDP. According to World Bank and UNESCO statistics (2018), Georgia has spent on education 3,5 % of its GDP during 2016-2018 and this value is not far from the aggregated performance (4,0%) of Upper-middle income countries. As for the raw numbers, the official statistics derive from the Ministry of Finance. The graph below illustrates the state budget allocation of 2018, education and science sectors take 9,9 % of the whole state budget, which reinforces the argument that education is a state priority.

Graph 2

State's expenditure in percentage, 2018. Taken from the website of the Ministry of Finance



Policy and strategy documents take a special place in comprehensive context analysis; therefore, state priorities and vision will be examined to understand the political climate. The governmental program 2016-2020 will be discussed in the first place to set the general scene, and then specific 2017-2021 strategy respective to education and science. Regarding higher education, five broad themes emerged from the program analysis, such as: Implementing new funding model; Efficient models of quality management; Improving teachers' training system; "Incorporating modern technologies; Internationalization; "Implementing "Study in Georgia" to increase international students' flux"; and Building University city in Kutaisi with a STEM focus. As for the science, the following priorities have been identified: "To position Georgia as a regional scientific center"; International cooperation; "Improving infrastructural capacities"; "Facilitation to implement modern technologies in research facilities"; "Strengthening Kartvelian studies abroad"; and "Promoting Horizon-2020". Given strategic directions reinforce the state's ambitious vision for the internationalization and openness for modern technologies, however, the interview results shall shed the light to what extent those statements on the paper have been put in action (Government of Georgia, 2016).

It is also interesting to examine the state priority for Entrepreneurship and Development of Innovations and Technologies, and if there are any linkages with higher education. It has to be mentioned, that Entrepreneurship and Innovations are high on the political agenda. The governmental strategy towards Entrepreneurship is mainly seen through the financial support of entrepreneurs, facilitation of micro and small entrepreneurship in regions, and promotion of Georgia's export potential at international markets. There is no explicit crossover with higher education in this section. The only case when there is a linkage between education and entrepreneurship is under Vocational Education. It is expressed that entrepreneurial education is the priority and it will be incorporated in teaching (Government of Georgia, 2016).

When it comes to innovation strategies, relatively more connection with the education sector can be traced. Special attention is paid to fab labs and their integration into school and university curriculum, strengthening the quality of STEM education is highlighted as well (Government of Georgia, 2016). Besides supporting the start-up climate is a priority which is backed up by the respondents (Res.3, Res.4, Res.5, Res.6, Res.13, Res.14) and it will be elaborated under the upcoming section.

Therefore, to sum up, Governmental Program 2016 exhibits interests in entrepreneurship, innovation, and technological development, but cross-sectoral cooperation and linkages are not present, such as industry, economic development, public-private partnerships, and higher education. It is obvious that at this stage higher education institutions are not seen as an integral part of innovation ecosystems. In December 2020, the Government of Georgia has introduced the program 2021-2024 "Building European State". Under the higher education section, it is highlighted: To increase the budget of HE; Yet again, one objective is to develop a new funding model (which was also objective of previous program 2016-2020). There is no explicit record regarding innovation, entrepreneurship, and HEIs, or collaboration between industry and HEIs (Government of Georgia, 2020). On that note, more advanced and sharpen focus can be traced under science, as it is indicated that special strategy will be drafted, which will cover the

development of science and technology. Similar to the previous program, the major concern of the current one (2021-2024) is the deficiency of complementarity and the cross-sectoral priorities, and the explicit role of HEIs in nurturing innovative and entrepreneurial ecosystems is still missing.

4.2.2. Ministry Vision and Priorities Review: Facts & Figures

Georgian government adopted the "Georgian Unified Strategy for Education and Science 2017-2021" which is considered the main guiding document in terms of governmental vision and strategies (Government of Georgia, 2017).

Under the HE, the narrative starts with a general context review, highlighting the respective success and challenges, and then sets out specific objectives. The current strategy has three objectives: 1. Modernization of HE, internationalization, and improving quality; 2. Creating capacity for effective lifelong learning; 3. Increase access to quality education. For this paper, the first objective preempts attention. There is mentioned that the creation and dissemination of new knowledge, innovation, and technologies have to become an inseparable part of the HE agenda (Government of Georgia, 2017, p.36). Interestingly enough, the statement is written in the future tense, which indicates that positioning higher education institutions as elements of the innovation ecosystem is at the initial phase. This latter has been frequently confirmed by multiple respondents (Res.3, Res.5, Res.7) as well. The need for the development of research infrastructure and laboratories is briefly underlined. It can be noted down that the priority for HE between 2017-2021 is quality.

The STI section, similar to HE, starts again with the context review, although it is reflected rather critically. It refers to the science and innovation systems challenges during the transition period, after Georgia gained independence. As it is narrated at the beginning of this chapter, the Soviet footprint impacted significantly the transition. Especially when it comes to science, as it was managed independently, outside of the university domain, subsequently research was not integrated into the teaching process. Thus, officially the reconciliation process between universities and research institutes started in 2010-2011, when up to 70 research universities integrated into 5 universities (Government of Georgia, 2017, p.40). This fact also draws attention to the nature and culture of science in Georgia, which has its ramification. Multiple respondents (Res.3, Res.4, Res.5, Res.7, Res.13) emphasized the implications caused by the modification of the system, such as formal integration and lack of receptiveness.

Several challenges are described about STI, such as lack of funding, the need to improve the quality of scientific research, strengthening the research potential, developing a culture of innovation, and lack of research commercialization. Yet another identified challenge is the classification of expenditure on R&D, as there no unified methodology is deployed to evaluate funding and classify expenditure. Apart from the public sector, lack of funding relates to the contribution of the private sector as well. An overall speaking partnership among research

institutes, private and public sector remains troublesome, consequently, research potential has not been applied to national strategic fields. Especially limited collaboration among research institutes, industry and SMEs is present. The context overview reinforces the importance of research commercialization and technology transfer for sustainable development, although basic research is seen as a driver of both, and surprisingly applied research is not mentioned. Attention should be paid, that under STI section development the culture of spin-offs and university-industry partnership is mentioned, yet again in the future tense. The need for infrastructure development and software updates is stressed. The last important point is related to the promotion of science and innovative mindset in secondary education, to prepare young generation from the schools.

Based on the overview, strategy introduces three objectives: 1. Developing Georgian STI ecosystem to achieve outstanding quality in science and technologies; 2. Strengthening the role, status, and value of STI, and its positioning as a national strategic priority; 3. The STI system internationalization and diversification of funding streams. It's fair to mention that this strategy contains an action plan, which provides sub-objectives and elaborates further. At first glance, the strategic objectives are relevant and exhibit fundamental directions, however, some abovementioned challenges are not addressed explicitly. For instance: collaboration between research institutions and the business sector does not seem to be fleshed out. Analytically speaking the bottom line is that the strategy concerning STI demonstrates promising avenues for preparing the innovation and entrepreneurial grounds. Nevertheless, similar to the governmental program 2016-2020, this strategy 2017-2020 lacks consistent steps and cross-sectoral connections, and most importantly holistic approach based on a logical build-up and relationship between all educational priorities.

4.2.3. Legal Framework

The legal framework regarding STI is not full-fledged and robust. Although, the system is mainly (but not exclusively) regulated by the following documents: Law of Georgia on Science, Technology and their Development, adopted in 1997; Law on Higher education, adopted in 2004; and Law on Innovation, adopted in 2016. This latter is quite recently developed but it does serve the guiding structure in the search of the pathways to innovation.

The law defines innovation as applied, new or upgraded product, process, or service, which carries economic, scientific, or social value (Law on Innovation, 2016). The law explicitly sets out to create and improve the Georgian innovation ecosystem, to build knowledge and innovation-based economy, to support production, apply and export modern technologies. As for the scope, it covers subjects, infrastructure, commercialization, and funding of innovative activities. The fact that law introduces, inter alia, the concept of a Knowledge-based Economy is significant per se. Although it remains to be seen to what extent the concept is applied in practice.

The law on innovation lists the following infrastructural enablers for innovative activities: Science park, Busines Incubator, Business Accelerator, Technology Transfer Center, Entrepreneurial Innovation laboratory (FabLab), and Innovation laboratories (ILab). Each enabler is elaborated further, and surprisingly higher education institutions are only referred to the science park. Besides, the law provides information about the funding of innovation and commercialization process of the state-funded project. The fact that the law on innovation was adopted in 2016 implies that innovation latterly became a significant part of the political agenda. Therefore, this once again confirms that building the innovation ecosystem in Georgia is at a nascent stage.

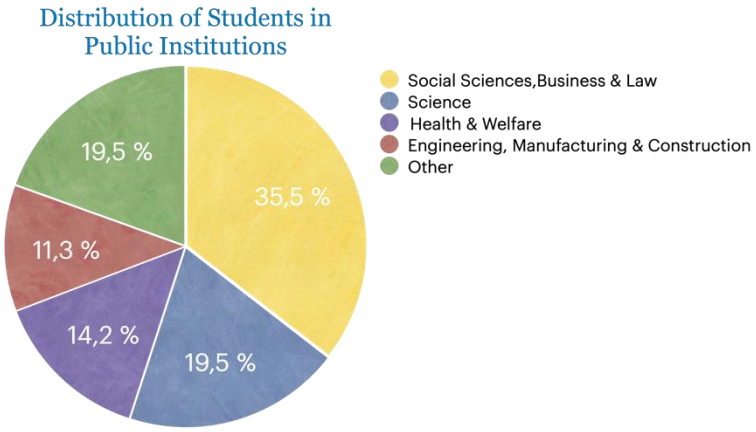
As for the Law on Science, Technology and their Development, even though it was adopted in 1994, a fairly large number of amendments have been initiated including 2020. As stated, this law defines the main aims and principles of the state policy in science and technology. Nevertheless, the guiding principles are portrayed as general and broad statements and carry the message that the state will ensure the development of science and production of the new technologies through upholding academic freedom and democratic and participatory governance. The main body of the framework covers governance, related topics, and the state's involvement in the development of science and technology.

4.2.4. Report Findings

Bochorishvili and Peradze (2020, p.27) evaluated the higher education sector as "strong and characterized with improving financial performance" in recent Georgia's education sector review. In the same report, it is also highlighted that tuition fees are the main source of revenue for universities, although there is a positive revenue trend, it grew from GEL 251 Mn to Gel 691 Mn in the last 10 years span. Revenue growth is explained with the broader intake of the students past 10 years, especially international students. Nevertheless, total enrollment growth seems to be declining as of today. Yet another important information connected with enrollment is students' distribution according to fields. Graph 3 and Graph 4 below illustrate the preference among Georgian students from public and private higher education institutions. Social science, Business, and Law have accommodated most of the students' enrollment in the fall semester of 2019, furthermore, this has been a steady trend for a long time. These figures give a possibility to reflect that share of STEM subjects is more significant among public universities rather than in private universities. When it comes to demand, the supply of graduates from social science, business, and law was 12 times more than the demand itself in 2019 (Bochorishvili & Peradze, 2020, p. 43), which deserves reflection.

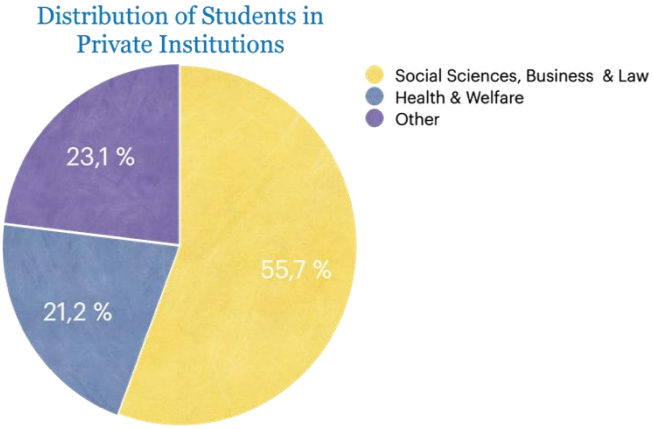
Graph 3

Students' distribution at private HEIs. Authors own interpretation based on Geostat data ,2020



Graph 4

Students' distribution at public HEIs. Authors own interpretation based on Geostat data, 2020



Bochorishvili & Peradze (2020) have underscored several problems faced by the Georgian education sector. One of the main problems identified in the report is the funding system of higher education, as it is heavily dependant on the households and as it was mentioned above, tuition fees represent the major share (85 %) of total spending on higher education. Besides, public universities have a legally defined price ceiling - GEL 2, 250 per year, while private universities have no price celling. From the public university perspective, the same problem was highlighted by *Res.4*, who indicated that GEL 2,250 is not enough to provide high-tech teaching and to hire professionals from respective STEM fields. *Res.2* also posited that the current funding model is already outdated as it was introduced in 2005 and does not respond to current market prices anymore, *Res.2* mentioned that modifying the funding model has been a part of the political agenda, and it is expected to change by 2021.

Another problem, illustrated in the report, is drop-out and delayed graduation, which is associated with avoidance of military obligations for male students. The same issue is emphasized by *Res.13*, as higher education has long been a harbor for those male students who do not want to serve the military service. This is somewhat profitable for the state as students still pay for their studies. Lastly, the mismatch between Georgia's education system and the labor market is highlighted as well, labor's contribution to the economic growth equaled to 0,7%

during 2011-2019, and higher education adds low value to employees. As mentioned above, this problem relates to the uneven distribution of Georgian students into the field, the demand for technical skills is not met, meanwhile Georgia's education sector oversupplies Business and Law fields (Bochorishvili & Peradze, 2020, pp.38-46).

Bregvadze et al., (2017) studied universities' role in regional development with a special focus on universities from Adjara and Imereti regions. The research showed that reviewed universities do not meet the needs of the regions, governmental and non-governmental stakeholders underlined that there was a lack of qualified university graduates, especially in the technical fields. Bregvadze et al., (2017, pp.37-38) indicated that the study displayed the following challenges: National policy on regional development did not focus on Georgian higher education institutions, institutions were seen as beneficiaries and not partners, there is no regional coordination, and partnership between academia and business was lagging behind due to various factors (organizational culture, scope, and focus of the project).

4.3. Science, Technology and Innovation Review: Facts & Figures

> "Unlike developed countries, universities in Georgia do not have any research development-related revenues, which might be seen as an opportunity for the sector's growth outlook."
>
> Bochorishvili & Peradze, 2020, p.28
> GALT & TAGGART Research

National Erasmus + office Georgia has published the special report "15 Years of Bologna Process in Georgia", which covers diverse topics of HE. The report includes the paper regarding research management in Georgia, which underlines respective challenges and opportunities worth mentioning. Similar to the strategy of Ministry, it is underlined that context plays a distinctive role in science, as Georgia is a post-soviet country and recently has experienced the merger between universities and the research institutes (Bregvadze, 2020). This latter was hitherto attached to the Academy of Science; thus, the merger wounds have not been healed seamlessly, and still, need a great deal of lubrication. The other noted challenges refer to lack or obsolete research infrastructure, financial scarcity, non-existing research priorities, and poor account of third mission activities.

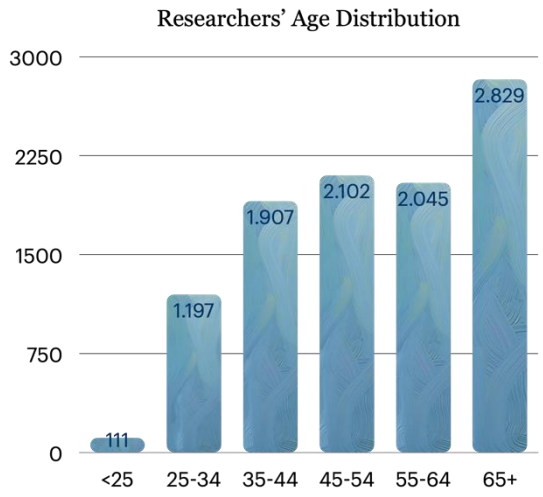
Bregvadze (2020) referred to the importance of quadruple helix and the need for functional links among diverse stakeholders, this outlook strengthens and resonates with the findings from Governmental documents' analysis, that strategies and priorities should be cross-connected and communicated to achieve greater synergy. Therefore, the following solutions have been identified to support the research management process in Georgia: 1. To understand the demand; 2. Clustering supply; 3. Helping clusters adapt; 4. Clarifying accountability standards.

To probe the demand, it is necessary to involve multi-stakeholders in the discussion; promote transparency of the processes and consolidate the data. Clustering supply is an interesting concept somewhat related to Network Governance (Campbell, 2013), which aims at optimizing the research resources and data and creating new interdisciplinary networks to increase efficiency and research productivity. The important nuance is the informational and awareness vacuum, which needs to be penetrated through cooperation. Currently, gathering, storing, and processing research-related data is inconsistent and unstructured. In the end, it is underlined that all these interventions need to be taken into account holistically and systematically, so there is a clear build-up. This review lays the significant foundation to start research management processes in Georgia and carries insights that can be particularly helpful to spur the reforms in that respect.

Georgian innovation ecosystem in higher education is not easy to portray, as the information is sporadic in various documents and there is no systematic analysis. Besides, the innovation ecosystem is not studied in the country either, which makes the data collection process challenging. Even though innovation has become a buzzword of today, measuring and quantify innovation is a complex matter as it seldom stays within lines. Spending on R&D is quite low (Bochorishvili & Peradze, 2020), according to UNESCO (2020) and World Bank (2020) statistics, that track the data since 2013, exhibit slow growth from 0,08% of GDP in 2013 to 0,3 % of GDP in 2018. The main database regarding science is available from Geostats, which covers the basic values, such as number of patents, number of researchers, and number of institutions. According to 2019 data, the R&D expenditure equaled 140, 2 Mn GEL, the research capital was divided among 48 research institutions (Geostat, 2020). The Graph 5 below illustrates the age distribution, which exhibits outliers and explains large standard deviation, therefore the 65+ age group accounts for the most researchers at a given moment, and the <35 age group accounts for the least.

Graph 5

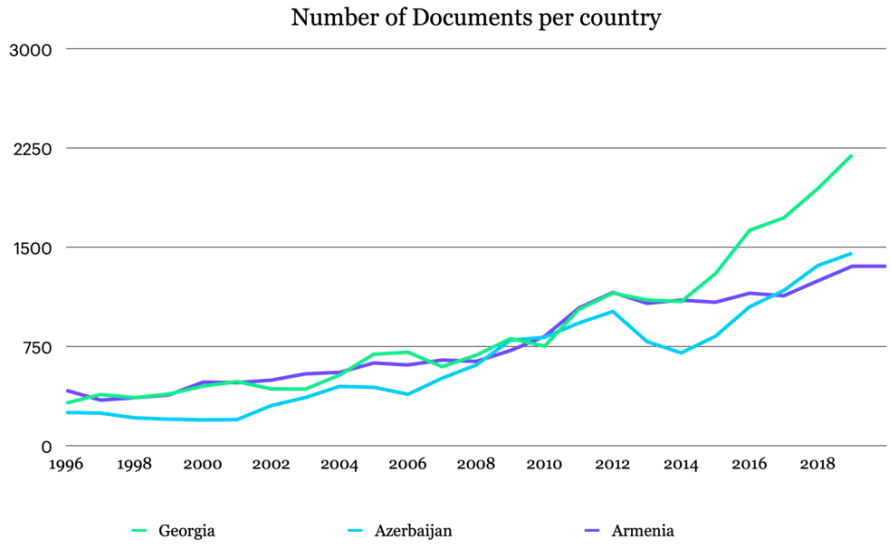
Researchers' age distribution. Author's interpretation based on Geostat, 2019.



When it comes to citable, non-citable, and publishing articles, according to Scimago Journal and Country Rank, Georgia has a leading position in the region and exhibits a positive trend. Nevertheless, a closer look at subject-based publications reports diverse country performance (Scimago, 2019).

Graph 6

A Number of publications per country. Author's interpretation, based on Scimago, 2019.

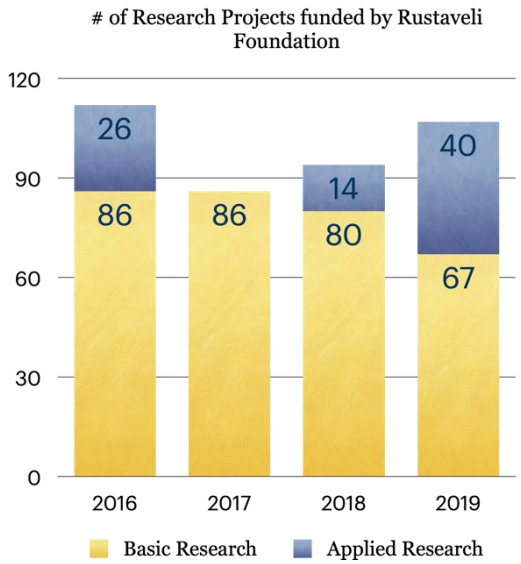


One of the interesting and noteworthy data is taken from the website of Rustaveli Foundation, which shows the proportion of the approved applied and basic research projects. As Graph 7 shows below, the basic funded research projects outnumber the applied ones, although, in 2019, the trend has changed slightly in favor of applied research. This data leads to the impression that basic research is the priority, and the second, interest among researchers towards basic research still dominates.

Graph 7

A Number of research projects funded by Rustaveli Foundation. Author's interpretation based on Rustaveli Foundation Statistics, 2016- 2019[1]

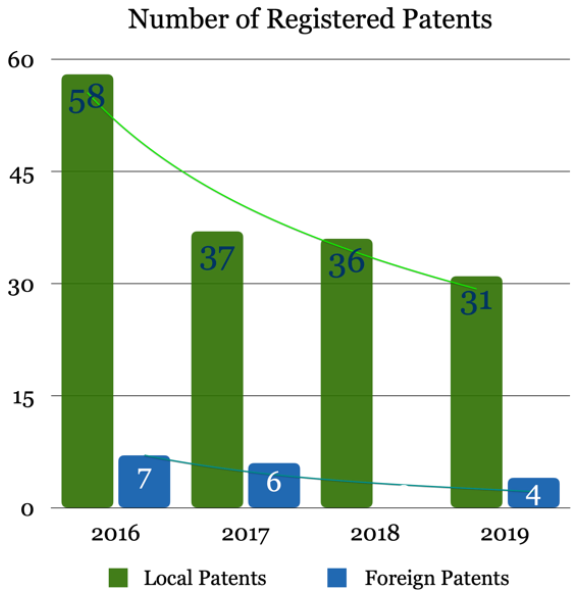
[1] The value for applied research in 2017 could not be found via website, therefore it is regarded as 0, although it can be a technical mistake.



Several international reports have addressed Georgia in line with innovation, which helps to get the overall picture to some extent. Global Innovation Index 2020 ranked Georgia 63 among 131 countries, which means deterioration compared to the previous year Georgia was ranked 43, thus it was acknowledged as the largest drop in the region, although it is noteworthy that some information is missing in the Georgian case, which could explain the significant drop (WIPO, 2020). In 2018 according to EBRD Knowledge Economy Index Georgia ranked 16th position among 38 EBRD countries, and out of its four pillars: Institutions for Innovation, Skills for Innovation, Innovation System, and ICT infrastructure. Georgia performed the most poorly at Innovation System's pillar, which measures interaction among innovation system's input, output, and linkages (Pospisil, 2019). More precisely poor performance under this section means that spending on R&D in Georgia does not pay off. As for the invention, the negative trend is reported in Graph 8, for local and foreign registered patents. Besides, the number of filled applications has been declining as well (World Bank, 2018).

Graph 8

A Number of Registered Patents in Georgia. Author's interpretation based on Geostat data,2019



When it comes to science and innovation, two governmental bodies play a critical role in STI development, Georgia's Innovation and Technology Agency (hereinafter GITA) and Shota Rustaveli National Science Foundation of Georgia (Rustaveli Foundation). The former focuses on innovation and technology development, the latter intends to enhance and nurture scientific capital. Conducted interviews with representatives from respective institutions will cast light on their activities and stance in the innovative and entrepreneurial ecosystem.

Document analysis aimed at examining the current context in Georgia and partially answered the first and second research questions. Document analysis showed that Georgia lags behind in innovation performance, and this statement is explained by the argument that innovation and entrepreneurial ecosystem is at a rudimentary stage in Georgia. The fact that special law was adopted in 2016, implies that rhetoric is still fresh and needs to put flesh on. Furthermore, both discussed strategies (Governmental 2016-2020, Ministry 2017-2021) exhibit the importance of innovation in an explicit manner and confirms the state willingness to develop the ecosystem. Nevertheless, several discrepancies can be noticed, such as a lack of cross-sectoral linkages and consistency of measures. Besides, the role of higher education institutions is not seen as a powerhouse for economic developments, and expectations and agendas on innovation heavily rely on science exclusively. In addition to prioritizing education and science, other positive trends can be traced, for instance, the overall expenditure on education and science in total is relatively high, Georgian researchers have favorable output in terms of publication in the region, and many initiatives have been introduced to raise awareness about innovation, science, and entrepreneurship.

As for the challenges, several above-mentioned sources confirm the funding on R&D, industry participation and outdated scientific infrastructure seem to be most challenging at this point. Beyond funding and infrastructure, some contextual conditions appear to be significant and alarming, such as integration of research institutions and higher education institutions due to soviet legacy, poor data governance and research management, student's uneven distribution according to fields, lack of cooperation researchers and universities, aging scientific capital and declining trend in the patent application. Despite the challenges the system faces at this moment, the current build-up paints a promising picture for future development. Having special institutions in place, relevant legal framework, and consistent measures will enable conditions to ripe eventually, especially when the ministerial strategies will be better aligned and build on each other.

Chapter 5

5. Interview Findings

5.1. Innovation and Entrepreneurial Ecosystem in Georgia

(In the Context of Higher Education)

The interview questions were customized to the respondents and designed to cover the main research questions (see Annex II). Several common challenges were identified, which was shared by most of the respondents. Nevertheless, the stance and viewpoints of the respondents were slightly different depending on the cluster groups (Governmental, University, International and Internal Stakeholders) they represented.

Most of the respondents similarly evaluated the Georgian innovation ecosystem. All of them stated that Georgia is building the ecosystem at this very moment, therefore it is an early stage for a comprehensive diagnosis. Although all respondents agreed that development in this regard is crucial for myriad reasons. Res.3[2], Res.7, and Res.14 assessed the context from a governmental perspective. As Res.3 depicted: "Innovation is a driver for county's economic development, and this is even more important for Georgia, as we are a small state, and our economy is not based on natural mineral unlike many countries. However, this gives us the extra motivation to invest in human capital to run our economic development. Human Capital is a boundless resource, while gas or oil have limited capacity, thus it is the ultimate advantage to base economic development on human capital." Res.7 also underlined that country that is innovation rich exhibits more independence and sovereignty to create new knowledge, besides the current situation in Georgia is top-down driven, which means that innovation is mainly promoted by the government and participation of the other sectors is limited. Res.14 affirmed that the Ministry of Education and Science prioritizes innovation and that is why it is an integral part of the current strategy. It is worth noting that the answers provided by Res.14 were quite broad and general:" Many universities try to find business partners, as they are autonomous entities, and it is up to them to plan a partnership. The ministry is also interested to facilitate a partnership between universities and industry. Since 2015, the ministry organizes a festival of science and innovation to disseminate knowledge into society. This is a good platform to promote innovation, science and technology, and foremost to interest the young generation."

As Res.3 reported, that Georgia is lagging behind in terms of innovation because the government prioritized innovation quite recently, while developed countries started to advance decades ago in this regard. GITA was officially established in 2014, and the first deployment of the supportive projects started in 2016, whereas the budget for the project was doubled in 2018. Despite the rapid tempo, the performance and output are not extensive yet. This assessment corresponds to the document review as well, and once again reinforces the idea that it has been approximately five years since significant reforms started and innovation became part of the political agenda.

[2] See Table 2 (pg.29) for respondents' details

Similar to Res.7, Res.3 stated that at this moment the government is the main driver for innovation, which is not favorable, and underlined that the private sector must be an integral part of the ecosystem: "Private sector should invest into the development of innovative business, new companies and fund research, we notice similar trends. In the beginning, GITA used to fully finance innovative projects, now we decreased the share ratio, however, we increased the overall budget. We promoted the involvement of the private sector, and as of today, within 2 years period, we spent 8 Mn GEL on start-up development, which made a 30 Mn Gel return on investment from the private sector. Therefore, it is crucial to decrease the driving role of the government and its participation eventually and it will grow interest from the private sector." This comment creates room for the possibility to build up Triple/Quadruple helices.

Res.7 also elaborated on the role of the Rustaveli Foundation, as a pivotal stakeholder in the development of science. Rustaveli Foundation actively supports and funds scientific projects, and grant application always includes the indicator to create something new. Although unlikely to GITA, Rustaveli Foundation does not directly fund start-ups or spin-offs, but rather scientific projects which also entail innovative elements. Interestingly, Res.7 stated that GITA and Rustaveli Foundation are two main governmental institutions, which take a key role in innovation ecosystem building, however, as they have divided roles and domains between themselves, GITA's prerogative is to focus on start-up ecosystem, while Rustaveli Foundation focuses on science. This type of distribution has advantages as well as disadvantages for the system building, especially in the context when cross-sectoral collaboration and linkages are absent. Also, concerning both institutions, National Innovation Ecosystem (hereinafter GENIE) project was underlined by respective respondents (Res.3, Res.7). The GENIE project was developed between IBRD and the government of Georgia in 2016, and according to the agreement, Georgia receives 40$ Mn for implementation including 2021. This is a quite large-scale project and IBRD's role as a stakeholder is worthy of mention. GENIE serves four purposes: to create infrastructure; to ensure innovative support services; funding innovations, and to provide technical assistance for the implementation of the project (GITA, 2021).

According to Res.7, under the GENIE framework, Rustaveli Foundation has recently introduced a special grant competition that aims at strengthening applied research, and one of the related requirements is to include young Ph.D. students in the project, to boost not only their research skills but also entrepreneurial. Res.3 from GITA stressed that higher education institutions are seen as the birthplace of innovators, thus they must keep providing technical knowledge, which is not still in place: "For us, it is important that universities and schools implement various study programs to promote entrepreneurial mindset and skills". Under the GENIE framework, intending to boost entrepreneurial skills among Georgian students, GITA organizes theme-oriented camps in cooperation with universities, 3 times per year and tries to take students from theme-related fields and mix students from other fields, such as Business, Law, IT, Biotechnology. Similarly, GITA organizes similar camps for up to 100 school students, from 9th, 10th, 11th and 12th, grades, but the aim is to spark an interest in STEM education (Res.3). The deliberate focus to promote STEM among school students has a positive value, especially when the above-mentioned statistics pinpoint that students' interest remains low in STEM fields.

Res.4, Res.5, and Res.6 explained the importance of innovation and entrepreneurship from a university perspective. Res.4: "There are several important purposes to develop innovation and entrepreneurship in the university. First of all, it is the commercialization of the research, which is challenging in Georgia. Second, to develop an entrepreneurial mindset for the students, which is in progress, and third, to produce the new product itself, especially in terms of STEM, and this latter is problematic as well." Res.5 also commented that the current situation is challenging due to the contextual underpinnings: "when the Soviet Union was dismantled, the soviet science model did not adapt well and smoothly to innovation and technological development." The reference to the challenges caused by the soviet legacy is richly portrayed by the majority of respondents and through various analyzed documents.

Res.5 noted that similar to science, from the 90s Georgian universities, showed some degree of reluctance to be adaptive and receptive, instead maintained conservative attitude: "Ilia State University managed to adapt relatively, and their performance speaks itself, yet it does not focus purely on applied research per se. Georgian Technical University did not manage to embark on the same journey, although it could be most innovative and technology-oriented. In contrast, private universities showed more flexibility to react to changes, that explains how Business Technology University developed as one of the most innovative university."

Res.6 described the function of the Knowledge Transfer and Innovation Center's (KTI Center) at Tbilisi State University (TSU), which is the largest and oldest university in Georgia. The KTI center exists for 3 years and mainly aims to support students and professors in building a start-up and entrepreneurial culture. Res.6 noted that 16 research universities have merged recently with TSU, and seven out of 16 stands for applied research centers, thus the center intends to facilitate commercialization of the research outcome. Interestingly enough, the beneficiary of the KTI center is students, as they show big interest: "Students want to be financially independent, that is why they seem very eager to create their entrepreneurial activity. As for the applied researchers, they have experienced some disappointments in terms of commercialization, thus they exhibit distrust towards the center. This is a big challenge because when GITA has some grant competition, researchers are hesitant to participate. And that is somewhat understandable, the so-called success story of their research commercialization is very low. We regularly organize different types of workshops, seminars, and long-term projects for students, and we intended to do the same for researchers based on the need, however, not all researchers know English and many of them belong to the old generation." This last fact corresponds with the statistics regarding the uneven age distribution of the Georgian researchers. Res.6 elaborated that they often support researchers with fundraising or grant application writing, which gives the impression that the KTI center in practice represents rather a research support unit than the technology or knowledge transfer center.

Res.3 also commented on the issue of technology transfer from GITA's perspective: "Technology transfer is a pivotal issue, unlike to start-ups it is an idea based on research and science, which is developed in the university and might be patented or not or licensed. Technology transfer happens in the big universities, where many technologies are clustered. In Georgia, there are small universities, even in TSU, which is considered the largest university, the research and

scientific potential is dispersed. We have more than 50 research institutes and universities, which is more than the country needs and it is nearly impossible to open technology transfer offices everywhere. Consequently, we founded centralized technology transfer which covers all universities and there is no need for universities to set up on their own. Currently, one pilot project is running, which is funded by European Union, and out of 94 applications, we chose 9 projects to run and divided one Mn Eur. For GITA main intention is to build the functioning system and not the commercialization per se. GITA offers the following conditions: we admit that intellectual property belongs to the university 100%, although we keep the right to manage the product. Besides, when we commercialized the product, the 10 % goes to our commission, and the rest is given back to the university under the obligation to pay a minimum of 30% out of 90% to the scientist or the group of the scientists. Therefore, we want to have a properly operating system, in which every stakeholder knows its role and place." Unlike Res.3, Res.14 from the Ministry of Education and Science assessed the current situation more sanguine manner, while mentioning that almost all research universities have technology transfer and innovation centers, which is a good starting point.

Other university participants Res.4 and Res.5 also touched on technology transfer issues within the university. Res.5 commented that commercialization centers at universities with applied research focus should be busy with training and raising awareness among the academicians: "they are usually busy with paperwork, and I think they should be more active, identifying strong sides and capacity of the universities. For instance, Georgian Technical University (GTU) should not be trying to cover all directions chaotically, but rather should find its niche market to penetrate. The highest expenditure from the government of Georgia goes to road infrastructure and related services, thus imagine if GTU starts to focus on improving roads, building bridges, and rendering tunnels. Recently we spent up to 2 Billion GEL to render the Rikoti Tunnel pass, consequently, it makes sense to focus on relevant issues. The same goes for renewable, green, and alternative energy, as Georgia has the potential to develop in that regard. Therefore, there are some untouched fields that avenues that could be absorbed by universities." This analysis offered by Res.5 deserves further discussion, as it stresses the necessity of responsible and problem-based research, which will be useful and beneficial for the whole community. Res.4 elaborated that ISU also had a technology transfer office, but due to insufficient funding it did not manage to sustain. Also similar to Res.5, respondents highlighted the importance of the employed staff who are familiar with the specifics. Res.4 noted that their collaboration with GITA's technology transfer center was not productive, as their rules are stiff, formula oriented, and not targeted at researchers.

Respondents from Quality Assurance agency, Res.1 and Res.2 reported that accreditation standard contains records regarding entrepreneurship, especially to align study programs with the needs of the labor market. As for the authorization (institutional evaluation) standard, it entails a requirement to study the market and involve external stakeholders in program development. As for the innovation, Res.2 pointed out that 7th authorization standard explicitly demands universities to use and provide modern technologies in the study, management and scientific processes.

An interesting perspective was developed by Res.2 regarding university-industry collaboration: "Universities should initiate a partnership with the private sector, although state's role is to create incentives for the industry to stimulate this type of partnership. The special policy should be issued by the state which will stimulate by the private sector to collaborate with the university. Currently, the interaction between university and the private sector is based on the circle of friends and private connections. The policy could include special indicators that will lead to mutual benefits for both sectors, such as offering internship placements in return for taxing benefits. Thus, having more precise and mutually beneficial mechanisms would motivate both parties, this could provoke real interest for the business sector, which goes beyond personal connections."

A rather critical viewpoint about the overall ecosystem was reported by Res.13 as internal stakeholder and academic personnel, by mentioning that ecosystem is not present at this moment: "Before 2004, nothing was happening in Georgia, since 2004 there has been an investment in electronic governance, in fact, Georgia is one of the leading post-soviet counties in electronic governance. Although now we see the crisis. The government is the main player, which generated accumulation and concentration of the talents under the Legal Entity of the Public Law (LLPL), which depleted the innovation market. Consequently, small and medium-sized businesses are not strong enough to finance business, only banking, gambling and communication companies who have the capital and attract most of the software engineers. At present, we do not have innovative products that can be exported, for the ecosystem, there must be a demand-supply chain and competition. "

As for the university innovation ecosystem, Res.13 noted that R&D has two main funders: government and industry, in case of Georgia the latter cannot afford to invest in research: "From the governmental side, there are two entities: Rustaveli Foundation, to flow the money into research but does not have an effect, to put it mildly, and second is GITA which is significant intervention and carries right vision. Although to see the result, it is necessary to move beyond in-house development. " Res.7 also reaffirmed the role of the Rustaveli Foundation in research funding, as for the impact, the result could be a diverse performance, such as intellectual property, copyright, patent, trademark, know-how, design, and so on. According to the respondent, the outcome in terms of commercialization and patents is poor and less than they have expected, however, under the GENIE project, better results are anticipated. Besides, there are different procedures to apply for patents locally and internationally, and this latter is connected with high prices. In terms of impact, Res.7 reported, that it has been 2-3 years, since the Rustaveli Foundation funds project which involves international parties to strengthen cooperation, and a quite large number of publications have been produced, and this is consistent with the Scimago Journal statistics as well (see Graph 6).

In terms of stakeholder's roles, few external actors actively stimulate innovation and entrepreneurship among universities. Most of the respondents (Res.2, Res.3, Res.4, Res.6, Res.7, Res.14) referred to World Bank and British Council as interested parties in the ongoing processes. Res.11 and Res.12 illustrated British Council's stake, Creative Spark is 5 years initiative to support universities and institutional partnerships to develop entrepreneurial skills and a

creative economy across Central Asia and Ukraine. Res.11 explained that the rationale behind the program was to lessen the skills gap among the people who work for the creative industry and to strengthen international cooperation. Besides, Great Britain is one of the most entrepreneurial country initiated the project based on the needs, and the selected countries offer promising grounds. Res.11: "On the one hand, the aim is skills and institutional development, building close partnership among involved universities and third parties. On the other, support start-ups and raise awareness about Intellectual Property Rights." Respondents have underlined the importance of the creative industry and its contribution to the wider economy, which is still not well understood in Georgia, and mainly awareness comes from top-down initiatives.

Res.11 and Res.12 reported that an open call was announced for the selection of the participant under the "Creative Spark" program, and out of 30 applicants, 8 universities were selected. So far, the program has generated impact through several activities, for instance, the Academy of arts introduced four educational courses related to entrepreneurship on bachelor and master levels; Also, slowly opening up innovation or similar centers at universities, and "Enterprise Educators Georgia" to lobby and advocate entrepreneurial education was recently initiated, Big Idea Challenge tries to fund start-up ideas. Res.12: "As of today, there is an Entrepreneurial Education Alliance and it consists of the following universities: TSU, ISU, BTU, Academy of Arts, and Akaki Tsereteli State University. The next step is to have a sound legal framework." Res.11 noted that British Council has a facilitator role in this process. Res.4 also confirmed that universities are somewhat succeeding to implement entrepreneurial teaching and learning through competitions, hackathons, and integrating entrepreneurship in curriculums: "Under the Creative Spark, we [ISU] try to integrate tech entrepreneurship in STEM subjects and develop STEM-oriented courses. "

Res.11 stressed that BTU entrepreneurial center exhibited income earning opportunity and worked successfully with National Museum, which can be regarded as a good example. Res.11 reported: "Speaking of the impact, under this program, the communication between Ministry of Finance, Ministry of Economy and Sustainable Development and Ministry of Culture [currently Ministry of Culture is integrated with Ministry of Education and Science] has been encouraged, to consider art as a viable source for economic development." Res.6 highlighted that TSU has a high-tech fab lab, equipped with a web printer, laser cutter, and so on, intends to stimulate entrepreneurial activities and support researchers to develop prototypes. In addition, there is a special subject – practical entrepreneurship, in which students need to produce a product within the fab lab to get the credit. Although, as Res 6 explained, curriculums are not up to date regarding innovation and entrepreneurship.

Conducted interviews with different stakeholders reinforced the findings from the document analysis. The array of events and activities can be identified on national and institutional levels. It is evident that most of the initiatives are state-driven, but the explanation is embedded in the context as well, which was discussed at the beginning of the document analysis. Currently, governmental bodies remain the main drivers in the ecosystem development and the main funder of the R&D. Banking industry is mainly involved in financing start-ups, otherwise, SMEs do not seem to be strong enough to invest in R&D. Research universities see the need and exhibit

willingness to become major players in the knowledge-based economy. Although, they generate limited economic value and face diverse challenges that impede the process. Therefore, interview and document synthesis allow the conclusion, that the weak Triple Helix interaction is traceable, in which government dominates, industry and university are relatively passive players, but with potential to become fastest-growing segments in the innovation ecosystem. And it takes respective conditions to come to fruition and challenges must be eliminated.

5.2. Covid-19 disruption

Interestingly enough some of the participants referred to Covid-19 and the current global pandemic as an awakening force for the Georgian higher education system, in terms of innovation, technologies, and digitalization. Res.5 explained, that even though BTU was established quite recently, it always carried a strong vision and strategy towards technology, that influenced the management style. Subsequently, due to lean management, BTU adapted swiftly to online teaching and learning. It has to be mentioned that BTU is a private, a small university that accommodates up to 4000 students, hence these circumstances played their role in flexibility.

Res.1 also noted that due to the pandemic, universities start to think more about integrating innovation and technologies in educational processes. Furthermore, Covid-19 affected NCEQE's administrative procedures, for instance started to broadcast the authorization and accreditation councils' meetings through Zoom application, which is a big step forward as all interested parties could watch the discussion. Nevertheless, Res.1 also pointed out that the readiness and receptiveness even from the NCEQE personnel were quite low, which is connected to the values and risk-taking culture.

Res.14 reported that covid-19 put the educational system under the spotlight, as it was very challenging for the Ministry of Education and Science to handle the simultaneous digitalization for schools, vocation, and higher education institutions, which hitherto was running on offline interaction. Res.14 evaluated positively the response and facilitation process by the Ministry.

Res.6 underlined that for the KTI center, the pandemic halted some ongoing international projects, however, it positively affected the training and created a possibility to provide workshops for more people: "During face-to-face training, we could take around 30 participants due to limited physical capacity, now we can accept much more. Besides, it made it possible to leverage budget, the money for catering services was reallocated for other purposes."

Res.13 compared the pandemic-induced changes to a window of opportunity: "Covid-19 helped to tame the digitization between students and professors. Earlier, when I was teaching and advocating for distance learning, it was always problematic. Now, it became a part of normality, thus I see the possibilities for bottom-up approaches." Res.11 also underlined that pandemic influenced the "Creative Spark" program as well and encouraged to start "In-conversation sessions with entrepreneurs", which allows students to listen to various international speakers."

5.3. Respective Challenges

A broad spectrum of challenges has been identified through the document and interview analysis. Despite the stake and perspective, most of the challenges described by the participants intersect. Identified challenges need deconstruction to paint the holistic picture, thus they will be discussed from a broader, national scope to narrow institutional levels. This section answers the second research question. Most of the challenges described by participants correspond to the findings from the document analysis as well. All the challenges are interconnected and causal relationship with each other. Therefore, they are clustered under four umbrella terms: Context, Funding, STI management, and Legal & Procedural framework.

Table 3

Clustered themes of challenges. Developed by Author.

	Geography of HE/ Context	Funding	STI Management	Procedural Framework
Challenges	Post-Soviet Legacy	Low expenditure on R&D	Outdated infrastructure	Poor Data Governance
	Shift to the mindset	Lack of Business participation	Underemphasised Applied Research	Lack of Cross -sectoral collaboration
	Top - down approach	Financial autonomy and sustainability	Dispersed research capital	Inflexible procedures
	Risk-averse culture	Outdated Funding model	Vulnerable Merger	Legal Framework

5.3.1. Context

First comes the geography of higher education which lays the contextual underpinnings and triggers respective challenges. It has been underlined frequently that the post-soviet legacy played a major role in shaping the higher education and science landscape in Georgia. Consequently, the state has always proved to be a system-enabler and driver. Although since the Rose Revolution, the wave of New Public Management stretched in Georgia as well, the state remained and still is the leading agenda-setter. Therefore, the system of higher education and science has been no stranger to top-down and state-driven initiatives, which became a long-standing habit. Res.1 also referred to the matter of values and culture and noted that the Georgian

higher education community carries more risk-averse culture and value of receptiveness. Concerning geography and context, Res.5 underlined that research institutes as part of the post-soviet legacy remained separated and fully dependent on governmental funding: “Research institutes are not self-sustained, they always ask for more funding from the state, and I affirm, the funding is indeed limited. However, I have the counter-argument as well, what do they offer as a return on investment.”

Another problem related to the context is profitmaking and mental barriers. Res.5 also elaborated on the matter of values and academic culture: “Majority of the researcher is quite aged, who originally comes from soviet “school” and they are very respected and shrewd in their fields. Although, the problem is that during the Soviet Union, the commercialization of the research outcome was not a case. Soviet scientists had special state-induced objectives to solve, which were later applied by the state itself. When this model was disrupted, scientists faced confusion. Besides, commercialization and profitmaking are not easy skills or tasks, it takes a great deal of preparation and conditions in Georgia and elsewhere. “This narrative has been echoed and affirmed by other participants as well, Res.4 commented that entrepreneurship and commercialization stem from the USA, which recently has been introduced to Europe but have not developed in Georgia yet. One of the reasons which explain the situation is the mental barriers and the mindset: “Professors and researchers do not understand why they need to sell the ideas, or why applied research has become paramount when in their understanding all types of research are important and necessary.” Res.7 also underlined that mental barriers among researchers exist: “The acceptance and receptiveness of the terms among the older generation are limited, as research was not supposed to have a commercial effect during soviet periods. Nevertheless, a new generation is more oriented and curious to see this effect.”

Res.2 also underlined that problem is not only rooted in the mindset but rather a system level, vocational educational institutions used to be forbidden to carry out economic activities until 2018. This corresponds to a universal shift in the understanding that universities can be economic agents. Nevertheless, the literature review also highlighted that developed countries accepted this transformation decades ago, whereas developing ones are still in the process of familiarizing themselves. This aligns with Res.5’s situation analysis, that most of the state universities continue to be conservative in this regard. Res.7 confirmed that most of the funding from Rustaveli Foundation is allocated to basic research, and relatively less goes to applied research, hence, basic research remains a priority and high on the national agenda. This goes in line with the statistics from Graph 7 and leaves room for reflection. As Res.7 put it: “Competition for basic research is very high, everybody wants to participate. Last year, only 4 out of 120 applied research projects got funded. If we have more budget, we will be able to fund more. Limited budget encourages the high competition.”

Res.5 noted: “My personal experience of working in Rustaveli Foundation earlier, convinced me that only top-down approach is not enough, there is need for grassroots, bottom-up initiatives as well. For the innovation ecosystem, I see the urgency of consolidation between universities and science to solve specific problems. “Similar argument was developed by Res.4:” We have very good research potential in respect of human capital, but they do not have access to the relevant

problems." Besides, Res.4 and Res.5 both underlined that research potential in the country is scattered, and there is a lack of cooperation among universities and its researchers. In addition to top-down culture, Res.13 underscored, that currently innovation funder and the user is the state itself on behalf of its public agencies, which creates a monopoly on the market and depletes it from the competition. Therefore, Georgia needs to promote competition, public agencies should accept private services and outsourcing, the state should be a policymaker and not an administrator."

Res.4 mentioned that universities are not part of the policy-making process and do not have a " seat on the political table." That is why there are similar problems that it was 10 years ago:" State does not listen to the universities, and this is a system-wide problem." Res.4 referred to the formal and inconsistent policy-making process, which has been successfully applied in many fields and does not yield any tangible results. Due to this situation, the respondent explains why scientific priorities have not been defined in the country yet, Res.4: "Georgian National Academy of Science officially exists, but it is not active in practice, and when the state wants to determine the priorities, always approaches this academy, and consequently they have set 86 priorities which is unrealistic by all means. This also hinders situations when international partners want to collaborate and there is no prioritized direction. Rustaveli Foundation tried to solve the problem in 2019, gathered university representatives, and spent the whole day discussing and agree on priorities, however, brainstorming was in vain, we still have 86 priorities. Therefore, voices from the universities are not heard." Also, the respondent underscored, that state should not play favorites: "If you analyze recent history, it is easy to notice that different political parties showed favoritism towards different universities, which is indeed wrong." Res.1 exhibited a similar point and underlined that education must be independent of the ruling political party.

5.3.2. Funding

After context-induced challenges come the lack of R&D funding, which is a significant obstacle for ecosystem building and causes a plethora of implications. Similar to the findings from Bochorishvili and Peradze (2020), Res.4 confirmed that the existing student's voucher system (2500 GEL per student) is not accommodating the current needs, thus limited finances have a chain reaction on higher education institutions: "2500 GEL is insufficient especially for STEM fields, considering the laboratories it needs, not to mention the wages for the engineers. It is very hard to find professionals in the field of technology and engineering, who have a pivotal role in innovation. Besides, academia has been losing a competitive position with industry to scout for this type of personnel. Consequently, we are dependent on the grant projects." This comment raises the issues about financial autonomy and sustainability of the universities, particularly when diversification is problematic at this point. Res.4 also reported that ISU has targeted an annual budget for its research institutes, which is around 15-30 000 GEL, and this amount of money has minor importance in research development.

Financial scarcity is also connected to the fact that industry and business do not invest in higher education, hence the system is heavily dependent on the public purse and tuition fees, which

does not allow universities to spend unsparingly on research. Therefore, the public (Rustaveli Foundation, GITA) and international (World Bank, British Council) grants lubricate the research wheels in the country, which is still good to fertilize the ground and grant short-term stability, but not supportive of the consistency and sustainability. Furthermore, according to Res.4, this situation plays a hindering factor for universities to develop far-reaching and long-sighted R&D plans and strategies, as finances are unpredictable. Res.7 stated that the budget is indeed problematic, even though Rustaveli Foundation manages the budget, the priorities come from high-level groups with higher political weights.

According to Res.4 unlike the examples from the USA and Europe, Georgia does not have local businesses, which are oriented to produce new products, rather most of the companies use the existing technologies to run. Thus, they do not need students and professors from academia to develop new products, dissimilar to Google, Facebook, and so on. Besides, only two companies are working in the field of technology and engineering: State Military Scientific-Technical Center – DELTA, and EMCoS, hence the expectation from the industry to be more integrated are low. Res.5 also noted: "the business sector is more conservative than innovative in Georgia, and it adapts slowly, however, GITA is trying to boost start-up sector and promote innovative niche markets. Business needs to be aware, that by investing in research for specific purposes, is a financially cost-effective process. " Similar to these abovementioned comments, Res.3 from GITA confirmed that Georgia does not have big corporations and related job opportunities, so the sector is mainly represented by small and medium businesses. Consequently, their participation in R&D is insignificant. Nevertheless, GITA promotes share-funding policy and within the past 2 years, Georgian start-ups managed to get funding up to 30 Mn GEL from the private sector, and this is a positive trend-worthy to hold on to.

Overall financial challenges affect universities' internal expenditure as well, not only on research per se, but the auxiliary offices and units, such as technology transfer and commercialization centers. Res.4 noted that one of the difficulties to sustain such offices is the flux of seed money, which is not always a case. Besides, Res.6 reported, that TSU's KTI center does have an annual budget, although this does not cover seed money and it is not targeted, thus the autonomy for budget disposal is limited and undergoes multiple formal procedures. In general, inflexibility and stiff procedural requirements have been identified as a challenge by some participants and will be discussed further. According to Res.2, the funding model for higher education is expected to change, although discussions about it continue the past 5 years.

5.3.3. STI Management

One of the implications of financial problems leads to infrastructure, which has been identified as a drastic problem by all respondents and the document analysis. Res.4 commented that decent research laboratories are paramount to conduct high-quality research, especially in the STEM fields, infrastructural materials are quite high-priced. As Res.4 put it: "There are some grants targeted for the commercialization of the research, but this is less relevant for the scientists at this moment, the baseline is to have the decent infrastructure. As for the international projects,

which bring a large amount of money, evaluating things from European standpoints. They are oriented on commercialization, while unlike to Europe, in Georgia the basic need still is decent, functioning infrastructure."

Res.7 underlined that one of the major challenges is material-technical resources: "Good innovation takes good technical infrastructure, just walls are hardly enough. Modern equipment is a necessity, which is again connected with a budget, thus, the problem is complex. I still believe in top-down initiatives, if there are willingness and vision from high-level groups, Rustaveli Foundation will be able to perhaps fund infrastructure or innovation-oriented educational programs."

Res.6 also confirmed that from the KTI center's perspective, when they analyzed the needs of the scientists, outdated equipment, in research laboratories and institutes, was recognized as a major problem: "Scientists are not able to conduct research properly due to the existing infrastructure. Sadly, our center [KTI] does not have the budget to cover material resources." Res.14 reported that the Ministry of Education and Science has several projects to finance infrastructure, thus development for the university and research institute's infrastructure has been started. Special agency – LEPL Educational and Scientific Infrastructure Development operates and is accountable to Ministry. Yet, infrastructure remains a major hindrance to building an innovation ecosystem.

Another challenge pointed out by the participants and document analysis is capacity building, which is driven by cooperation and not by competition. University representatives Res.4 and Res.5, both stressed that competition among universities and academicians is quite significant, and this causes some serious problems for Georgia, in which research capital is limited and scattered. As Res.4 put it: "Universities in Georgia do not consider themselves as members of one united area, but rather the competitors and hinder each other's development." A similar comment was provided by Res.5: "Our problem is following, due to the competition the universities are dispersed, competition goes beyond students or academic programs, and reaches the science as well. And this does not make sense for a small country like ours, we will not be able to get synergy unless we come together and cooperate. That is why I believe in the consolidation of the research capital." Another factor that exacerbates the situation is the overall research capital, as Res.4 and Res.13 highlighted, mainly research is done in public universities (but not exclusively depending on the capacity), due to the funding and affiliated human resources.

This challenge has multi tiers and represents a more complex issue than it looks and goes back to the soviet legacy. As it was discussed above, research institutes and universities have been merged quite recently, thus rehabilitation is still a vulnerable process. Therefore, consolidation is necessary at the same time on institutional levels and then on national levels. Concerning capacity building, the issue of brain drain was underlined. Res.4 connected this problem with improper public spending with good cause mainly when public agencies bring international experts who do not know the context well and a quite big chunk of money is paid for this service: "Georgia has significant brain drain problem, only I know at least 20 Georgian engineers from Silicon Valley, and instead for seeking international expertise this money could be used for

bringing back Georgian experts and circulating brain gain." Brain drain deserves attention from policymakers, as it could really have an impact on ecosystem building.

Res.6 underlined the related problem from a different perspective, KTI center which belongs to the oldest and largest university in Georgia, employs only three people, which is not an adequate human resource. Furthermore, Res.6 added that they cannot conduct follow-up research and measure the impact of the center, only final reports are published annually. Regarding commercialization centers, Res. 5 highlighted that most of the centers at universities represent formal centers, and it is crucial to have employees with special skills "If it was up to me, I would hire people who are experienced in marketing, PR, business, the ones who are oriented on commercialization and can the sell the products. Technology transfer and commercialization centers need to be proactive, to define the weak and strong sides of the university capital, and to enhance the promising ones. Thus, until we reach this point, the cycle will continue to be unproductive."

Also, concerning capacity building, it is interesting to touch the following issue. The rationale behind GITA's initiative to run a centralized technology transfer office holds some degree of truth. Research and scientific capital in Georgia are spread out, the merging matter between universities and research institutes is still not well oiled, and the overall system lacks myriad resources. Hence, a centralized technology transfer center can better generate synergy. Nevertheless, in this developed reasoning one significant piece is missing which is creating precedents, institutional memory, and collective learning, in a given context GITA becomes driver and collector of the tech transfer experience, while universities keep being reactive interested parties in the process and not the proactive ones. Thus, this model does not stimulate capacity building for universities, rather governmental unit becomes the center of gravity. Similar to Res.13's comment, the concentration of the resources and knowledge under one entity will deplete the blanket university capital in the country to grow powerful.

5.3.4. Legal & Procedural Framework

Rules and regulations have a significant contribution to ecosystem building, thus related challenges can be seen from a different perspective: 1. The need for flexible procedures; 2. The call for robust data governance; 3. The room for incentivizing and legal amendments.

Res.4 shared the experience about the applied research grant applications process: "Rustaveli Foundation has unreasonable requirements. For instance, I wanted to spend the grant money on the laboratory, but they did not approve due to the inflexible system. Another problem is that applications are written by lawyers and not the who know the specifics of STEM and applied research. They are oriented on formal assessment, to tick the criteria, and does not focus on the actual result itself." Res.4 also reported that the procurement process is complicated and does not allow flexibility in the research process, mainly this problem is noticeable about public agencies and public universities, complicated procedures impede research and put some degree of bureaucracy on it. Res.2 confirmed that procurement procedure for public institutions is burdensome: "Procurement legislation hinders public institutions to be more independent and

implement innovation. Each submitted tender to buy a computer might last several months and, in the end, it might fail. The initial purpose to introduce tender was to battle the corruption, but as of today, there must be other solution."

Several participants underlined the importance of incentivizing industry through regulations to invest in R&D. Res.12 noted that eventually to attract business as an R&D funder, there must be some regulations or deregulations adopted, and one option could be the law on Philanthropy and Charity. A similar comment was made by Res.2 who underscored that state needs to have a special policy to incentivize industry and university collaboration based on mutual benefits.

Lack of data and poor data governance have been identified during the data collection process. Res 1. explained that universities' public engagement is not evaluated, and data is not available. Res.4 approached this issue from a different perspective, and underscored, that mapping of the national-wide situation is missing, and most importantly measuring the impact. As Res.4 noted: "We need to have impact analysis, how much money do we spend and what is the outcome of it."

Regarding the creative industry, Res.11 and Res.12 reported that there is a serious lack of studies and hard data, especially coding is missing to distinguish the share of the creative economy to the total income. In general, there is no united platform, unit, or agency which synchronizes the data about higher education and science. Information is scattered on institutional and national levels; thus, it leads to the impression that data governance is not in a place and decisions are not guided or supported by data.

5.4. HEInnovate

The third research question about HEInnovate intended to probe the grounds whether or not introducing the tool could contribute to the institutional development of the universities. For this purpose, in addition to Georgian respondents, international experts were interviewed as well. The given answers unfold very interesting patterns, almost all participants from Georgia welcomed the idea of using the tool for mapping institutional potential, however, international respondents, on the other hand, reserved judgment.

To begin with, almost the majority of the respondents from Georgia did not have prior knowledge about the HEInnovate tool. All university respondents agreed that institutional mapping, to identify strengths, weakness and its societal standing, is crucial and supports strategy development. Res.4 noted that this tool could be especially helpful to assess research institutes and shed light on related challenges. A similar tendency was pointed by the representatives of the governmental bodies. Res.3 underscored, that Georgian universities should be more socially engaged and aligned to the current needs, thus tools like HEInnovate could indeed play a positive part in ecosystem development. Res.14 underlined that all types of tools, that could help universities for institutional diagnosis and better societal positioning, should be encouraged.

As for the HEInnovate dimensions, Res.1 highlighted that this tool is a good possibility for self-assessment, although the Georgian context is relatively different and carries some specifics: "Public universities are not flexible, and in general higher education system is not autonomous.

"Besides, Res.1 and Res.2 both agreed that even though the authorization standards require higher education institutions to have diversified funding sources, in practice it is not a case, universities live on students' tuition." Therefore, financial autonomy is also questionable. Res.1 and Res.2 underscored that the progress regarding entrepreneurial teaching and learning is more tangible, and additionally various centers like fab labs, accelerators, and innovation centers have been opening up. Nevertheless, Res.1 noted that auxiliary centers will not build the system alone, but rather professors should promote an entrepreneurial mindset. Res.6 also pointed out that not all HEInnovate dimensions are relevant for the Georgian context, but they can be tailored as most of the practices are in place.

Res.10 outlined that European Commission and OECD introduced HEInnovate with joint effort in 2013 to emphasize the role of higher education institutions as a potential powerhouse in innovation and entrepreneurship. Besides, Res.10 explained that quite often policy domains do not interconnect, a policy of innovation or regional development does not necessarily relate to the policy of higher education, that is why it is important to put it on a political agenda: "Policy frameworks are weak generating complementarities. Geography of higher education plays a big role as well; innovative regions are good generating innovative universities because they put a lot of money." HEInnovate has eight dimensions, which holistically assess the innovative and entrepreneurial capacity of the university, and as Res.10 put it. HEInnovate was developed in Europe, so it carries European characteristics, and implementing it into developing country context might not work, unless it is customized to the context.

Res.8 coordinated the Austrian HEInnovate country review and narrated the personal experience:" We (Austria) are a small country, we have many small and medium enterprises, and some large companies. Teaching and research have become more and more important, universities are involved to implement innovation. Therefore, I think HEInnovate is a very important tool to build up and raise awareness." Respondent also underlined that HEInnovate is self-assessment, and not for evaluation, and working on Austrian country review, some challenges were connected to the dimensions, as they did not apply to the context.

Related comment from Res.9 carried some skeptical overtone about using HEInnovate in Georgian context: "I am not a big fan of online tools, like HEInnovate, I think they are rigid and presuppose, while the whole idea of the ecosystem is that you go and start with who you are, where you are and with a cultural element. I do not know Georgian context, but I think you have to find a Georgian way of doing things, find the way that suits you." All international respondents emphasized that copy-paste approach seldom works, and it has to be well aligned to the context and culture.

5.5. Summery

In reviewing the literature, several theories and concepts have been highlighted, such as Triple Helix theory (Etzokiwtz & Leyderstorff, 2000) and its application to stimulate innovation on national levels, Mode 2 research (Gibbons et al., 1994) to sync society and science, and Clark's Entrepreneurial University which often is used to explore the entrepreneurial capacity of higher

education institutions. The results suggest that none of these concepts seem to be relevant at present. Nevertheless, the weak interaction among state, university, and industry implies that Triple Helix application at initial state is present. And for what it is worth, innovation and entrepreneurship are held in high esteem, at least on paper.

The first research questioned intended to shed a light on the current situation regarding innovation and entrepreneurship. Extensive document and interview analysis prove that innovation has been recently regarded as an important political domain. Thus, it can be summarized that innovation and the entrepreneurial ecosystem are at a rudimentary stage, but it exhibits potential for becoming a fast-growing segment. The willingness from the state is declared through different strategy papers, although a tangible plan is missing. Therefore, recommendations will try to pave the way for better decision making, otherwise the system might keep running in circles. As for the universities, due to the abovementioned factors, they have a long way ahead to position as flagships for economic development. Nevertheless, strengthening the focus on applied research, both from funding donors and universities, could be a great starting point for societal engagement. Regarding the concept of "Entrepreneurial University", higher education institutions lack the capacity for managerial steering, especially public universities; funding base is not yet diversified, although entrepreneurial teaching and learning have started to be integrated into curricula, and auxiliary centers are opening up which will affect the entrepreneurial culture eventually.

The second research question aimed to probe the challenges for Georgian higher education institutions to innovate and pursue entrepreneurship. Similar challenges were reported from the documents and interview analysis. Overall, the results indicate that there is a logical sequence among the identified challenges, which were clustered together under four umbrella terms: Context, Funding, STI management, and Legal & Procedural framework. They are all interconnected and most of them are mutually inclusive for the system. Hence, it is important to take measures holistically, especially when existing challenges are not brand new.

The third research question tried to examine grounds to introduce HEInnovate tool for institutional development. Two divergent discourses emerged from Georgian and international respondents. The former welcomed the idea of using the tool for assessing and mapping institutional capacity, while the latter seemed more reluctant and emphasized the power of context and culture in building and accelerating the ecosystem. Although all participants agreed that online tool application in different context takes a great deal of tailoring and customization.

As a bottom line, the study did not focus on pandemic and its ramifications on Georgian higher education per se, although participants referred to it. Despite the plethora of problems and footprint Covid-19 brought (access to the internet, access to equipment, adaptation, and so on), its disruption can be seen as a silver lining to shift the mindset and to domesticate concepts, such as innovation, digitalization, distance learning, and so on.

Chapter 6

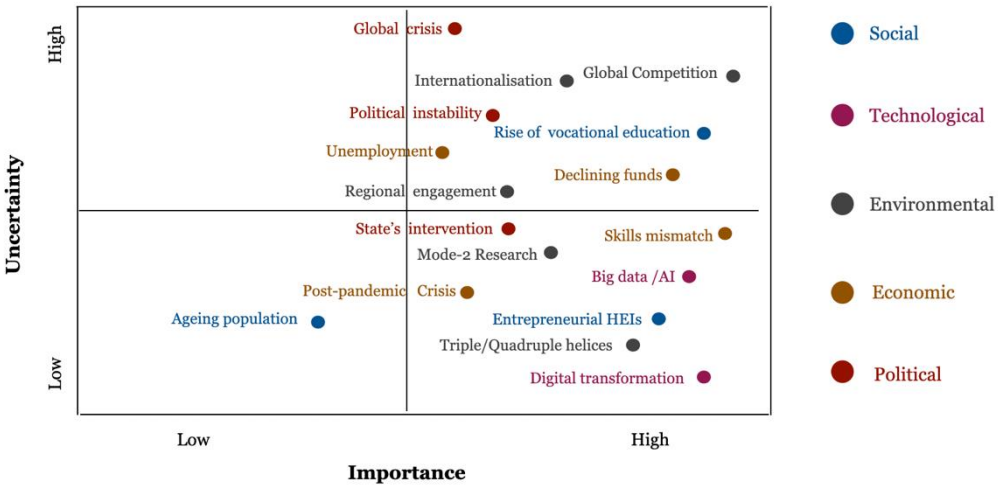
6.1. Scenario Propositions

This section tries to analyze the research findings from a foresight perspective and to lay the foundation for the recommendations. The purpose of using the scenario is twofold: 1. It helps the researcher to explore and supports the process of crafting the recommendations; 2. Secondly, it aims at strengthening public discourse about the future of Georgian HEIs and generate discussion among various stakeholders. The researcher took inspiration from Schoemaker's (1995), O'Brien's (2003), and Iversen's (2006) guiding principles to construct scenarios. The scenario approach is used as a novel way to make a creative and sound transition to the recommendation, therefore in this case it is seen as the means to the end. Besides, the researcher took the opportunity of having diverse respondents and different stances around subjects. The scenarios have exploratory nature and meet the following set of criteria: plausible, relevant, divergent, and challenging (Iversen, 2006).

From literature, document, and interview analysis, several influencing trends and present challenges have been identified, which are context-sensitive. The researcher took the liberty to use the key trends and factors to categorize according to STEEP (social, technological, environmental, economic, political) and then applied to the uncertainty/importance matrix. The scope of the scenarios is the *Georgian higher education context by 2035* in regard to innovation and entrepreneurship, thus the time frame is 15 years from now.

Table 4

Uncertainty/Importance matrix, developed by Author



It has to be underlined once again, that steps and principles of constructing scenarios were customized to fit the purpose of the paper. Thus, consolidation and prioritization of the trends were managed intuitively by the researcher. As Table 4 shows there are several trends illustrated, for prioritizing cross-impact analysis technique was deployed. Consequently, the three highest-scoring factors were selected as themes: "Entrepreneurial HEIs, Triple/Quadruple helices, Digital transformation", all of them are characterized as low uncertainty and a high degree of importance. Based on these trends and country context, three scenarios were constructed: 1. Fast & Furious; 2. The entrepreneurial Gambit; 3. False Positive.

- **Scenario I – "Fast & Furious"**

The Georgian higher education context is adapted and responsive to external trends, the state's intervention is decreased significantly, and universities have been granted greater autonomy. More financial and managerial freedom allows universities to engage with various stakeholders and to co-create with industry, mutual trust is restored, and silos are broken. Digitalization in teaching and research is full-fledged, which leads to remarkable digital HEI presence and facilitates international cooperation. Besides, learning analytics and data become powerful tools for creating sound national and institutional memory. Georgian universities are recognized as entrepreneurial and innovative institutions, they have expressed exceptional fast pace of transformation past 15 years. The patent application and invention have increased in Georgia, applied and problem-based research has become pivotal, science serves the society. Georgian innovation and entrepreneurial ecosystem are claimed as fast-growing and exemplary in the region. The innovative fusion is inclusive and non-linear, the government, universities, industry, and society leverage synergies as a symbiotic organism, each party is heard and deemed critical. The knowledge is permeated through society and beyond.

- **Scenario II – "The entrepreneurial Gambit "**

The state puts universities high on the political agenda and their integration in innovation and entrepreneurial ecosystem. To increase the HEI engagement in this ecosystem, the state recognizes the need to scan the environment and assess the institutional capacity. Besides, the state moves strategically and scarifies its interventional role into a facilitator for the sake of university resilience and country development. Georgian and international experts are invited to customize the HEInnovate tool to explore the existing capacity within the universities, this process involves multi-stakeholder dialogue to make it as inclusive as possible. Based on the outcome, a special action plan is developed to support universities' transition into the entrepreneurial phase, an action plan is accepted and shared by respective parties, research management techniques are in place. Eventually, HEIs take ownership of the knowledge transfer process, digitalization and blending learning become normal. As for the science, cross-sectoral collaboration and co-creation are promoted and supported by various institutions, interdisciplinary and transdisciplinary networks are appearing. Georgian innovation and

entrepreneurial ecosystem exhibit a promising pace characterized by a "speed, not haste" approach. HEIs start to become regionally engaged, societally reflexive and accountable.

- **Scenario III – "False Positive "**

The situation becomes static and continues the same cycle as it was in 2020. The state still declares innovation and entrepreneurship as high priority, demonstrates commitment, and keeps investing in education, science and start-ups separately, without clear linkages and complementarities. The lack of resources fuels the resource dependence relationship, competition remains strong among universities and academicians. HEIs' transformation happens slowly and unsystematically; only some universities manage in-house developments and are involved in entrepreneurial activities. Digitalization became familiar, although most universities have returned to the onsite and traditional mode of teaching in the post-pandemic era. Poor research infrastructure is still a pending issue and heavily affects on the research process. The HEI capacity has not been studied, neither is the R&D situation in the country, thus, information is still sporadic and systematic data is missing. The connection and partnership between industry and universities remain feeble. The state continues to be the sole architect of policy and finances, universities' autonomy has not increased, legal and contextual barriers persist, and top-down tensions prevail. Although the slow progress and linear innovation are noticeable.

Table 5

Scenario assessment, developed by Author

Scenarios	Relevant	Plausible	Consistent
Most	The Entrepreneurial Gambit	False Positive	False Positive
	Fast & Furious	The Entrepreneurial Gambit	The Entrepreneurial Gambit
Least	False Positive	Fast & Furious	Fast & Furious

The above-constructed scenarios present three divergent futures for the Georgian HE context concerning innovation and entrepreneurship. Table 5 above assesses each of them according to their degree of relevance, plausibility, and (external) consistency. "Fast & Furious" is the least plausible yet relevant scenario for Georgia, "False Positive" is the least desirable, but realistic. "False Positive" intends to foreshadow the audience as there is a good chance to lean to it. The sweet spot of this particular scenario is the false impression of the functional ecosystem, as in

reality, it does not yield tangible output due to the linearity and lack of interaction. "The entrepreneurial Gambit" is foreseen as a preferable pathway Georgia could embark on with the right vision and management, it carries a high degree of relevance and a medium degree of plausibility/consistency. Although scenarios are different and meet the criteria to varying degrees, each scenario has its internal logic.

6.2. Recommendations

Systemizing and organizing the results from the document, interview and scenario analysis, provide insights and helps to craft the conclusion and propose relevant recommendations. It is evident that at the minimum the idea of innovation and entrepreneurship looms large on the national agenda, although it lacks the build-up. This study intends to serve as the basis for policy discussion in Georgia, thus offered recommendations exhibit the synthesis of identified challenges and resources and try to look at the status quo from a different perspective. Besides, the given recommendation builds on "The Entrepreneurial Gambit" scenario, as the researcher believes that with the right vision and commitment, Georgia can demonstrate rapid acceleration and progress, as once it happened 15 years ago.

The recommendations below are not a one-time remedy for building innovation and entrepreneurial ecosystem, however, it aims to fuel the already started process. Therefore, this section of the study does not attempt to invent the wheels, rather lubricate and complement existing ones for better capacity building. All the recommendations below are inter-connected and overarching.

6.2.1. Recommendation I: Joint Application

Background*:* Georgian policy and strategy making could use a nudge, to see the missing pieces in the process. Currently, policymaking is characterized by vertical nature, in which governmental vision for economic development, innovation, higher education, and science do not communicate, consequently, synergy is missing. Thus, the joint application offers a way for horizontal policymaking, to unite capacity and orchestrate cross-sectoral cooperation, on national and institutional levels. In this model, the government's strategic role is emphasized. It combines top-down and bottom-up approaches and stimulates in-between convergence. Campbell and Pantelic (2020) used innovation of joint applications originally concerning academia and explained as the process when more than one person applies for the positions in the higher education institutions, and positions could be split to strengthen complementarity, interdisciplinarity, and networking capabilities. Besides, it is elaborated in the article, that Joint application is not restricted to the academic sector, thus this study applies innovation of joint application, as cross-sectoral complementarity.

Rationale: Joint application refers to establish the multi ministerial table and stimulate policy dialogue, the government has its overall strategy, although it does not have a separate strategy that focuses on innovation explicitly and clustered policy initiatives in thematic areas. Thus, it is recommended to draft the paper which works on the strategy, which emphasizes the need for industry, higher education, economy, and society. This also corresponds to the Quadruple Helix concept. This way, the lack of cross-sectoral cooperation will be solved, and consistency of policymaking will be guaranteed. The first step should be to set up the task force which would connect people from different policy domains, so it will not stay the formal union and it will be accountable towards the multi ministerial assembly.

Activities for policymakers: Joint application will be advised for working on the legal and procedural framework. There is a need for legal amendments and revaluation of the procedures to customize better to the beneficiaries. This study was not set out specifically to propose the legal revision, nor the questions focused on this direction, however, the respondents expressed the necessity. Thus, this section will not recommend the exact changes, although multi ministerial assembly should sit and define what would work better for the ecosystem. Besides, incentives should relate to various interested parties: researchers, universities, and business representatives. Especially for researchers, as it seems that basic research represents more of academic culture in Georgia, it would be great if there will be some incentives embedded in the research assessment, so the researcher's motivation will be sound. This also relates to the new funding model, which will be introduced, in which it is crucial to entail recognition of the researchers who work on problem-based research and do not necessarily publish on high-impact journals, so they are valued and get credit for societal engagement. The stimulus should be connected with tangible career advancement.

Even though, one of the participants noted that the state has to back down from being the administrator and facilitator of the process, the circumstances and the context points to the opposite. Top-down initiatives must continue to the extent it is necessary for ecosystem building, expenditure on R&D has to be strengthened. As the state remains to be the prime R&D funder, its withdrawal can drastically damage the process. Meanwhile, industry and business should be incentivized to invest in R&D and collaborate.

6.2.2. Recommendation II: Network Governance

Rationale: Network Governance is recommended to apply both on national and institutional levels to maximize the result and capitalize on existing resources. Ferlie et al., (2009, p.24) described Network Governance between HE institutions and other social actors, aiming at developing self-steering and self-organizing capacity, to joint problem solving, organizational learning, and dissemination of 'good practices.' In this scenario, it is believed that Network Governance can be used to orchestrate knowledge production better. This model emphasizes the state's role as a facilitator. Despite the challenges, Georgia has good research capital, and if there is enough funding and decent infrastructure then the output could be significant. The funding has to increase, and stating this fact is hardly news, therefore in a given scenario, it is expected

that eventually, funding will grow, especially as the current discourse relates to the new funding model. Nevertheless, only better funding conditions will not yield a better output, if the infrastructure stays the same and if applied research keeps remaining underemphasized. The best option is to renew laboratories and facilities for each (public) university, which is unrealistic in the immediate future, given the state capacity. Therefore, the optimal solution is to create the shared laboratories and facilities with high-tech equipment, it should be a well-thought-out co-creation space that enables the scientist to embark on the innovations. And this option does not imply that the existing infrastructure for the universities should not be improved or upgraded, rather they are mutually exclusive.

Activities for policymakers: Network Governance could be manifested through interdisciplinary and transdisciplinary research projects, which will be based on the societal challenges and will try to meet the existing needs. Interdisciplinary research projects should recruit researchers from different universities, which will facilitate the cooperation and consolidation among them, especially among STEM and Art oriented universities to strengthen STEAM collaboration. As for the transdisciplinary research projects, it will unity not only researchers but representatives from industry, business, and non-governmental organizations. Through this type of research network project, contact with the ministerial task force will be maintained to stay in line with national priorities. Although, this interaction requires a delicate balance, between academic autonomy and national agendas. The added value of this type of governance will be to enhance collective learning and experience, so the expertise will not be concentrated under one university or research unit. This will be an attempt to rehabilitate the merger process and turn overall competition into cooperation, although subtly promote healthy competition among research networks. Besides, these research networks will have access to the shared laboratories and infrastructure, for co-creation.

Network governance should be applied for the potential project-based collaboration between GITA and Rustaveli Foundation, these two governmental institutions play a crucial role in research and innovation. Based on the interviews and documents, they seemed siloed from each other and they have divided the tasks and responsibilities between themselves, in which innovation is GITA's responsibility, and research is under the auspices of Rustaveli Foundation. They both have their own, quite significant budget, so it could be more synergetic to unite forces and finances for the special project regarding research and innovation. For starting it could be a pilot version, and then it can develop as a separated funding framework, with a special focus on interdisciplinary, transdisciplinary research and non-linear innovation.

Activities for university practitioners: Interdisciplinary networks should be developed also on an institutional level, and can be guided by clustered themes, which will bring together researchers from different disciplines. This will navigate research capital and support the merger issue on research-intensive universities. This recommendation will be beneficial for the teaching and learning domain, as students will actively engage in the research project and knowledge production, besides it could spark an interest in science among students.

6.2.3. Recommendation III: Seat at the table.

Rationale: The third recommendation derives from the first one while emphasizing the importance of participatory policymaking. The term itself is taken from Webber's (2018) article regarding the involvement of institutional research in the decision-making process. Conducted interviews with university representatives proved that they acknowledge the capacity, needs and possibilities of their universities and the system in general, thus they are important actors, and interested parties. So far, their involvement seems to be ineffective and inconsistent. Therefore, universities' representatives are competent to take part in high-level discussions and meetings, such as drafting strategy, policy, and national priorities. In addition to the overall purpose, "Seat at the table" tries to encourage grass-root initiatives and a bottom-up approach, which will be the step towards the higher autonomy of universities. Active role in the policymaking and planning processes will eventually affect the ownership from the universities' side. This recommendation refers to the proactive role of the universities in terms of business collaboration, some factors require governmental intervention, but some of the collaborations and initiatives should be university-driven as well. As Georgia does not have large industries and mainly consists of small and medium-sized businesses, it is less expected that business will make the first step unless there are some tangible incentives. Meanwhile, universities can invite business stakeholders and offer different types of partnerships.

Activities for policymakers: To facilitate inclusive participatory decision making two options can be offered: 1. To set up an online platform, which facilitates the feedbacking process. So, all interested parties will have a chance to give ideas, recommendations, and suggestions on policy drafts. This will promote transparency, accountability, and inclusiveness; 2. The second option is less inclusive but intends to invite university representatives at multi ministerial tables, so they could participate in real-time meetings. The integral element of this process is accountability and outcome, and not the gathering itself. The slippery slope in this scenario is follow-up and result, if university representatives do not see the consequence, they will stop participating. Thus, their participation should be documented and accessible publicly, so policymakers feel accountable and university representatives have political leverage.

Activities for the university practitioners: Universities' proactive role is important to connect higher education to the need of the labor market, so universities produce relevant human capital. For this purpose, collaboration with business is crucial. At the beginning stage, higher education institutions could initiative a university-business forum or alliance, whereas they could come together to solve problems and balance the supply-demand disparity.

6.2.4. Recommendation IV: Championing Open Science

Background: This recommendation develops from already ongoing activities here and there, thus promotion of Science must continue. For this purpose, Georgian success cases have to be highlighted and stories about local champions have to be told when it comes to innovation, science, and entrepreneurship. This should aim at distance brain circulation and the involvement of the Georgian scientist and researchers who work internationally. Georgian scientists from

abroad could be invited to take part in research collaboration. Apart from Georgian researchers, the engagement of international researchers will have a positive impact on capacity building. Internationalization and international partnership are already deemed important for the Georgian higher education context, however, focus on common projects could promote boundless research. Also, several respondents alluded that sharing success stories will contribute to awareness building and lobbying. Besides, as was illustrated earlier, the majority of researchers are aging, so it is important to captivate the young generation. This recommendation relates to the STEM promotion in the school, which was highlighted by the majority of the participants, and the rationale derives from the fact that student's distribution to the STEM fields is still relatively low. Research networks will be able to host and invite school students to shared laboratories, where the innovation will be invented, so the students can see how the process works behind the black box.

Rationale: Championing the science should concentrate on applied research and spotlight it on the national agenda, which will eventually spark interest on university levels once there will be an explicit demand. Especially during a pandemic, it has been proved that R&D represents a crucial element for a country's development and fostering innovation dynamics, thus, apart from funding, applied research should be stimulated. Currently, the awareness about innovation and entrepreneurship has been started in Georgia but it needs to move to the next phase, in which capacity building should focus on the acceleration process. Things are in place, entrepreneurship and profitmaking are not traits for the researcher, rather the skill that can be developed on the way to the degree it is aligned with the values and interests of the researchers and the university itself. And even though it is not a trait, it has hereditary features and power from one generation to another, once the institutional memory is built.

Activities for university representatives: For research-intensive universities, it is important to declare commitment towards innovation and entrepreneurship through strategic vision and action plan. Even though having a vision does not lead to institutional transformation, innovation and entrepreneurship have to be lived in practice. Nevertheless, strategic orientation is a step closer.

Activities for policymakers: The research support process is crucial, usually universities have specially designated units for this purpose, although as human and financial capacity is limited at this point, it should be taken care from the state. Researchers and university representatives must be trained in terms of legal issues, intellectual property, guidelines should be developed for data policies, the collection, and processing of the data. What is important here is to disseminate knowledge among universities and promote a culture for in-house research management. In the beginning, it could be a state-driven initiative and facilitated by Rustaveli Foundation, but eventually, institutional memory should be built.

6.2.5. Recommendation V: Plea for Data-informed Governance

Data governance is poor regarding the higher education sector, and that relates not only to the national context but also to the institutional one. On the national level, the data is scattered

among various governmental agencies; therefore, it complicates the data mining process. Considering the 21st century and modern technologies, the value for data to use for decision making, it is highly recommended to build a robust system that unifies the data from secondary, vocational, and higher education. Data-Informed Decision Making (Webber & Zhang, 2020) has been adopted lately and it looks at the data as one of the tools to get evidence and provide strategy, so data is guiding and auxiliary. This type of intervention will be beneficial for multiple actors, for the decision-makers, to be informed while working on the strategy and based their argument on actual evidence. For the university representatives, and stakeholders who want to be aware of how the system is running. This initiative can be easily started from the state, as first place it is the state's responsibility to have a full-fledged data system, and later it will be a good example for the universities to start building their data governance system.

Activities for policymakers: This way it will be possible to consolidate the information about multiple issues and in the future, it will give the possibility to be used for foresight. Technically, the first and easiest step will be to set up the unit under the Ministry of Education and Science, as they can lawfully gather the data respective of the students, academic staff, research and third mission activities, and so on. Thus, the first phase will be gathering and classification of the data, so it can be accessed online for all stakeholders. Later, in a best-case scenario, it can develop as a separated *Intelligence Unit* that will go beyond data gathering and starts analyzing, researching, and projecting. Consequently, high-level decisions will be data and evidence-informed, this platform will allow multiple stakeholders to plan and forecast for their good. This type of unit can be a good precedent for public administration. It has to be mentioned that there are some agencies and the national statistics office of Georgia, and at first sight, it might raise questions about redundancy, but they do not carry the idea of forecasting, data mining, and future scanning. The unit will be cost-effective as it doesn't require to be large but rather staffed with data scientists and educational researchers. And at last, it can provide services for the universities in the beginning, although, the ideal would be to delegate and support data-governance at institutional levels.

Activities for university representatives: this recommendation calls for attention in connection with data collection, universities need to develop the culture of gathering and using the information for institutional development. Right now, authorization and accreditation standards demand data collection and its utilization, although this process remains formal and schematic. Collecting and disseminating the knowledge of how information can be used for strategic foresight, can serve as a turnaround in this matter. The universities are a natural hotbed for big data as higher education is a human-rich system, built and driven by people. As time goes by, data becomes more powerful and pivotal. Therefore, Institutional Intel as a potential data powerhouse could be a good start to distribute experience among universities, so it will sink in eventually, and not be forced upon.

6.3. Suggestions for further research

The study intended to cast light on innovation and the entrepreneurial ecosystem in the Georgian higher education context. The researcher believes that in given context and capacity, the study gathered quite significant information. Although, the interesting observation from the researcher is that more respondents she interviewed, more information was coming up on the surface, which was not apparent from the start. That leads to the importance of the holistic review of the national situation. To have a practical guide to building innovation and an entrepreneurial ecosystem, there has to be a clear account of the status quo.

It is believed that this study could serve as the basis for policy discussion and future inquiry, but it is not enough to pave the way for radical changes. The researcher tried to connect the dots from governmental agencies and universities, however as it was stated under the limitations, the sample was not large to generalize findings in terms of university. Besides, the study did not involve representatives of small and medium-sized enterprises. It is deemed critical to study the current R&D context which illustrates the strengths and weaknesses of the respective sectors and enables further development. The ways to conduct the survey and explore the pathways could be different and heterogeneous, for universities HEInnovate tool could be customized and relevant dimensions selected to assess the baseline among all universities. Besides, UNESCO's practical guide can be adapted to survey R&D. There are multiple ways to review the context if there is a will to do so.

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Annex I

Consent Form English

CONSENT FORM

Nino Popkhadze

Master Thesis Research

Danube University Krems / Tampere University

Thesis Title: "*Exploring Pathways to Innovation and Entrepreneurship in Georgian Higher Education Context*"

1. **What is the purpose of the study?** The purpose of the study has twofold nature, the first one is to shed light on innovative and entrepreneurial activities in Georgian higher education context. And, the second one is to bring forward discussion by conducting feasibility study to trace existing potential and respective challenges in Georgia. For this purpose, special attention will be paid to inquiry how HEInnovate[1] tool can be tailored for Georgian higher education context.

2. **How was I chosen?** The researcher made the selection of the participants based on purposive sampling design. The main criterion was to find information-rich respondent in the field of entrepreneurship and innovation from respective universities or agency, who will be able to provide relevant information or has a professional stake in ongoing processes regarding the context.

3. **What will be involved in participating?** The researcher will arrange to interview you online (face to face interview will be conducted only in rare occasions, due to covid-19) for approximately forty-five minutes. The researcher will tape record the interview and make transcriptions from the tapes. Coding will be done through Atlas.ti program.

4. **Who will know what I say?** Since the researcher plans to conduct and transcribe all the interviews independently, she will be the only one. Besides, researcher will assign you a pseudonym in the process and she will be the only person who knows your identity. The professors on the given master's committee at Danube University Krems and Tampere University, with whom researcher plans to share the findings, will not be able to identify you by name.

5. **What risks and benefits are associated with participation?** The study doesn't pose any ethical problems, although some precautions will be undertaken at various levels. Ethical constraints will be assured from the very beginning by designing the consent form, active communication with potential respondents and informing regarding the usage of the information. In order to avoid possible breach of confidentiality, the researcher will be coding transcripts with the special pseudonym. As it is the case study, the university/ agency name (only if a respondent represents the university or the agency) will be identified to serve the purpose of the study, which may

result in some insiders being able to infer your identity. To protect against that risk, it will be ensured that your name does not appear in any transcripts or in any publication or public statement based on the study. All types will be destroyed one year after the completion of the project. Once the interviews are transcribed, respondent will have chance to read and endorse information if s/he so requests. Master thesis will be published on official websites of two leading European universities, which will put Georgian universities under spotlight of inquiry and attention by European peers. Besides, researcher aims to publish the report on HEInnovate website, whereas interested parties will have chance to read about Georgian innovative and entrepreneurial ecosystem in higher education.

6. **What are my rights as a respondent?** You may ask any questions regarding the research, and they will be answered fully. Your participation in the study is voluntary; you may withdraw at any time. Upon your request, you have right to read the transcripts and endorse information. All interviews are intended to be recorded, you have right to participate in the interview without recording, thus in this case the researcher will be taking notes.

7. **What will be published?** Following the completion of the dissertation, the researcher plans to maintain verbatim transcripts for use in future publications and scholarly presentations. The researcher intends to publish the findings as articles in professional journals.

8. **If I want more information, whom can I contact about the study?** This study has been approved by Danube University Krems, by MARIHE program Board. In addition, the master advisor, Dr. David Campbell, can be contacted at this following email address david.campbell@donau-uniac.at .

Please choose one:

I agree to be interviewed with recording. I agree to be interviewed without recording.

_____ _____

Nino Popkhadze, Student-researcher Respondent signature, date

[1] HEInnovate is self-assessment tool initiated by European Commission and OECD to help higher education institutions

Consent Form Georgian

თანხმობის ფორმა

ნინო ფოფხაძე

სამაგისტრო კვლევა

დუნაის უნივერსიტეტი კრემსი/ ტამპერეს უნივერსიტეტი

თეზისის სათაური: "*ქართული უმაღლესი განათლების კონტექსტში ინოვაციებისა და მეწარმეობის ბილიკების ძიებაში*"

1. **რა არის კვლევის მიზანი?** ამ კვლევის მიზაანს გააჩნია ორმაგი ბუნება,პირველის მიზანია ნათელი მოჰფინოს ინოვაციურ და სამეწარმეო აქტივობებს ქართულ უმაღლეს საგანმანათლებლო სივრცეში. მეორე მხრივ კი, კვლევა შეეცდება ხელი შეუწყოს დისკუსიის გაღვივებას საქართველოში არსებულ შესაძლებლობებსა და გამოწვევებზე, რაც ნაწილობრივ გამოვლინდება HEInnovate[3] მექანიზმის პილოტირებითა და ქართულ კონტექსტზე მორგებით.
2. **როგორ მოხდა ჩემი შერჩევა?** კვლევის ავტორმა გამოიყენა მიზნობრივი შერჩევის დიზაინი.შერჩევის მთავარი კრიტერიუმი იყო ინფორმაციულად-მდიდარი რესპონდენტების მოძიება,რომლებსაც გარკვეული სახის ინტერესი, გამოცდილება ანდა პროფესია აკავშირებდათ ინოვაციებსა და მეწარმეობასთან, და ასევე შეეძლოთ რელევანტური ინფორმაციის მოწოდება მოცემულ კონტექსტში.
3. **რას მოიცავს ჩემი მონაწილეობა?** კოვიდ-19-ის გათვალისწინებით, მკვლევარი დაგეგმავს ონლაინ ინტერვიუს. ინტერვიუ გაგრძელდება დაახლობით 40 დან 60 წუთამდე. გათვალისწინებულია ინტერვიუს ჩანაწერის გაკეთება და მისი ტრანსკრიპციაც მკვლევრის მიერ. შემდგომში ტრანსკრიპტის კოდირება და დამუშავება მოხდება atlas.ti პროგრამის მეშვეობით.
4. **ვის ეცოდინება ის რასაც მე ვიტყვი?** რადგანაც მკვლევარი აპირებს ინტერვიუს ჩაწერას და მის ტრანკსრიპციას დამოუკიდებლად, მხოლოდ მას ექნება წვდომა ჩანაწერთან. ასევე, ჩანაწერის კოდირების პროცესში თქვენ მოგენიჭებათ ფსევდონიმი, მკვლევარის გარდა არავის არ ექნება თქვენი იდენტიფიცირების საშუალება. კვლევის შედეგების წარდგენა მოხდება დუნაის უნივერსიტეტი კრემსისა და ტამპერეს უნივერსიტეტის ლექტორებთან, რომლებიც ვერ შეძლებენ თქვენს იდენტიფიცირებას.
5. **რა რისკები და უპირატესობებია აქვს ჩემს ჩართულობას?** კვლევა არ წარმოადგენს ეთიკური საფრთხეს, თუმცა გარკვეული ზომების მიღება გათვალისწინებულია კვლევის პროცესის სხვადასხვა ეტაპზე. ეთიკური შეზღუდვები გათვალისწინებული იქნება თავდაპირველად თანხმობის ფორმის მომზადებით, პოტენტციურ რესპონდენტებთან აქტიური კომუნკაციით ინფორმაციის გამოყენების თაობაზე. კონფიდენციალობის შესაძლო დარღვევა თავიდან იქნება აცილებული

[3] HEInnovate არის თვითშეფასების ინსტრუმენტი, რომელიც ინიცირებულია ევროკავშირისა და OECD-ს მიერ, რათა დაეხმაროს უმაღლეს საგანმანათლებლო დაწესებულებებს მათი სამეწარმეო და ინოვაციური შესაძლებლობების შესწავლაში.

ტრანსკრიპტის ფსევდონიმით კოდირებით. რადგანაც ეს კვლევა არის შემთხვევის შესწავლა (case study),კვლევის მიზნიდან გამომდინარე უნივერსიტეტის ან დაწესებულების სახელი იქნება იდენტიფიცირებული, რამაც შეიძლება გამოიწვიოს ის, რომ ზოგიერთმა "ინსაიდერმა" მოახერხოს თქვენი პირადობის დადგენა(მხოლოდ იმ შემთხვევაში თუ რესპონდენტი წარმოადგენს ან უნივერსიტეტს ან რაიმე სხვა დაწესებულებას, და არ მონაწილეობს როგორც დამოუკიდებელი ექსპერტი). ამ რისკის თავიდან ასაცილებლად, გარანტირებული იქნება კვლევის ფარგლებში რომ თქვენი სახელი არ დაფიქსირდება არც ტრანსკრიპტში და არც რაიმე კვლევაზე დაფუძნებულ გამოცემასა თუ საჯარო განცხადებაში. ჩანაწერები განადგურდება პროექტის დასრულებიდან ერთი წლის თავზე. ინტერვიუს დასრულების შემდეგ, რესპოდენტს ექნება საშუალება გაეცნოს ტრანსკრიპტს, თუკი ის ამას მოითხოვს. სამაგისტრო თეზისი გამოქვეყნდება ორი წამყვანი უნივერსიტეტის ვევგვერდზე, რაც ევროპელი კოლეგების მხრიდან ყურადღების ცენტრში მოაქცევს შესაბამის ქართულ უნივერსიტეტებს და ზოგადად ქართული კონტექსტს. ასევე არის გეგმა, რომ სტატიის ან ანგარიშის სახით გამოქვეყნდეს HEInnovate-ვებგვერდზე, სადაც დაინტერესებულ პირებს საშუალება გაეცნონ ინფორმაციას ქართული უმაღლესი განათლების ინოვაციურ და სამეწარმეო ეკოსისტემას.

6. **რა არის ჩემი, როგორც რესპონდენტის, უფლება?** თქვენ უფლება გაქვთ დასვათ ნებისმიერი შეკითხვა კვლევასთან დაკავშირებით, რომელზეც სრულყოფილ პასუხს მოგაწვდით მკვლევარი. თქვენი ჩართულობა არის მოხალისეობრივი და თქვენს კეთილ ნებაზე დაფუძნებული, თქვენ უფლება გაქვთ ნებისმიერ მომენტში გამოეთიშოთ კვლევას. თქვენი მოთხოვნის საფუძველზე, თქვენ შეგიძლიათ გაეცნოთ ტრანკსრიპტს და დაამოწმოთ. კვლევის მიზნებიდან გამომდინარე, ყველა ინტერვიუ ითალისწინებს ჩაწერას, თუმცა თუ თქვენ მოითხოვთ რომ ინტერვიუ არ იქნას ჩაწერილი, მოცემულ შემთხვევაში მკვლევარი გააკეთებს ჩანაწერს ხელით.
7. **რა გამოქვეყნდება?** დისერტაციის დასრულების შემდეგ, მკვლევარი აპირებს შეინახოს სიტყვიერი ტრანსკრიპტი სამომავლო პუბლიკაციებსა და სამეცნიერო პრეზენტაციებში გამოსაყენებლად. მკვლევარს განზრახული აქვს შედეგების სტატიებად გამოქვეყნება შესაბამის პროფესიულ ჟურნალებში.
8. **თუკი დამატებითი ინფორმაცია მსურს, ვის შეიძლება მივმართო?** ეს კვლევა დამტკიცებულია დუნაის უნივერსიტეტი კრემსის მიერ, MARIHE პროგრამის ფარგლებში. გარდა ამისა, სამაგისტრო მრჩეველს, დოქტორ დევიდ კემბელთან შეგიძლიათ დაკავშირება შემდეგ ელ.ფოსტის მისამართზე david.campbell@donau-uniac.at .

გთხოვთ მონიშნეთ რომელი გსურთ:

მე ვთანხმდები ინტერვიუს ჩაწერით. _____

მე ვთანხმდები ინტერვიუს ჩაწერის გარეშე. _____

ნინო ფოფხაძე,

სტუდენტ-მკვლევარი

რესპონდენტი, ხელმოწერა

Annex II

The main body of interview protocol in English[4]

Interview Protocol

Erasmus Mundus Master's in Research and Innovation in Higher Education (MARIHE)

Danube University Krems /Tampere University

General Information:

- Interviewer: Nino Popkhadze
- Supervisor: David Campbell
- Name of the project: Exploring Pathways to Innovation and Entrepreneurship in Georgian Higher Education Context
- Number of questions: 11
- Estimated Time: 45-60 minutes
- Time of the interview: 8th of October 2020, 11 a.m.
- Place: Interview will be recorded online via Zoom program

This interview is part of a thesis project that explores developments of innovation and entrepreneurship under Georgian universities, as a requirement of the master's degree program, supported by Erasmus Plus. The study is qualified under a qualitative case study and has twofold nature, the first one is to shed light on innovative and entrepreneurial activities in the Georgian higher education context. And the second one is to bring forward discussion by conducting a feasibility study to trace existing potential and respective challenges in Georgia. For this purpose, special attention will be paid to inquiry how the HEInnovate[1] tool can be tailored for the Georgian higher education context and explore existing practices by its guiding framework. Your answers will help the study to understand the role of the HEInnovate tool for universities to promote innovation and entrepreneurship. your participation is greatly appreciated. The interview protocol is adapted from Creswell's manual (Creswell, 2013).

The interview is structured around three main research questions, whereas the first two of them intend to describe the overall situation and provide future speculation in the field of innovation and entrepreneurship of higher education context. As for the last question, it aims to test how the HEInnovate tool can be adapted in the Georgian context. The theoretical framework of the research is based on the following concepts: system- wide **Triple Helix** concept (Etzkowitz & Leydesdorff, 2000), science-wise **Mode 2 Research** (Gibbons et al., 1994) and institutional wise – **Burton Clark's entrepreneurial university model** (Clark, 1998).

[4] The main body of the protocol was the same for all respondents, the questions were customized respectively. Thus, to avoid the redundancy, protocol is displaced only once in each language.

Table 1: Main research questions.

Number of questions	Main Question	Aim
I- Question A	• What is the current situation regarding the innovation and entrepreneurship in the Georgian higher education context?	In the process of exploring innovative and entrepreneurial patterns of higher education context, geography, location and context matter. Most of the studies in this field focus on developed countries, and less is known about developing country scene. Thus, the **question-A** aims to analyze the status quo and to systemize the existing practices.
II- Question B	• What are current challenges and opportunities for Georgian higher education institutions to innovate and pursue entrepreneurship?	Each higher education system responds to a change differently, there are similarities and differences, and distinctive features that need attention. **The question-B** tries to trace the bottlenecks for Georgian HEIs to pursue entrepreneurship and innovation.
III- Question C	• How could the HEInnovate approach contribute to the higher education system in Georgia?	The HEInnovate tool is widely used among European HEIs to assess their innovative and entrepreneurial capacity. The attempt to pilot the tool serves the mission to bring forward discussion and awareness about innovation and entrepreneurship in the Georgian higher education context. The subtext of **question-C**

		is to probe, whether this tool can be tailored in the Georgian context, what could fit and what could be modified.

The interview is intended to be semi-structured, in the beginning the number of questions is fixed. Nevertheless, depending on the flow of the interview and its development, clarification questions could be asked based on the answers. The interviews will be recorded and later in November, verbatim transcribed. The interviewee will have the chance to read the transcript and to endorse it if s/he so requests, which will increase the reliability of the research.

Thank you very much for your participation and your valuable contribution to the research project. The master paper will be later available online on the official website of Danube University Krems and Tampere University.

[1] HEInnovate is self-assessment tool initiated by European Commission and OECD to help higher education institutions to examine their entrepreneurial capacity (heinnovate.eu)

The main body of interview protocols in Georgian

ინტერვიუს ოქმი

ერასმუს მუნდუსის სამაგისტრო პროგრამა:"კვლევა და ინოვაცია უმაღლეს განათლებაში (MARIHE)"

დუნაის უნივერსიტეტი კრემსი/ ტამპერეს უნივერსიტეტი

ზოგადი ინფორმაცია:

- ინტერვიუერი: ნინო ფოფხაძე
- ხელმძღვანელი: დევიდ კემბელი
- პროექტის სათაური: ქართული უმაღლესი განათლების კონტექსტში ინოვაციებისა და მეწარმეობის ბილიკების ძიებაში
- კითხვების რაოდენობა: 11 კითხვა
- სავარაუდო დრო: 45-60 წუთი
- ინტერვიუს დრო: 8 ოქტომბერი, 11 საათი
- ადგილი: ინტერვიუ ჩაწერილი იქნება ონლაინ ზუმის მეშვეობით

ინტერვიუ არის სამაგისტრო პროგრამის ფარგლებში სადისერტაციო პროექტის ნაწილი, რომელიც შეისწავლის ინოვაციებისა და მეწარმეობის განვითარებას ქართულ უნივერსიტეტებში, პროექტი მხარდაჭერილია ერასმუს + მიერ. აღნიშნული კვლევა არის

თვისობრივი და აქვს ორმაგი მიზანი. პირველ რიგში, კვლევას სურს საქართველოს უმაღლესი განათლების კონტექსტში ინოვაციური და სამეწარმეო საქმიანობას მოფინოს ნათელი. ხოლო მეორე მხრივ, დისკუსიის წამოწევა არსებული შესაძლებლობების და შესაბამისი გამოწვევების ანალიზით. მიზნიდან გამომდინარე, განსაკუთრებული ყურადღება დაეთმობა HEInnovate[1] ინსტრუმენტს და მისი ჩარჩოს გამოყენებას, თუ როგორ შეიძლება აღნიშნული ინსტრუმენტის მორგება ქართულ კონტექსტზე. თქვენი პასუხები დაეხმარება მკვლევარს უკეთესად გაიგოს სამინისტროს ხედვა მეწარმეობისა და ინოვაციების როლთან დაკავშირებით. თქვენი მონაწილეობა არის ძალზედ დაფასებული. ინტერვიუს პროტოკოლი არის ადაპტირებული კრეზველის სახელმძღვანელოდან (Creswell, 2013).

ინტერვიუ სტრუქტურირებული 3 ძირითადი საკვლევი კითხვის გარშემო, სადაც პირველი ორი მათგანი აფასებს ზოგად სიტუაციას საქართველოში ინოვაციებისა და მეწარმეობის კუთხით(უმაღლესი განათლების ფარგლებში). ხოლო მესამე კითხვა ეხება HEInnovate ინსტრუმენტს და მისი ჩარჩოს შესაძლო ადაპტირებას ქართულ კონტექსტში. ჩემი კვლევის თეორიული ჩარჩო დაფუძნებულია შემდეგ კონცეფციებზე: სისტემურ დონეზე - სამმაგი სპირალის (**Triple Helix,** Etzkowitz & Leydesdorff, 2000), მეცნიერების მიმართულებით - მეორე დონის კვლევის (**Mode 2 Research,**Gibbons et al., 1994) და ინსტიტუციურ დონეზე ბურტონ კლარკის მეწარმე უნივერსიტეტების მოდელის (Clark, 1998) კონცეფციებზე.

ცხრილი 1: კვლევის მთავარი კითხვები.

კითხვების რაოდენობა	**ძირითადი კითხვა**	**მიზანი**
I-კითხვა A	როგორია საქართველოში უმაღლესი განათლების კუთხით არსებული მდგომარეობა ინოვაციებისა და მეწარმეობასთან დაკავშირებით?	უმაღლესი განათლების კონტექსტში ინოვაციური და სამეწარმეო მოდელების ძიების პროცესში გეოგრაფია, მდებარეობა და კონტექსტი მნიშვნელოვანია. გამოწვევებიც და შესაძლებლობებიც კონტექსტის შესაბამისია. უმეტესი კვლევები აღნიშნულ სფეროში ორიენტირებულია განვითარებულ ქვეყნებზე და ნაკლებადაა ცნობილი განვითარებადი ქვეყნის სცენის შესახებ. **A კითხვა** მიზნად ისახავს სტატუს კვოს ანალიზს, არსებული პრაქტიკების სისტემიზაციას
II-კითხვა B	რა არის არსებული გამოწვევები და	ყოველი უმაღლესი საგანმანათლებლო სისტემა განსხვავებულად რეაგირებს ცვლილებებზე, არსებობს

	შესაძლებლობები ქართული უმაღლესი საგანმანათლებლო დაწესებულებებისთვის ინოვაციისა და მეწარმეობის დანერგვისთვის?	მსგავსებები და განსხვავებები, ასევე დამახასიათებელი თვისებები, რომლებიც ყურადღებას იმსახურებენ. **B კითხვა** ცდილობს გამოვლინოს ბარიერები, რომელიც ხელს უშლის ინოვაციურ პროცესებს, და ასევე ქართული უმაღლესი საგანმანათლებლო კონტექსტის სპეციფიკური პოტენციალი.
III - კითხვა C	რამდენად შესაძლებელია HEInnovate-ს ჩარჩომ და ინსტრუმენტმა წვლილი შეიტანოს ქართულ უმაღლეს საგანმანათლებლო სისტემაში?	HEInnovate ინსტრუმენტი ფართოდ არის გამოყენებული ევროპულ უნივერსიტეტებში მათი ინოვაციური და სამეწარმეო შესაძლებლობების შესაფასებლად. ინსტრუმენტისა და მისი ჩარჩოს პილოტირება ემსახურება მისიას რომ ხელი შეუწყოს დისკუსიას და ცნობიერების ამაღლებას ინოვაციებისა და მეწარმეობის შესახებ საქართველოში. შესაბამისად **C კითხვა** არის მცდელობა იმისა, თუ რამდენად შესაძლებელია მოცემული ინსტრუმენტის ადაპტირება ქართულ კონტექსტში, რა შეიძლება შეიცვალოს და რა დაემატოს სპეციფიკის გათვალისწინებით. და რაც მთავარია, რა სარგებლობას მოუტანს მისი დანერგვა ქართულ უნივერსიტეტებს.

ინტერვიუ ნახევრად სტრუქტურირებულია, დასაწყისში დაფიქსირებულია კითხვების რაოდენობა. ამის მიუხედავად ინტერვიუს დინამიკიდან და პასუხებიდან გამომდინარე, დასაზუსტებელი კითხვები შეიძლება დაისვას. მოხდება ინტერვიუს ჩაწერა და შემდეგ მისი სიტყვასიტყვითი ტრანსკრიპცია. რესპონდენტს ექნება საშუალება გაეცნოს ტრანსკრიპციას, თუკი ის ამას მოითხოვს.

დიდი მადლობა მონაწილეობისთვის და კვლევითი პროექტში შეტანილი მნიშვნელოვანი წვლილისთვის. სამაგისტრო ნაშრომი მოგვიანებით ხელმისაწვდომი იქნება დუნაის უნივერისტეტის კრემსისა და ტამპერეს უნივერსიტეტის ოფიციალურ ვებ-გვერდზე.

Annex III

Interview questions for Ministry in English

Table 2: Interview questionnaire.

A. What is the current situation regarding the innovation and entrepreneurship in Georgian higher education context?	1. What is the nationwide interest and benefits to strengthen entrepreneurship and innovation? Especially for the country like Georgia 2. How would you describe overall innovative ecosystem in Georgian higher education context? And what is the strongest pillar in Georgian innovation ecosystem? 3. Could you tell us about your department, when it was established and what is its role in the Ministry? 4. What is the stake of the Ministry in terms of entrepreneurship and innovation in higher education? 5. Could you describe what is specific strategy or action plan adopted by Ministry for entrepreneurship and innovation in higher education (2017-2021)? 6. From ministry perspective, who are the main stakeholders in the process of innovation and entrepreneurship? Who should collaborate to reach synergy?
B. What are current challenges and opportunities for Georgian higher education institutions to innovate and pursue entrepreneurship	1. From your perspective, what are the main challenges to foster innovation and entrepreneurship? 2. What is your strategy to eliminate challenges at this moment? 3. What could have been done to facilitate the process faster and more smoothly? 4. What is your future vision and have you already developed new strategy (2021 onwards) ?
C. How could the HEInnovate approach contribute to the higher education system in Georgia?	1. Have you ever heard of HEInnovate tool? 2. Would it be interesting to measure and map innovative and entrepreneurial capacity of Georgian universities?

	3. HEInnovate tool has 8 dimensions: which one of this sounds most relevant for Georgian universities?

Interview questions for Ministry in Georgian

ცხრილი 2: ინტერვიუს კითხვარი.

A. როგორია საქართველოში უმაღლესი განათლების კუთხით არსებული მდგომარეობა ინოვაციებისა და მეწარმეობასთან დაკავშირებით?	1. რა სახელმწიფოებრივი მნიშვნელობა და სარგებელი აქვს ინოვაციების და მეწარმეობის დანერგვას , განსაკუთრებით ისეთი ქვეყნისთვის როგორიც საქართველოა? 2. როგორ დაახასიათებდით ქართულ ინოვაციურ ეკოსისტემას, და რა არის მისი ყველაზე ძლიერი საყრდენი(pillar) ? 3. შეგიძლიათ მოგვიყვეთ თქვენი დეპარტამენტის შესახებ და თუ რა არის მისი როლი სამინისტროში? 4. რა არის სამინისტროს პოზიცია უმაღლეს განათლებაში მეწარმეობასთან და ინოვაციებთან დაკავშირებით? 5. შეგიძლიათ გაგვაცნოთ სამინისტორს სპეციალური სტრატეგია/ სამოქმედო გეგმა ან სტრატეგიული ამოცანა ინოვაციასთან და მეწარმეობასთან დაკავშირებით (2017-2021) ? 6. თქვენი აზრით ვინ არიან მთავარი დაინტერესებული მხარეები ინოვაციებისა და მეწარმეობის პროცესში, და ვინ უნდა თანამშრომლობდეს სინერგია რომ მივიღოთ?

B. რა არის არსებული გამოწვევები და შესაძლებლობები ქართული უმაღლესი საგანმანათლებლო დაწესებულებებისთვის ინოვაციისა და მეწარმეობის დანერგვისთვის?	1. თქვენი, როგორც სამინისტროს პერსპექტივიდან, რა არის მთავარი გამოწვევები იმისთვის რომ ინოვაციებისა და მეწარმეობის დანერგვას ხელი შეუწყოთ ? 2. როგორ ცდილობთ აღმოფხვრათ გამოწვევები ამ მხრივ ? 3. რა შეიძლება გაკეთდეს იმისთვის რომ ინოვაციური და სამეწარმეო პროცესები უფრო სწრაფად დაინერგოს უნივერსიტეტებში (ფინანსები, ცნობიერების ამაღლება, წახალისება)? 4. რა არის თქვენი სამომავლო ხედვა, მუშაობთ თუ არა ახალ სტრატეგიაზე ინოვაციებთან დაკავშირებით (2021 წლის შემდეგ პერიოდზე) ?
C. რამდენად შესაძლებელია HEInnovate-ს ჩარჩომ და ინსტრუმენტმა წვლილი შეიტანოს ქართულ უმაღლეს საგანმანათლებლო სისტემაში?	1. გსმენიათ თუ არა HEInnovate ინსტრუმენტის შესახებ ? 2. იქნებოდა თუ არა საინტერესო რომ მოხდეს ქართული უნივერსიტეტების ინოვაციური და სამეწარმეო შესაძლებლობების შეფასება (mapping) აღნიშული ინსტრუმენტისა და მისი ჩარჩოს გამოყენებით ? 3. HEInnovate-ს აქვს 8 განზომილება, თქვენი აზრით რომელი მათგანი შეესაბამება ყველაზე მეტად ქართულ უნივერსიტეტებსა და კონტექსტს ?

Interview questions for university representatives in English

Table 2: Interview questionnaire.

A. What is the current situation regarding the innovation and entrepreneurship in Georgian higher education context?	1. How would you describe overall innovative ecosystem in Georgian higher education context? 2. What does entrepreneurship and innovation mean for your university? 3. Do you have any specific strategy or action plan for entrepreneurship and innovation in your university? 4. Who are the main stakeholders in the process of innovation and entrepreneurship?
B. What are current challenges and opportunities for Georgian higher education institutions to innovate and pursue entrepreneurship	1. From your university perspective, what are the main challenges to innovate and pursue entrepreneurship? 2. What could have been done to facilitate the process faster and more smoothly? (Finances, awareness, promotion) 3. What are the institutional benefits to introduce entrepreneurship and innovation within university? Why do we need to innovate in a first place?
C. How could the HEInnovate approach contribute to the higher education system in Georgia?	1. Have you ever heard of HEInnovate tool? 2. What is the role of university leadership in promoting entrepreneurship and innovation? (rector, vice- rector, deans) 3. How sustainable and diversified is university funding? 4. What is role of applied research in your university? 5. To what degree is integrated entrepreneurial mindset in curriculum? 6. What are the current or accomplished projects to support entrepreneurs? 7. How would you evaluate start-up culture in your university? 8. How would you describe your digital presence? 9. What is your experience with science park, incubators, spin-offs and KTOs (knowledge transfer office)? 10. How do you support internationalization? 11. How do you assess your entrepreneurial impact? (in terms of teaching, research and projects)

	12. Would it be interesting for your university to participate in innovative and entrepreneurial capacity assessment process? 13. What is missing from this tool or what can be added to make it more applicable for Georgian context?

Interview questions for university representatives in Georgian

ცხრილი 2: ინტერვიუს კითხვარი.

A. როგორია საქართველოში უმაღლესი განათლების კუთხით არსებული მდგომარეობა ინოვაციებისა და მეწარმეობასთან დაკავშირებით?	1. როგორ დაახასიათებდით ზოგადად ინოვაციურ ეკოსისტემას ქართულ უმაღლეს საგანმანათლებლო კონტექსტში ? 2. რას ნიშნავს მეწარმეობა და ინოვაცია თქვენი უნივერსიტეტისთვის ? 3. გაქვთ თუ არა სპეციალური სტრატეგია/ სამოქმედო გეგმა ან სტრატეგიული ამოცანა ინოვაციასთან და მეწარმეობასთან დაკავშირებით ? 4. თქვენი აზრით ვინ არიან მთავარი დაინტერესებული მხარეები ინოვაციებისა და მეწარმეობის პროცესში (ვინ უნდა იყოს)?
B. რა არის არსებული გამოწვევები და შესაძლებლობები ქართული უმაღლესი საგანმანათლებლო დაწესებულებებისვთის ინოვაციისა და მეწარმეობის დანერგვისთვის?	1. თქვენი უნივერსიტეტის პერსპექტივიდან გამომდინარე, რა არის მთავარი გამოწვევები იმისთვის რომ ინოვაციები დანერგოთ და მეწარმეობას ხელი შეუწყოთ ? 2. რა შეიძლება გაკეთდეს იმისთის რომ ინოვაციური და სამეწარმეო პროცესები უფრო სწრაფად და მარტივად დაინერგოს უნივერსიტეტებში ?(ფინანსები, ცნობიერება, წახალისება) 3. რა ინსტიტუციური შესაძლებლობებს ხედავთ ინოვაციების და მეწარმეობის დანერგვით ?
C. რამდენად შესაძლებელია HEInnovate-ს ჩარჩომ და ინსტრუმენტმა წვლილი შეიტანოს ქართულ უმაღლეს საგანმანათლებლო სისტემაში?	1. გსმენიათ თუ არა HEInnovate ინსტრუმენტის შესახებ ? 2. თქვენს უნივერსიტეტში, რა არის ლიდერთა/მმართველთა რგოლის როლი მეწარმეობისა და ინოვაციების წახალისებაში? 3. რამდენად მდგრადი და დივერსიფიცირებულია უნივერსიტეტის დაფინანსება?

	4. რა როლი აქვს გამოყენებით კვლევას თქვენს უნივერსიტეტში? 5. რამდენად ინტეგრირებულიასამეწარმეო უნარ-ჩვევები კურიკულუმში? 6. რა პროგრამები ან უკვე დასრულებული პროექტები არსებობს, რომლებიც ხელს უწყობს მეწარმეებს? 7. როგორ შეაფასებდით start-up კულტურას თქვენს უნივერსიტეტში? 8. როგორ შეაფასებდით თქვენ ციფრულ პრეზენტულობას(ანაბეჭდს)? 9. რა გამოცდილება გაქვთ სამეცნიერო პარკებთან,ინკუბატორებთან, spin-off და ცოდნის გაზიარების ოფისებთან(KTO) ? 10. როგორ უჭერთ მხარს ინტერნაციონალიზაციას? 11. როგორ აფასებთ თქვენს სამეწარმეო გავლენას?(სწავლების, კვლევებისა და პროექტების თვალსაზრისით) 12. იქნება თუ არა საინტერესო რომ მიიღოთ მონაწილეობა თქვენი უნივერსიტეტის ინოვაციური და სამეწარმეო შესაძლებლობების შეფასება/mapping-ში? 13. რას შეცვლიდით(რა გაკლიათ) ამ ინსტრუმენტში, ქართულ კონტექსტისთვის უფრო ადაპტირებული რომ გახდეს?

Interview questions for international experts

Table 2: Interview questionnaire.

HEInnovate ‘s role in assessing country/institutional innovation and entrepreneurship	1. What was the main motive to initiate HEInnovate project? 2. From HEInnovate perspective, why do universities need to pay attention to innovation and entrepreneurship? 3. How did you come up with 8 dimensions of the tool? 4. These dimensions are mutually exclusive. Would you consider some of them more crucial for higher education institutions than the others? 5. What are the institutional benefits for higher education institutions to apply HEInnovate tool?

	6. What are the nationwide benefits to map their own strengths and weaknesses in terms of innovation and entrepreneurship? And how HEInnovate can be used to develop national innovation and entrepreneurial agenda? 7. At this moment, HEInnovate tool is actively used among OECD and EU countries, what are your thoughts about adapting and introducing this tool in developing country context? 8. Coming from geography of higher education perspective, what would you recommend for the Georgian Higher Education context, which is characterized by weak linkages, top-down approach and in-house development, how can we catalyze innovation and embody its culture institutionally and nationally? 9. From the beginning until now, how do you imagine the future of HEInnovate tool? 10. I aim to bring and tailor HEInnovate framework into Georgian Higher Education context, to support universities to map their innovative and entrepreneurial capacity. What would be your guidance in that respect?

Table 2: Interview questionnaire.

Higher Education institutions (HEIs) role in developing economies and regional development?	1. How would you describe European Innovation Ecosystem? 2. From your perspective, why do universities need to pay attention to innovation and entrepreneurship? 3. What is EUA's policy and stake to accelerate this process? 4. From your perspective, what are the main challenges European universities face to innovate and pursue entrepreneurship? 5. What could have been done to facilitate this process faster? 6. What are the nationwide benefits to invest in innovation ecosystem, especially when it comes to developing countries?

	7. From your perspective, what are the institutional benefits to introduce entrepreneurship and innovation within university? 8. From your perspective, who are the main stakeholders in higher education context to yield synergy in terms of innovation and entrepreneurship? 9. From your experience, what would you recommend for the Georgian Higher Education context, which is characterized by weak linkages, top-down approach and in-house development, how can we catalyze innovation and embody its culture institutionally and nationally? 10. I am to bring and tailor HEInnovate framework into Georgian Higher Education context, to support universities to map their innovative and entrepreneurial capacity. What would be your guidance in that respect?

Interview questions for Rustaveli Foundation in English

Table 2: Interview questionnaire.

A. What is the current situation regarding the innovation and entrepreneurship in Georgian higher education context?	1. What is the nationwide interest and benefits to strengthen entrepreneurship and innovation? Especially for the country like Georgia 2. How would you describe overall innovative ecosystem in Georgian higher education context? 3. What is the stake of Rustaveli Foundation in terms of promoting entrepreneurship and innovation in higher education? 4. From your statistics and observation, how would you describe the situation regarding applied and interdisciplinary research in universities? (mode 2 research) 5. What are the metrics to measure the impact of the funded projects? And which phase does it take place? 6. How would you evaluate Georgia's international presence and engagement in terms of research? 7. How would you describe overall competition and interest from researchers to apply for your project grants?

B. What are current challenges and opportunities for Georgian higher education institutions to innovate and pursue entrepreneurship	1. From your perspective, what are the main challenges to foster innovation and entrepreneurship for universities? 2. What could have been done system wide and institutional wise to facilitate the process faster and more smoothly? 3. What is your vision for future, what would you like to change or develop (if there is any) in terms of priorities, grants allocation or action plan?
C. How could the HEInnovate approach contribute to the higher education system in Georgia?	1. Have you ever heard of HEInnovate tool? 2. Would it be interesting to measure and map innovative and entrepreneurial capacity of Georgian universities?

Interview questions for Rustaveli Foundation in Georgian

ცხრილი 2: ინტერვიუს კითხვარი.

A. როგორია საქართველოში უმაღლესი განათლების კუთხით არსებული მდგომარეობა ინოვაციებისა და მეწარმეობასთან დაკავშირებით?	1. რა სახელმწიფოებრივი მნიშვნელობა და სარგებელი აქვს ინოვაციების და მეწარმეობის დანერგვას , განსაკუთრებით ისეთი ქვეყნისთვის როგორიც საქართველოა? 2. როგორ დაახასიათებდით ზოგადად ინოვაციურ ეკოსისტემას ქართულ უმაღლეს საგანმანათლებლო კონტექსტში ? 3. რა არის რუსთაველის ფონდის პოზიცია უმაღლეს განათლებაში მეწარმეობასთან და ინოვაციებთან დაკავშირებით? 4. თქვენი სტატისტიკიდან და დაკვირვებიდან გამომდინარე, როგორ დაახასიათებდით სიტუაციას გამოყენებით და ინტერდისციპლინარულ კვლევებთან დაკავშირებით უნივერსიტეტებში ? (Mode 2 research) 5. როგორ ხდება დაფინანსებული პროექტების შედეგების გაზომვა/შეფასება და პროექტის რა ეტაპზე? 6. როგორ შეაფასებდით საქართველოს საერთაშორისო პრეზენს კვლევის კუთხით ?

	7. როგორ აღწერთ აპლიკაციის შემოტანის პროცესს, კონკურენციასა და მკვლევართა ინტერესის მხრივ?
B. რა არის არსებული გამოწვევები და შესაძლებლობები ქართული უმაღლესი საგანმანათლებლო დაწესებულებებისთვის ინოვაციისა და მეწარმეობის დანერგვისთვის?	1. თქვენი პერსპექტივიდან, რა არის მთავარი გამოწვევები უნივერსიტეტებისთვის, რომ ინოვაციებისა და მეწარმეობის დანერგვას ხელი შეუწყოთ ? 2. რა შეიძლება გაკეთდეს იმისთვის რომ ინოვაციური და სამეწარმეო პროცესები უფრო სწრაფად დაინერგოს როგორც სისტემურ დონეზე ასევე ინსტიტუციურად? 3. რა არის თქვენი მომავლის ხედვა, აპირებთ თუ არა რაიმე შეცვალოთ ან განავითაროთ გრანტების, სამოქმედო გეგმისა თუ პრიორიტეტების მხრივ?
C. რამდენად შესაძლებელია HEInnovate-ს ჩარჩომ და ინსტრუმენტმა წვლილი შეიტანოს ქართულ უმაღლეს საგანმანათლებლო სისტემაში?	1. გსმენიათ თუ არა HEInnovate ინსტრუმენტის შესახებ ? 2. იქნება თუ არა საინტერესო და სასარგებლო რომ მოხდეს ქართული უნივერსიტეტების ინოვაციური და სამეწარმეო შესაძლებლობების შეფასება (mapping) აღნიშული ინსტრუმენტისა და მისი ჩარჩოს გამოყენებით ?

Interview questions for GITA in English

Table 2: Interview questionnaire.

A. What is the current situation regarding the innovation and entrepreneurship in Georgian higher education context?	1. What is the nationwide interest and benefits to strengthen entrepreneurship and innovation? Especially for the country like Georgia 2. How would you describe overall innovative ecosystem in Georgian higher education context? And what is the strongest pillar in Georgian innovation ecosystem? 3. What is the stake of GITA in terms of entrepreneurship and innovation in higher education?

	4. Could you elaborate about GENIE project, its importance and implementation process? 5. So far, how would you evaluate your collaboration with higher education institutions? (How strong is the linkages) 6. From your perspective how would you evaluate overall commercialization and technology transfer processes in higher education context? 7. What are the metrics to measure the impact of the funded projects? do you have follow-up policy? 8. How would you describe overall competition and interest from university-based researchers to apply for your project grants?
B. What are current challenges and opportunities for Georgian higher education institutions to innovate and pursue entrepreneurship	1. From your perspective, what are the main challenges to foster innovation and entrepreneurship in general and in HE context? 2. What could have been done system wide and institutional wise to facilitate the process faster and more smoothly? 3. What could have been done to promote entrepreneurial mindset, start-up culture and user-inspired research within universities?
C. How could the HEInnovate approach contribute to the higher education system in Georgia?	1. Have you ever heard of HEInnovate tool? 2. Would it be interesting to measure and map innovative and entrepreneurial capacity of Georgian universities?

Interview questions for GITA in Georgian

Table 2: Interview questionnaire

A. როგორია საქართველოში უმაღლესი განათლების კუთხით არსებული მდგომარეობა ინოვაციებისა და	1. რა სახელმწიფოებრივი მნიშვნელობა და სარგებელი აქვს ინოვაციების და მეწარმეობის დანერგვას , განსაკუთრებით ისეთი ქვეყნისთვის როგორიც საქართველოა?

მეწარმეობასთან დაკავშირებით?	2. როგორ დაახასიათებდით ქართულ ინოვაციურ ეკოსისტემას, და რა არის მისი ყველაზე ძლიერი საყრდენი(pillar) ? 3. რა არის GITA-s პოზიცია უმაღლეს განათლებაში მეწარმეობასთან და ინოვაციებთან დაკავშირებით? 4. შეგიძლიათ მოგვიყვეთ GENIE პროექტის შესახებ, მისი მნიშვნელობასა და განხორციელების გზებზე? 5. როგორ შეაფასებდით თქვენს თანამშრომლობას უმაღლეს საგანმანათლებლო დაწესებულებებთან ? (რამდენად მყარია ეს კავშირები) 6. თქვენი პერსპექტივიდან, როგორ შეაფასებდით ზოგადად კომერციალიზაციისა და ტექნოლოგიური ტრანსფერი პროცესებს უმაღლესი განათლების კონტექსტში ? 7. როგორ ხდება დაფინანსებული პროექტების შედეგების გაზომვა/და გაქვთ თუ არა follow-up პოლიტიკა ? 8. როგორ აღწერთ აპლიკაციის შემოტანის პროცესს, კონკურენციისა და მკვლევართა დაინტერესების მხრივ?
B. რა არის არსებული გამოწვევები და შესაძლებლობები ქართული უმაღლესი საგანმანათლებლო დაწესებულებებისთვის ინოვაციისა და მეწარმეობის დანერგვისთვის?	1. თქვენი პერსპექტივიდან, რა არის მთავარი გამოწვევები უნივერსიტეტებისთვის, რომ ინოვაციებისა და მეწარმეობის დანერგვას ხელი შეუწყოთ ? 2. რა შეიძლება გაკეთდეს იმისთვის რომ ინოვაციური და სამეწარმეო პროცესები უფრო სწრაფად დაინერგოს როგორც სისტემურ დონეზე ასევე ინსტიტუციურად? 3. რა შეიძლება გაკეთდეს რომ წახალისდეს სამეწარმეო აზროვნება, start-up კულტურის დანერგვა და მომხმარებლით შთაგონებული კვლევა უნივერსიტეტებში?

C. რამდენად შესაძლებელია HEInnovate-ს ჩარჩომ და ინსტრუმენტმა წვლილი შეიტანოს ქართულ უმაღლეს საგანმანათლებლო სისტემაში?	1. გსმენიათ თუ არა HEInnovate ინსტრუმენტის შესახებ ? 2. იქნება თუ არა საინტერესო და სასარგებლო რომ მოხდეს ქართული უნივერსიტეტების ინოვაციური და სამეწარმეო შესაძლებლობების შეფასება (mapping) აღნიშული ინსტრუმენტისა და მისი ჩარჩოს გამოყენებით ?

Interview questions for NCEQE in English

Table 2: Interview questionnaire.

A. What is the current situation regarding the innovation and entrepreneurship in Georgian higher education context?	1. What is the stake of Quality Assurance Center (NCEQE) in terms of entrepreneurship and innovation in higher education? 2. Do you have any specific standard or requirement in terms of innovation in higher education? 3. From your perspective, who are the main stakeholders in the process of innovation and entrepreneurship? Who should collaborate to reach synergy? 4. How would you describe overall innovative ecosystem in Georgian higher education context?
B. What are current challenges and opportunities for Georgian higher education institutions to innovate and pursue entrepreneurship	1. From your perspective, what are the main challenges to foster innovation and entrepreneurship? 2. What could have been done to facilitate the process faster and more smoothly? 3. What is the nationwide interest and benefits to strengthen entrepreneurship and innovation? Especially for the country like Georgia 4. How do you see your role as QA center to support this type of processes and if you have any kind of agenda in that sense?

C. How could the HEInnovate approach contribute to the higher education system in Georgia?	1. Have you ever heard of HEInnovate tool? 2. From your perspective, to what degree university leadership and management can take independent decisions? 3. What is your stance about the integration of innovation and entrepreneurship in teaching and learning in Georgian higher education institutions? 4. Do you have any standard or requirements to support entrepreneurial mindset within universities? 5. How would you evaluate the digital presence of Georgian universities, their engagement? 6. From your perspective, what is the role of internationalization in terms of innovation and entrepreneurship in Georgia? 7. How universities can measure and analyze their impact of activities which are categorized as third mission, knowledge dissemination, projects) 8. Would it be interesting to measure and map innovative and entrepreneurial capacity of Georgian universities? 9. HEInnovate tool has 8 dimensions: which one of this sounds most relevant for Georgian universities?

<u>Interview questions for NCEQE in Georgian</u>

ცხრილი 2: ინტერვიუს კითხვარი.

A. როგორია საქართველოში უმაღლესი განათლების კუთხით არსებული მდგომარეობა ინოვაციებისა და მეწარმეობასთან დაკავშირებით?	1. რა არის განათლების ხარისხის ცენტრის ხედვა უმაღლეს განათლებაში მეწარმეობასთან და ინოვაციებთან დაკავშირებით? 2. გაქვთ თუ არა სპეციალური სტანდარდი ან მოთხოვნა რომელიც ინოვაციასთან და მეწარმეობასთან არის დაკავშირებული? 3. თქვენი აზრით ვინ არიან მთავარი დაინტერესებული მხარეები ინოვაციებისა და

		მეწარმეობის პროცესში, და ვინ უნდა თანამშრომლობდეს სინერგია რომ მივიღოთ? 4. როგორ დაახასიათებდით ზოგადად ინოვაციურ ეკოსისტემას ქართულ უმაღლეს საგანმანათლებლო კონტექსტში ?
	B. რა არის არსებული გამოწვევები და შესაძლებლობები ქართული უმაღლესი საგანმანათლებლო დაწესებულებებისთვის ინოვაციისა და მეწარმეობის დანერგვისთვის? C. რამდენად შესაძლებელია HEInnovate-ს ჩარჩომ და ინსტრუმენტმა წვლილი შეიტანოს ქართულ უმაღლეს საგანმანათლებლო სისტემაში?	1. თქვენი პერსპექტივიდან, რა არის მთავარი გამოწვევები იმისთვის რომ ინოვაციებისა და მეწარმეობის დანერგვას ხელი შეუწყოთ ? 2. რა შეიძლება გაკეთდეს იმისთვის რომ ინოვაციური და სამეწარმეო პროცესები უფრო სწრაფად დაინერგოს უნივერსიტეტებში (ფინანსები, ცნობიერების ამაღლება, წახალისება)? 3. რა სახელმწიფოებრივი მნიშვნელობა და სარგებელი აქვს ინოვაციების და მეწარმეობის დანერგვას , განსაკუთრებით ისეთი ქვეყნისთვის როგორიც საქართველოა? 4. როგორ ხედავთ ხარისხის უზრუნველყოფის ცენტრის როლს ამ პროცესებში და თუ გაქვთ რაიმე სამოქმედო გეგმა ამასთან დაკავშირებით? 1. გსმენიათ თუ არა HEInnovate ინსტრუმენტის შესახებ ? 2. რამდენად აქვს ავტონომია და მოქნილობა უნივერსიტეტს მიიღოს გადაწყვეტილებები? 3. რა არის თქვენი პოზიცია ქართულ უმაღლეს სასწავლებლებში ინოვაციების და მეწარმეობის ინტეგრირებაზე? 4. გაქვთ თუ არა რაიმე სტანდარტი ან მოთხოვნა რომელიც ხელს შეუწყობს სამეწარმეო აზროვნების წახალისებას 5. როგორ შეაფასებდით ქართული უნივერსიტეტების ციფრულ პრეზენს (presence)? 6. თქვენი აზრით რა მნიშვნელობა აქვს ინტერნაციონალიზაციას საქართველოში ინოვაციებისა და მეწარმეობის მხრივ? 7. როგორ უნდა ხდებოდეს მსგავსი აქტივობების (რომელსაც მიეკუთვნება: მესამე მისია, ცოდნის დისემინაცია, პროექტების) ანალიზი და შეფასება უნივერსიტეტის მხრიდან ? 8. იქნება თუ არა საინტერესო რომ მოხდეს ქართული უნივერსიტეტების ინოვაციური

	და სამეწარმეო შესაძლებლობების შეფასება (mapping) აღნიშული ინსტრუმენტისა და მისი ჩარჩოს გამოყენებით ? 9. HEInnovate-ს აქვს 8 განზომილება, თქვენი აზრით რომელი მათგანი შეესაბამება ყველაზე მეტად ქართულ უნივერსიტეტებსა და კონტექსტს.