Research in Kazakhstani universities: exploring faculty's perspectives

Dinara Dauletbayeva

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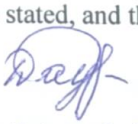
Signed: 

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Dear Dinara,

The NUGSE Research Committee reviewed the project titled "Research in Kazakhstani universities: exploring faculty's perspectives" and decided:

☐ To grant approval for this study

Approval: This approval is effective for the life of the study. However, any time you change any aspect of your project (e.g., recruitment process, administering materials, collecting data, gaining consent, and changing participants) you will need to submit a request for modification to the NUGSE Research Committee. Make sure to address all of the information requested on the request for modification form(s). Please be advised that in some circumstances, changes to the protocol may disqualify the project from approval.

Sincerely,

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(See Appendix A)

Acknowledgements

I would like to express my strong gratitude to my thesis supervisor, Chang Da Wan. His outstanding expertise, immense knowledge, constructive feedback and constant support helped me stay persistent and write a high-quality paper. I would also like to thank our professors Jack Lee, Ali Ait Si Mhamed, and Philip Montgomery for their passion in teaching their subjects and sharing this sparkle with us igniting the quench for knowledge and critical thinking. I am infinitely grateful to my parents and family for their love and support. I also thank my best friends for being by my side throughout this whole journey and making it more exciting and fun. Also, I want to thank the love of my life for pushing me writing this paper and being supportive when I needed it the most.

Research in Kazakhstani universities: exploring faculty's perspectives

Abstract

Research has been emphasized in several major Kazakhstani state policies on education and science development, and the importance of research lies in the promotion of innovation and economic development of the country. Within the research ecosystem of Kazakhstan, over 50% of researchers are faculty based in universities but there has been limited research done to illustrate their understanding and practice of research. This study seeks to examine faculty's understanding and practice of research in Kazakhstani HEIs. A multiple case study was based on a university (which is a part of SPIID 2015-2019) in which faculty's perspectives were explored across the three departments of hard sciences. This design was applied because it provides more extensive data to be collected and more profound understanding of the concept of research. Purposeful sampling was used to select the participants for the study. The findings of this study underlined the understanding and practice of research with the help of three perspectives: individual, social, environmental. From the findings, it is clear that faculty do not perceive research as their academic duty but rather as personal interest. Thus, faculty who are truly passionate about their profession can work even under constraints and in limited conditions as long as they are motivated by personal interest and curiosity. However, in order to achieve ambitious aims outlined in the state policies such as the integration of education, science and industry and commercialization, faculty should be more supported in the development of their research and entrepreneurial skills.

Keywords: faculty, research

Исследования в Казахстанских университетах: взгляды преподавателей

Абстракт

Роль исследований подчеркивается в главных стратегических документах по развитию образования и науки Казахстана, так как исследования способствуют инновационному и экономическому росту страны. Согласно статистике, более 50% всех ученых Казахстана составляют преподаватели университетов, однако вопрос понимания и практики исследований среди казахстанских преподавателей вузов не был глубоко изучен. Данная работа ставит своей целью изучить понимание термина «исследование» и исследовательской практики преподавателей вузов Казахстана. Методика данной исследовательской работы представляет собой изучение частных случаев, а именно трех кафедр точных наук одного университета в Казахстане, который является базовым вузом, осуществляющим подготовку кадров для ГПИИР 2015-2019. Данная методика позволила собрать более обширные данные и более глубоко понять концепцию исследования. Метод целевого отбора применялся в отборе участников данного исследования. Результаты данного исследования рассмотрены через призму трех перспектив: индивидуальная, социальная, внешняя. Результаты исследования показывают, что преподаватели не воспринимают само исследование как их академическую обязанность, а больше понимают исследование как личный интерес. Таким образом, преподаватели, которые действительно заинтересованы в своем исследовании занимаются им, несмотря на трудности и ограничения. Однако, для достижения таких амбициозных целей, обозначенных в государственных стратегиях, как интеграция образования, науки и промышленности и развитие коммерциализации, преподавателям нужна поддержка в плане развития исследовательских и предпринимательских навыков.

Ключевые слова: преподаватели вузов, исследование

Қазақстан университеттеріндегі зерттеулер: оқытушылардың көзқарастары

Аңдатпа

Зерттеулердің рөлі Қазақстанның бірнеше басты стратегиялық құжаттарында ерекше көрсетілген, себебі зерттеулер мемлекеттің инновациялық және экономикалық өсуіне ықпалын тигізеді. Статистика деректеріне сәйкес, барлық зерттеушілердің 50% астам университет оқытушылары құрайды, бірақ қазақстандық жоғарғы оқу орындарының оқытушылары арасында зерттеулерді түсіну және іс жүзінде іске асыру тереңдетіп қарастырылмады. Осы жұмыс өз алдына «зерттеу» терминінің түсінігін және Қазақстан жоғарғы оқу орындарының оқытушыларының зерттеу практикасын мақсат етіп қойды. Осы зерттеу жұмысының әдістемесі жеке жағдайларды қарастырады, дәлірек айтқанда, Қазақстандағы бір университеттің нақты ғылымдарының үш кафедрасы, ол ИИДМБ 2015-2019 кадрларды даярлаумен айналысатын негізгі жоғарғы оқу орны. Осы әдістеме одан да ауқымды деректер жинауға және зерттеу тұжырымдамасын одан да терең түсінуге мүмкіндік берді. Арнайы мақсатты іріктеу әдісі осы зерттеу үшін қатысушыларды іріктеп алуға қолданылды. Осы зерттеудің нәтижесі үш перспектива призмасы арқылы қаралды: жеке, әулеметтік, сыртқы. Зерттеу нәтижесінде оқытушылардың зерттеуге ара-қатынасы академиялық міндет ретінде емес, жеке қызығушылығы ретінде қабылдайтыны анық болды. Осылайша өз зерттеуіне расында қызығушылық танытқан оқытушылар қиындықтар мен шектеулерге қарамастан онымен айналыса береді. Алайда, мемлекеттік стратегияларда белгіленген, білім беруді, ғылым мен өнеркәсіпті және сауда саттықты дамытуды қарастыратын мендмендік мақсаттарға қол жеткізу үшін оқытушыларға зерттеулік және кәсіпкерлік бағыттағы қолдау керек.

Негізігі сөз: оқытушылар, зерттеу

Table of Contents

List of Tables

Chapter 1. Introduction

1.1 Introduction

This chapter introduces the research topic of this study which is focused on the faculty's perceptions of research. The reader will be provided with the background information to understand the context of the research problem. Then, the problem statement, the purpose of the study with the research question, significance, and benefits of the study along with the thesis outline are introduced in this chapter.

1.2 Background information

Academic research has not been thoroughly investigated in a systematic way, although it is a significant component of the workload at universities (Brew & Lucas, 2009). Most of the research conducted focused on science studies, knowledge production, teaching and research, research communities, or faculty research from library's perspectives (Akerlind, 2008; Brew & Lucas, 2009; Emmelhainz, 2017; Faliciani-White, 2016; Phoenix & Henderson, 2016). However, the need to explore faculty's understanding and practice of research is crucial as "research, as a subset of academic practice, is highly complex, and there is much to be gained from understanding its components and how they interact" (Faliciani-White, 2016, p. 119). Today universities are gaining recognition through promotion of research and innovation (OECD, 2017); hence, faculty research is important to investigate.

Reforms in Kazakhstan are aimed at accomplishing one of the main aims of the Strategy "Kazakhstan-2050" of becoming one of the 30 most developed countries in the world (Akorda, 2012). It is widely acknowledged that innovation is the main booster of economic development, and this is promoted through extensive research work (National Science Board, 2012). Many countries which have taken up leading positions globally have shown the need for having high-level research development that enabled them to create

innovations in different spheres of life and outstrip the rest of the world. China is one of such bright examples which has managed to become one of the world's economic powers as a result of its successful reforms undertaken in education and research over the last three decades (Bugnar & Fora, 2016).

Kazakhstan is likely to achieve its ambitious goal of becoming a highly-competitive country on a global level provided it increases the research potential of its universities. According to the National Report on Science for the year 2015, 390 organizations were involved in conducting research in Kazakhstan, and out of which there were 90 organizations within the higher education sector (MES & NAS, 2016). As the economic and social growth of developing countries depends to a large extent on the existence of research universities, it may be necessary to have more higher education organizations involved in research activities (Altbach, 2009). Active research at universities contributes to scientific breakthroughs and innovations, which can also be adopted by the local communities to address various issues of current importance to the society (Smith & Bagchi-Sen, 2012). The President of the Republic of Kazakhstan, Nursultan Nazarbayev stated: "In order to establish the science-based economy, first, it is necessary to increase the potential of Kazakhstan's science" (MES & NAS, 2014, p. 3), where universities play one of the most crucial roles.

1.3 Problem statement

Although the government is striving to promote education, science, and industry integration; yet education and science are still regarded separately at the governmental and policy levels. In the Strategic Plan of the Ministry of Education and Science of the Republic of Kazakhstan for the years 2017-2021, the fourth and fifth strategic directions refer to higher and postgraduate education and the development of science respectively, but the interrelation between these two directions has not been explicitly stated (MES,

2016b). There is a lot of information on research which can be obtained on a policy level, but it seems that the role of faculty on the institutional and individual levels is under-researched. There has been little empirical research done to explore how research is understood and practiced by faculty in Kazakhstani universities apart from a few researchers such as Iskakova, Beltenova, Tokbalanova, and Andirzhanova (2016), Kuzhabekova and Mukhamejanova (2017), Shakirova and Nurakhmetova (2015). Other articles published by Kazakhstani authors are focused on the issues of innovations or integration of education, science, and industry but do not provide a deep empirical analysis (Abdieva & Shamsharkhan, 2014; Aliyev, 2016). However, it is crucial to find out faculty's perceptions of research because when the policies on university research are designed, faculty become the main actors in their implementation. Therefore it is necessary to explore how faculty themselves understand the concept of research and how they conduct research under existing policies.

1.4 Purpose of the study and research question

The purpose of this study is to explore how research is understood and practiced by faculty at universities in Kazakhstan, which is guided by the following research question: How do faculty members at Kazakhstani universities understand and practice research?

The importance of exploring faculty's understanding and practice of research is vital for the research policy implementation in Kazakhstan. Faculty are one of the main actors who are involved in boosting research at universities. Thus, in order to successfully promote the integration of education, science, and industry and the process of commercialization, the perceptions of faculty should be investigated to understand the real situation with research at universities.

1.5 Significance and benefits of the study

The significance of this study is that it contributes to the limited existing literature on faculty research in Kazakhstan by deeply exploring faculty's understanding of research and research practices. The MES is encouraging faculty to publish more in journals with an impact-factor and engage in the commercialization activities which is emphasized in the main strategic documents. Thus, a proper understanding of faculty's perceptions might be useful for policy-makers and help address the question of low integration of education, science, and industry by identifying faculty's roles in this process which is likely to lead to more effective policies.

The insights into understanding and practice of research among faculty can be beneficial in several ways. First, it is rewarding for the faculty, who are mainly involved in teaching, because finding out more about current trends and difficulties experienced in the field of research will lead to a better understanding of research practice, and also contributing to the increased knowledge enhancing the quality of education provided at universities through research. Second, it will be valuable for a particular region if there is a developed research activity at this university, or the whole country on a global scale since research at universities can address important issues and develop the country in economic regard. And last but not least, businesses and enterprises might benefit as well, as it will enable them to learn more about the real situation with research and encourage them to work in collaboration with universities for mutual benefit.

1.6 Outline of the Thesis

In order to answer the research question on faculty's understanding and practice of research this thesis paper has been organized in the following way:

Chapter 1 introduces the reader with the research topic by providing background information on the context of research and identifying the problem statement followed by the purpose of the study, the research question, significance, and benefits of the study.

Chapter 2 provides an extensive literature review from three dimensions such as policy, institutional and individual. Policy level comprises the Kazakhstani context, research universities, differences between basic and applied research, and common challenges faced by Kazakhstani researchers. Institutional level covers the influence of the Soviet legacy and international cooperation, while the individual level is focused on the idea of research, different roles faculty perform at university and their motivation to do research.

Chapter 3 justifies the application of the qualitative research design for this study and provides an overview of the methodology used and the main procedures followed.

Chapter 4 discusses the findings in a similar pattern as illustrated in the literature review, but it starts with the individual level proceeding to the social level and environment.

Chapter 5 presents the discussion section in which the main findings are incorporated into the literature.

Chapter 6 concludes the paper by answering the research questions providing the limitations of the study, its implications, and recommendations for further research.

Chapter 2. Literature review

2.1 Introduction

This chapter analyses the available literature related to the topic of research in Kazakhstani higher education institutions and international experience. The questions of what constitutes research and what the research process comprises are explored using a number of sources of literature examining the issue from policy/environment, institutional/social and individual perspectives. The reason why the literature review is presented in such an order is that it seems that top-down approach is still prevalent in many fields of Kazakhstan, including education and science. Thus, first, it is necessary to investigate how research is regarded at the policy level, how it is practiced on the institutional and then examine an individual understanding of research.

2.2 Policy level/Environment

2.2.1 The Kazakhstani context. The following section presents some background information on the development of science and research across universities in Kazakhstan.

To begin with, the State Program on the Development of Education and Science for the Republic of Kazakhstan for the years 2016-2019 (MES, 2016a) has been the pivotal document guiding the development of education. However, this document is slightly scattered as it covers all levels of education (nursery, elementary, primary, secondary, vocational education and training, higher education) and science, and therefore has not focused on specific issues. One of the main objectives of this program is the development of competitiveness in education and science which is believed to play a crucial role in Kazakhstan's economic development. Thus, it is important to understand that in order to achieve the targets research should be developed at higher education institutions (HEIs). Out of 26 objectives, there are eight which concern science, commercialization, and innovation, but there is no separate objective for the role of science and research

particularly in the system of higher education except for the general aim of integrating education, science and the industry (MES, 2016a). The reason for this might be that overall the State Program is more focused on the development of education in general, but since the word "science" is present in the title of this program and the integration of education, science, and industry has been a major theme, the role of research at universities should be articulated more explicitly in the objectives.

According to the UNESCO (2015), Kazakhstan has the second largest share of researchers (17,000 researchers) among Central Asian countries after Uzbekistan. However, in comparison with developed countries this figure is relatively low (OECD, 2017). In terms of sector of employment, it is explicitly seen that most researchers are occupied in the higher education field with over 50% (UNESCO, 2015). Therefore, the need to investigate faculty research is relevant.

One of the objectives mentioned in the last section on Science is to strengthen the scientific potential and elevate the status of a scientist (MES, 2016a). However, it is important to mention that the main actions named in order to achieve this goal are mostly based on modifications of the legal acts. The legal framework for the development of education, science, and innovation in Kazakhstan was presented in the OECD (2017) Reviews on Innovation Policy of Kazakhstan, which provided a precise timeline on all laws, policies, and strategies adopted to contribute to the country's progress in terms of science and innovations. One of the criticisms made by OECD (2017) lies in the observation that some programmes had overly ambitious aims because they determined expectations that are too high to achieve in a very short period of time (p. 37).

Regarding faculty's engagement in research at universities, it seems that most of the target indicators comprise quantitative data which are aimed at increasing the number of publications in high-impact journals, the number of commercialized projects, and the

overall number of faculty who are engaged in research (MES, 2016a). However, it is not specified precisely what steps are to be taken in order to increase the output of faculty's publications in high-impact journals, how faculty will be trained to become highly competent in research, and what kind of skills they should possess to strengthen their research potential. Now it remains unclear whether policy-makers in Kazakhstan are more interested in quantitative indicators or rather committed to improving the quality of research in universities.

The principle of "publish or perish", which implies producing a certain number of quality articles for the sake of tenure, puts a significant pressure on Kazakhstani researchers to publish in the high-tier journals which is not always easy to accomplish due to time and financial constraints (De Rond & Miller, 2005, p. 322). In Kazakhstan, faculty's publications in high-impact journals can play an important role in "academic promotion and career development" (OECD, 2017, p. 129). According to the Report on the implementation of the State Program on the Development of Education for the Republic of Kazakhstan for the years 2011-2020 (MES, 2015), it is evident that some of the target indicators have been achieved. The number of faculty who publish in journals with an impact-factor reached 9.9% in 2015; this is about an 8% increment within five years (MES, 2015). This indicator is not high in comparison with developed countries, and this report highlighted that the low level of English proficiency by faculty and the lack of scientific writing skills according to international standards have been the major challenges for faculty to publish in high-impact journals. Another challenge to publishing scientific articles is inadequate access to information (Kairatbekkyzy, 2016). A simple reason is that it is expensive for researchers to get a subscription to these journals. However, in Central Asia researchers in Kazakhstan have been the most productive in terms of the number of

scientific publications published that accounted for approximately 56% of all Central Asian scientific publications in 2014 (UNESCO, 2015).

Another important trend in university research is the commercialization of research results for commercial benefit. The Law on "Commercialization of Results of Scientific and Technical Activities" (Akorda, 2015) defines different aspects of commercialization quite exhaustively itemizing all important actors, their obligations, and rights, methods of state support to promote commercialization and monitoring commercialization of research results. However, the productivity of the commercialization centers remains uncertain as too high targets were set to be accomplished in a rather short period of time (OECD, 2017). OECD (2017) pointed out the main challenges which hinder the development of commercialization such as high bureaucracy and low entrepreneurial skills. In Article 4, one of the steps towards increasing knowledge on commercialization was to design and implement the program on re-training and improving qualifications of those engaged in the field of commercialization (Akorda, 2015). However, it is not clear whether all faculty conducting research can participate in this program or it only relates to those working in the offices of commercialization. In addition, the number of hours allocated (72 hours on re-training and 36 hours on improving qualifications) also seems insufficient to obtain cutting-edge and profound knowledge on the complex process of commercialization.

Another strategic document related to the promotion of research and innovation is the State Program of Industrial-Innovation Development 2015-2019 (Akorda, 2016). It is necessary to note that 11 universities were chosen as the base for the implementation of this program (MES & IAC, 2016). However, this program is targeted predominantly on the industry and it is not clear in what ways and to what extent faculty will play a role in the implementation of this economic initiative in Kazakhstan, apart from curriculum development.

Overall, upon brief analysis of policies on science and research in Kazakhstan, it is obvious that although the role of research at universities is clearly understood, the role of faculty seems to be under-researched. Therefore, the focus on faculty's perception and practice of research is vital to understand faculty's role in university research.

2.2.2 Research universities. Since a number of universities in Kazakhstan have declared in their missions the aim of becoming research-oriented universities or increasing research capacity, it is important to examine the practices of research-intensive universities locally and internationally.

The importance of research universities in Kazakhstan lies in the "knowledge transfer", which implies the capacity to transmit knowledge to the community and to turn it into applicable knowledge by creating innovations which can be useful for a particular region (Abdyrov, Tashkenbayev, Askarova, Kudaibergenova, & Alimkulova, 2017, p. 4). This concept drives innovations in Iran, where despite the sanctions research is quite developed and focused on solving specific issues particular to their country (Lai, Ahmad, & Wan, 2016). More interestingly, research in Iran has shifted "from being publication-focused to emphasizing commercialization and product development" (Lai et al., 2016, p. 99). This approach has allowed them to develop research and produce innovations under external constraints "achieving self-sufficiency" (Lai et al., 2016, p. 99).

Altbach (2009) in his study also emphasizes the importance of establishing research universities in developing countries, which is argued as vital for their economic progress and development. The benefits of creating a research university are indisputable; however, it does not mean that all universities must become research-oriented and that high-quality education cannot be delivered in a traditional university. In addition, it is obvious that constructing a brand new research university in a developing country is rather problematic due to the large expenses; nevertheless, it will benefit universities in the long-term if they

try to “develop research capacity and the ability to participate in the world knowledge system” (Altbach, 2009, p. 16).

Currently, one of the worldwide trends in higher education is achieving the status of a world-class university in order to be prestigious on the global arena and become attractive for students and faculty internationally. This is also reflected in some of the missions of Kazakhstani universities which aim at achieving the top positions in the global rankings and conducting cutting-edge research on the international level. Undoubtedly, a solid research base is one of the main components of building a world-class university. Strong and consistent science and innovation policies in China enabled this country to rise to the top to equally compete with countries, which have already taken leading positions in this field (Cassiolato & Vitorino, 2009). For instance, Project 211 focused on advancing education and research at 100 chosen universities by substantially increased funding which would contribute to the development of the economy, science, and technology (Yang & Welch, 2012). Then, the 985 Project selected a smaller number of universities to promote them to world-class positions by enhancing their research capacity (Zhang, Patton, & Kenney, 2013). Due to its successful reforms and heavy funding, China has been able to significantly increase the number of scientific publications by overtaking the UK and almost catching up with the US (Zhang et al., 2013). However, the question of quality should not be neglected as the index of citations for these publications still remains rather low in comparison with developed countries (Postiglione, 2015). In addition, it was speculated that such a dramatic boost in the number of publications might be a result of a surge in the number of post-graduate degrees awarded (Zhang et al., 2013). It is necessary to highlight that in the quest for reaching the top rankings, the quality should not be compromised for the sake of quantity, which should be taken into account by policy-makers in Kazakhstan.

For a university to become world-class there are three basic factors which are essential to consider (Salmi, 2011). The first is having a "concentration of talent" (Salmi, 2011, p. 228). Increasing scientific potential is one of the priorities of science in Kazakhstan (MES & NAS, 2017). However, out of 619 PhD graduates in 2016, only 44 people decided to pursue their career in science which shows the low attractiveness of this field in Kazakhstan (MES & NAS, 2017, p. 58). Obviously, research universities should invest in human capital and attract the smartest students and the most highly-qualified faculty to build an excellent research system.

Second, "abundant resources" are vital for attracting and retaining the best minds (Salmi, 2011, p. 230). There is no doubt that in order to provide high-quality education and carry out cutting-edge research projects, extensive resources are an important sine qua non. If it is more or less possible to enroll talented students and hire qualified staff at university, the provision of funding and resources has always remained a touchy subject for developing countries such as Kazakhstan. The share of internal expenses for science in Kazakhstan slightly decreased in 2016 in comparison with 2015 comprising 0.14% of GDP, while this indicator for the leading countries in science ranges from 2.7 to 4.3% (MES & NAS, 2017, p. 61-62). This report also shows a downward trend in the salaries of scientists, particularly in HEIs, which can be one of the factors of the brain drain. In terms of funding, more than half of all internal expenses for science are funded from the state budget (MES & NAS, 2017). However, due to a decrease in state funding, HEIs have to diversify their sources of funding by looking for alternative ways such as commercialization. Additional funding can also be provided by competitive grants and international collaborations (Altbach, Reisberg, Slami, & Froumin, 2018, p. 6).

The last characteristic of a world-class university defined by "favorable governance" (Salmi, 2011, p. 231) gives universities a chance to become more

independent. The Ministry of Education and Science in Kazakhstan has planned to gradually transform centralized systems of universities to more autonomous institutions by the year 2018 (Sagintayeva & Kurakbayev, 2015). Historically, universities in Kazakhstan have not been able to take part in the decision-making process regarding teaching and research (Sagintayeva & Kurakbayev, 2015). Now the only exception is Nazarbayev University, which was granted full institutional autonomy according to the ad hoc legislation (Katsu & Saniyazova, 2018). This law has allowed Nazarbayev University to establish a sustainable education and research environment which satisfies international standards (Katsu & Saniyazova, 2018, p. 71). One of the positive aspects of granted institutional autonomy is that faculty are encouraged to participate and make decisions in the life of the university. However, the question that might arise here is how far faculty in Kazakhstani universities used to accountability to the Ministry are ready to embrace this autonomy and become more independent. Nevertheless, these changes are likely to have a positive impact on the research development in Kazakhstan as autonomy will create competitiveness and thus will lead to innovations in many sectors of education and science.

2.2.3 Basic vs. Applied research. The main source of funding for research at universities comes from the Ministry of Education and Science; however, the biggest share of it is allocated specifically for applied research. According to the statistical information provided on the official website of the Ministry of National Economy of the Republic of Kazakhstan Committee on Statistics (MNE, 2017), in 2013 the amount of internal current expenses for fundamental research was significantly lower than that of applied research (18,000 million Tenge and 33,000 million Tenge, respectively). Moreover, in 2017 the former dropped considerably by 8,000 million Tenge, whereas the opposite pattern could be observed in the latter situation. We can see that the ratio constitutes 1:4, which shows that a greater importance is paid towards applied research.

It is not surprising that the government of Kazakhstan is striving to promote the development of the industrial sector as is seen in the State Program of Industrial-Innovation Development 2015-2019 (Akorda, 2016). However, the question arises here, whether our country is only focused on applied research and is not interested in the development of fundamental research. From the statistics, it seems that in Kazakhstan, universities are encouraged to do more applied research, but the problem is that their output does not always meet the demands of the market due to the poor involvement of the private sector. For instance, lack of relevance of university research for industry needs was mentioned as one of the problems of commercialization (OECD, 2017). This is explained in a way that universities receive funding for research which is not coordinated with the industrial sector, which creates research results not relevant to the market (MES, 2016a). The reason for this low integration between education, science, and industry as indicated in the State Program is lack of financial stimulus for the private sector to cooperate with universities (MES, 2016a).

Basic and applied research are both necessary to boost the innovation processes in developed and developing countries (Czarnitzki & Thorwarth, 2012; Gersbach & Sorger, 2009). The main aim of basic research is creating new ideas as well as expanding existing theories and methods without the aim of generating profit. In contrast, applied research is focused on the practical application of the result of basic research, and at times may have the aim of commercializing the final product (Gersbach & Sorger, 2009). It might not be a good idea to separate these two types of research as they are interdependent and complement each other.

According to Gersbach and Sorger (2009), basic research is mainly funded by the government, whereas applied research is supported by the private sector. The reason why some governments may be reluctant to invest more in basic research can be its “vague

nature", which makes a researcher uncertain about its future outcomes, application and overall success (Czarnitzki & Thorwarth, 2012, p. 3). However, from the Kazakhstani policies, it becomes evident that there is a stronger emphasis on specific results, which explains the prioritization of applied research.

2.2.4 Common challenges with research at universities in KZ. A number of challenges concerning research development were indicated by the State Program on the Development of Education and Science for the Republic of Kazakhstan 2016-2019 with the following being related to higher education: division between science and education, low level of infrastructure for conducting research, low level of funding, high level of bureaucracy, low level of involvement of the private sector, and lack of effective monitoring of scientific-research work (MES, 2016a). These are general problems, but it is interesting to find out how faculty themselves understand and practice research, what the challenges faced by the faculty are and how they deal with emerging issues.

Aliyev (2016) along with some positive establishments in Kazakhstani science such as commercialization centers, business incubators, and growing academic mobility introduced a number of issues to be addressed such as the low interaction between educational institutions and the labour market, resulting in the slow development of innovation. Abdieva and Shamsharkhan (2014) referred to insufficient knowledge of foreign languages, ageing faculty, lack of infrastructure and low funding as the main complications which impede innovational advances in the education sector in Kazakhstan. Based on the study conducted in a medical university in Kazakhstan, it was revealed that faculty members are not engaged in research as actively as desired due to low salaries (Iskakova et al., 2016). In addition, due to a large teaching load, faculty are not able to engage in research fully or they have to sacrifice their teaching responsibilities which might result in the deterioration of the learning process. Additional challenges which were

mentioned include poor quality of equipment, bureaucracy, low commercialization, low applicability of patents, and expenses related to payment for publishing articles (Iskakova et al., 2016).

One of the obstacles to conducting proper research can be bureaucracy as mentioned by MES (2016a) and OECD (2017). Faculty complain that they have to fill in numerous reports on their research which takes away their actual time from conducting research. Usually, bureaucracy is regarded from the negative perspective which hinders the fast flow of work, causes annoyance and demotivation, and limits innovation (Adler & Borys, 1996). Katsu and Saniyazova (2018) also named "the highly bureaucratic nature" of the Kazakhstani administration system as one of the obstacles when implementing the program of building Nazarbayev University (p. 70). Conversely, there is an understanding that bureaucracy is necessary to guide work and promote transparency (Adler & Borys, 1996). This way administration is able to track how research funding is spent to avoid corruption.

Scientific and research work in Kazakhstan is mainly funded by the state in three ways: basic funding, grant funding, and program-targeted funding (Akorda, 2011; UNESCO, 2015). Basic funding covers the maintenance of infrastructure, salaries, and access to information. The purpose of grant funding is to increase the competitiveness and quality of scientific organizations and to promote commercialization through financing research projects. Program-targeted funding is also allocated on a competitive basis prioritizing state strategies. However, as mentioned earlier the level of funding for Kazakhstani science is significantly lower than in the developed countries in terms of GDP (MES & NAS, 2017). Therefore, it is obvious that it is rather challenging to achieve high results on the international level given such scarce funding for research. It was stated that the low level of basic funding for research in Kazakhstan makes it rather difficult to

transfer to the knowledge-based economy and create innovations (OECD, 2017, p. 24). In addition, competitive grants have also been criticized for funding "a large number of very small projects led by individual researchers or small teams" (OECD, 2017, p. 24). This might be a sign that the funding allocation system in Kazakhstan should be revised to become more effective and efficient.

It is obvious that the importance of conducting research at universities is clearly understood among scholars in Kazakhstan particularly in terms of education, science and industry integration, but what is missing is empirical research on how faculty themselves understand and practice research at universities in Kazakhstan.

2.3 Institutional level/Social

2.3.1 Soviet experience vs. Contemporary model. At the beginning of the twentieth century such countries as Germany, France, the USA, and the Soviet Union opted for the establishment of research institutes, where there were no teaching loads for researchers, so they could fully immerse themselves into conducting research (Graham & Dezhina, 2008). The authors point out that this seemed to be a worldwide trend among developed countries; however, with time these countries came to the realization that "teaching, far from being an impediment to research, was actually a stimulus to it" (Graham & Dezhina, 2008, p. 8). For instance, German universities are associated with the Humboldtian idea of a university, where one of the main principles was "the unity of research and teaching" (Pritchard, 2004, p. 510). These two concepts apart from being quite different can be mutually beneficial. Hence, these non-teaching research institutes started to transform into research universities, which have occupied an important role in promoting science and conducting research.

In Soviet universities, faculty had big teaching loads and were "neither encouraged nor expected to conduct research" (Graham & Dezhina, 2008, p. 11). Moreover, the

Academy of Sciences was criticized for having a superior status and more privileges than the university research which led to dissatisfaction among university professors (Graham & Dezhina, 2008, p. 13). As regards faculty in modern Kazakhstan, apart from heavy teaching loads, they are expected to conduct research, which is stated in the Law on Science (Akorda, 2011) according to which science and research are also seen as priorities in higher education. In 1996, Russia adopted the Integration Program, where the main focus was "to bring teaching and research together", which worked quite effectively at some Russian universities (Graham & Dezhina, 2008, p. 129). That is why, in order to improve research among faculty at Kazakhstani universities, some similar policies could be instituted which would regulate teaching and research work and keep them in balance.

It is not surprising to know that Soviet scholarship was highly influenced by politics due to the totalitarian regime (Niyozov & Shamatov, 2006). There was rather strict censorship in publications to avoid unwanted statements and articles. There was a strong involvement of the Party in the affairs of the Academy of Sciences in order to monitor their research activities and give orders (Friedman, 1969). It means that some creative ideas were shut down which hindered the faster progress of science. This might be one of the reasons for the lack of qualified researchers and appropriate conditions for research development in Central Asia (Niyozov & Shamatov, 2006). Nevertheless, it should not be neglected that Soviet science, particularly hard sciences, were well-developed and could compete on the international level (Esengarayev, 2017). However, a strong emphasis on exact sciences and industry left social sciences on the margins (Esengarayev, 2017). Despite all the negative aspects, the Soviet Union managed to create a very strong "scientific base" which made it one of the strongest empires of that time (Bowen, 1962, p. 433).

The contemporary model that Kazakhstani researchers follow seems to resemble more of Western science in their pursuit of taking the best practices from developed countries. In 1967 George Basalla published an article introducing a model of spreading of western science. He named several European countries which he considered to be pioneers of science equating western science with modern science (Basalla, 1967). Western modernism is associated with "progress optimism and emphasis on knowledge for productivity" (Sjostrom, 2017, p. 150). The other common characteristics attributed to Western science are "positivism, objectivism, reductionism, rationalism, and modernism" (Sjostrom, 2017, p. 151). It is also interesting to see how the author compares Eastern and Western culture to illustrate their differences that can be characterized as "formality vs. free-thinking; conformity vs. independence; and obedience vs. autonomy" (Sjostrom, 2017, p. 151). However, Kazakhstan is a young country of the former Soviet Union, which gained its independence in 1991. Therefore, the Soviet legacy still has its influence on different spheres of people's life such as mentality, culture, education, science, and research, which makes it impossible to fully embrace the western model due to the vestiges left from the Soviet time. In addition, not all research skills particular to the Western science might be applicable for the Kazakhstani context due to significant variations in the level of development and funding opportunities (Kuzhabekova & Mukhamejanova, 2017).

2.3.2 Cooperation. Social inputs play a significant role in faculty's understanding and practice of research, where social interactions among scholars provide an opportunity to collaborate with each other at work or conferences in order to share their experience and create new ideas (Faliciani-White, 2016). Communication among academics plays a major role in knowledge dissemination and building reputation (Becher & Trowler, 2001). These authors also examined academic networks by viewing them from "an inner and outer circle of professional acquaintance" (Becher & Trowler, 2001, p. 92). The outer circle can

include up to 400 people, for example, including people met at the conferences, whereas the inner circle implies closer links with an average of six people, who have common research interests and who can provide assistance and useful comment on one's work (Becher & Trowler, 2001). However, lack of trust is identified as one of the impediments towards knowledge sharing and thus a low level of research collaboration where faculty "are more likely to hide what they know" (Tan, 2016, p. 528). Becher and Trowler (2001) add that the reason for such behavior might be "the fear of theft" (p. 120).

Social inputs and outputs support the idea of "communities of practice", which represent a group of people who have similar interests in a field of research and advance their knowledge through collaboration (Shen, 2007, p. 5). Faculty communities of practice are considered to be a tool for enhancing faculty's research competence and encouraging interaction with each other (Nadelson, 2016). Currently, it is hard to imagine research without the collaboration of researchers within and between different departments (Monroe-Gulick, Valentine, & Brooks-Kieffer, 2017). Edward (2012) suggested that research tends to have "interdisciplinary nature" (p.116). The first reason Edward (2012) pointed out was cuts in funding which forced researchers to work together to have a better chance of getting some funding. Second, it is rather challenging to separate fields from one another as more and more problems required collective knowledge from different spheres. Third, in the era of internationalization, it is almost impossible to be confined to one country; thus, research has also become "an international or global reality" (Edward, 2012, p. 117).

Undoubtedly, internationalization has further promoted the development of academic networks in the following dimensions: staff mobility, institutional collaboration, and exchange of ideas (Scott, as cited in Becher & Trowler, 2001, p. 94). It has been suggested that "immobile academics" are less likely to achieve the same research

productivity as their mobile counterparts focusing more on national journals rather than international venue (Horta, 2013, p. 506). Although international collaboration is quite developed between Kazakhstan and foreign countries which is proven by co-authored publications, the cooperation within Central Asian countries is not so strong (UNESCO, 2015). Russia, the USA, Germany, UK, and Japan are among the top countries which have established research partnerships with scientists in Central Asia based on the number of papers published together (UNESCO, 2015). International networks and collaborative research projects are one of the many components which help build up research reputation (O'Loughlin, MacPhail, & Msetfi, 2015). One of the recommendations made by the UNESCO in 2015 was to promote cooperation in research among Central Asian countries. This is quite important as due to the regional proximity enhanced research cooperation can create a useful network and collaborative innovation projects to advance the countries' economies. In terms of economic globalization, scientific research carried out in one country may be applicable for another country and used for industrial and commercial purposes, which might also be advantageous for the regional development (Becher & Trowler, 2001).

2.4 Individual level

2.4.1 The concept of research. Newmann (1993) stated that although research has become an important part of university life, there is no universal definition of this term. It is interesting to note that in his study the participants were dissatisfied with "their inability to define 'research' appropriately" because they were afraid to provide too general or too narrow definition due to its complexity (Newmann, 1993, p. 100). Nevertheless, he was able to identify three main constituents of research such as new knowledge generation, enquiry, and "the dissemination of research results" (Newmann, 1993, p. 108).

Akerlind (2008) analyzed 10 key studies on an academic understanding of research. However, the studies investigated either focused on research-oriented universities, specific disciplines, outcomes of research or its importance, but not as much on faculty's understanding of research. Upon integrating literature review Akerlind (2008) conducted an empirical study on what "being a researcher" means by interviewing faculty at an Australian research-oriented university (p. 23). Four main dimensions of being a researcher at university were identified. The first one relates to "fulfilling academic requirements", which regards research as part of the job of an academic and involves a certain procedure of carrying out research (p. 24). "Research as integrated within institutional mission" can be regarded as another dimension of research (Edward, 2012, p. 116). It seems that universities have become obsessed with research and they see it as one of the main opportunities to achieve top positions in the ranking system which requires faculty to be more engaged in research. The second category is connected with a researcher's recognition in the field because of a new discovery. Kiley and Mullins (2005) also add that research is the discovery of new knowledge in a creative way or simply "new ways of seeing" some phenomenon (p. 251). The third characteristic of research is personal interest, which is an important intrinsic motivation factor to be engaged in research to find an answer to the question "that has been puzzling her/him" (Akerlind, 2008, p. 26). The main focus of the fourth category is bringing benefit to the society, which implies conducting research which is likely to have practical application and use. It is stated that in order for research to occur such components as "the human gifts of intellect, curiosity, and skill" are necessary which encourage a researcher to explore and discover new ways for the improvement of the people's welfare and society (Edward, 2012, p.114).

Brew (2012) developed a model of understanding research examining this concept from external and internal perspectives (p. 104). From the external view, the main aim of

research is to come up with solutions to problems and result in publications (Brew, 2012). The internal view is focused on the research process itself paying attention to investigating and uncovering something new (Brew, 2012).

In other studies conducted by Bills (2004) and Kiley and Mullins (2005) on supervisors' understanding of research, it was revealed that research constitutes a deep investigation of an issue in a rather systematic way following a particular methodology. To be more precise, from the perspective of postgraduate students, research is regarded as collecting data, finding new information, profound understanding of a subject and finding solutions, while from the perspective of supervisors, research is seen as "the rigorous application of systematic methods" to discover new knowledge "in new ways of seeing the world, oneself or a problem" (Akerlind, 2008, p. 21). According to the regulatory documents in the US, research has been defined as "systemic investigations that are designed or intended to contribute to the advancement of generalizable knowledge" (Edward, 2012, p.114). In other words, university research has a certain pattern every faculty member follows and it does not occur in a chaotic way.

The participants of the study on faculty research needs and challenges pointed out the following instruments necessary for them to do proper research: "subject knowledge, collaborators, graduate students, data analysis, access to research materials, research design, skill sets, computation, data" (Monroe-Gulick et al., 2017, p. 783). Therefore, it is necessary to identify whether similar needs and challenges are typical for Kazakhstani faculty engaged in research.

2.4.2 Faculty's roles. If we study research in broader terms, it will allow us to better understand its role in the university system and its interaction with teaching and service (Faliciani-White, 2016). A faculty member plays a number of roles while working at a HEI. According to Bentley and Kyvik (2013), the main responsibilities of a university

professor comprise teaching, supervising doctoral students and taking part in administrative work (p. 330). This situation is similar to the Kazakhstani context but numerous faculty members complain about the lack of time to devote to research due to heavy teaching responsibilities and additional service work.

At many HEIs faculty have to be engaged in both teaching and research simultaneously. Some faculty believe that teaching should be the priority of any HEI, whereas others state that research should never be neglected for the sake of "quality and standards" (Tennant, McMullen, & Kaczynski, 2010, p. 165-166). Research is usually considered to have a "higher status as an indicator of academic excellence", where researchers possess certain privileges like better funding, while faculty, who are not engaged in research, have to take more teaching hours "as a punishment" (Tennant et al., 2010, p. 166).

Tennant et al. (2010) present the scarcity model, according to which teaching and research should be separated: it is destructive when faculty are involved in both. For example, those who are not experts in research can focus on their teaching responsibilities to improve rather than trying to be good at both and have the opposite result. It is rather challenging to combine both due to time constraints and energy demands (Tennant et al., 2010).

One of the other roles performed by a faculty member of the modern world is that of an entrepreneur. Due to decreasing funding in HEIs, in order for faculty to survive, they have to engage in entrepreneurial activities to gain access to external resources and funding in the form of research grants (Bentley & Kyvik, 2013). For instance, sixteen higher educational institutions in Kazakhstan established commercialization centers (MES, 2015). Thus, academic entrepreneurs are seen as conductors of research results to the market with the aim of commercial benefit (Rahim, Mohamed, & Amrin, 2014). It is stated that

previous experience of working in the commercial sector may be a driving factor for a faculty member to be engaged in academic entrepreneurship (Rahim et al., 2014). However, the main drawback of being an entrepreneur can be that the aims and desires of "external stakeholders" do not always coincide with the university's mission (Bentley & Kyvik, 2013). In this case, there is a danger of faculty engaging in research just for the sake of money even though this area may not be of particular interest or use for this particular institution.

2.4.3. Motivation. Lastly, it is important to investigate the main motivating factors for faculty to conduct research in order to better understand their perceptions and practices. Faculty motivation can be studied from intrinsic and extrinsic perspectives.

It is assumed that the main factors motivating faculty to conduct research is funding and resources. Provided researchers are financially rewarded and given necessary infrastructure such as well-equipped laboratories and access to informational resources, they will be able to conduct quality research work (Nguyen, Klopper, & Smith, 2016). However, it is interesting to note that based on the survey conducted among faculty at one Kazakhstani university, it turned out that financial incentives are not the most influential factors of motivation (Shakirova & Nurakhmetova, 2015). Emmelhainz (2017) and Kuzhabekova and Mukhamejanova (2017) pointed out that in many developing countries there is a lack of access to information and resources that had hindered the research involvement of faculty.

Some researchers are ready to stay in this field despite insufficient funding if they are truly passionate about their research and are recognized by the scientific community or organization for which they work. In the study on "Productive researchers in countries with limited research capacity: researchers as agents in post-Soviet Kazakhstan", Kuzhabekova and Mukhamejanova (2017) investigated how successful researchers manage to work and

thrive under constraints. According to this study, the most important motivating factors for researchers to do research is curiosity, interest, and commitment which help them succeed in their research. This proves that intrinsic motivation might have a stronger influence on faculty's work and productivity than extrinsic motivation (Hardre, 2012). In terms of recognition, a new discovery will enable a researcher to become recognized in his/her field proving his/her personal achievement (Akerlind, 2008). Thus, policy-makers have to take this stimulus into account when addressing the issue of faculty motivation to do research.

2.5 Summary

This section provided the reader with background information on the Kazakhstani policies on science, research and innovation and the overall situation with the research development in Kazakhstan, particularly in HEIs. The literature was reviewed in three dimensions investigating the concept of research from policy level (environment), institutional level (social), and individual level. The environment undoubtedly exerts its influence on faculty's understanding and practice of research in terms of laws, regulations, funding, and internationalization. On the institutional level, it was studied how universities distinguish basic and applied research, how the Soviet legacy influences the Kazakhstani reality and how important institutional cooperation is in the time of globalization. From the individual perspective such questions as faculty's understanding of research, their different roles at universities and motivation to conduct research were carefully examined. It is clear that there is a lot of information on research on the policy level with regard to the aims and expectations of research development. However, it can be seen that there is little empirical data on faculty's understanding and practice of research.

Chapter 3. Methodology

3.1 Introduction

The following section describes the methodology which was applied to this research. Research design which was used to find the answers to the research question was qualitative. The rationale for choosing this method, sampling procedures and data collection instruments are discussed. The procedures for data collection and data analysis are also presented in this section, culminating in outlining ethical issues.

3.2 Research design

In order to determine how research is understood and practiced by faculty at universities in Kazakhstan, a qualitative research design was adopted. The main reason for choosing this approach is that it helps reveal more detailed and deep information about the issue as the above-mentioned research questions are structured in such a way where the qualitative design is most appropriate. According to Merriam and Tisdell (2016), qualitative research design enables researchers to understand and interpret people's attitudes, opinions, and experiences, which is the case for this research paper. Since I am, as the researcher, "interested in understanding the meaning people have constructed", research by its nature requires to undertake qualitative design (Merriam & Tisdell, 2016, p.15).

The constructivist epistemology is largely prevalent throughout this research paper as the data was collected through conducting interviews with participants. The main idea of constructivism is that historical and cultural background, and the surrounding in which people live and work have a strong influence on the situation, so this theory gives a researcher an opportunity to examine the views of the participants and make his/her own interpretations (Creswell, 2014). The research question of this thesis paper is how faculty members in Kazakhstani universities understand and practice research. With the help of the

constructivist epistemology, this research seeks to identify how the existing policies, regulations, or job responsibilities influence faculty's perception of research in universities.

A multiple case study design was chosen because this design gave an opportunity to immerse into the case more deeply and investigate the issue in a broader context. According to Merriam and Tisdell (2016), "a case study is an in-depth description and analysis of a bounded system", which is appropriate for this research paper, because it helps understand the situation "within its real-life context" (p. 37). The main reason for using a multiple case study is little existing research that has been done on the topic of faculty's understanding and practice of research at universities in the Kazakhstani context. The rationale is that a multiple case study provides an opportunity to study the problem in-depth, collect more extensive data, reveal the information in more detail, and understand faculty's perspectives more deeply comparing across the three departments (Chmiliar, 2012)

The site which was investigated represents a Kazakhstani university, which does not differ significantly from other national or state universities in terms of its organization and funding. The reason for choosing a university as a site is that more and more faculty at universities in Kazakhstan are engaged in research; therefore, it is reasonable to start investigating faculty research on the example of one university. It is important to emphasize that this university was chosen to be one of the 11 universities for the implementation of the State Program of Industrial-Innovation Development 2015-2019, which implies that it possesses some scientific-research base necessary for conducting research. Therefore, this particular case enabled the researcher to collect rich data for analysis.

This multiple case study can be characterized as instrumental because it has faculty's understanding and practice of research as its main focus, and does not try to

encompass the entire case (Hamilton & Corbett-Whittier, 2013, p. 12). According to these authors, this multiple case study can also be considered to be cumulative in its nature because the study was conducted across three different departments of one university which allows to "build a cumulative body of evidence to draw upon with regard to a particular phenomenon" (Hamilton & Corbett-Whittier, 2013, p. 19). In other words, all three cases represent hard sciences which enabled the researcher to collect richer data. Initially, it was planned to choose two departments of hard science and one department of social science. However, due to the fact that the social science is very different in nature from the hard science and faculty's perspectives on research can be contrasting, it was decided to focus only on the hard science to gain a deeper insight. Among all schools, three departments were chosen randomly for this case study with their names provided with pseudonyms to ensure anonymity and confidentiality: Department of Biology (Bio), Department of Engineering (Eng), and Department of Physics (Ph).

3.3 Participants

After selecting the three departments of a university for the multiple case study, the second step was to sample the participants within the case study. Purposeful sampling was used in determining the participants because it is necessary to investigate "information-rich cases" in order to get full responses to the research questions (Merriam & Tisdell, 2016, p. 96). In order to obtain necessary information, the participants were selected according to a pre-determined set of similar characteristics which represents homogeneous sampling (Creswell, 2012, p. 208). The participants were selected according to the two main criteria: they should possess some research experience or be engaged in a research project, and be involved in teaching. Homogeneous sampling allowed selecting a group of faculty-researchers to obtain a more comprehensive picture of faculty's understanding and practice of research.

Snowball sampling was also employed at a later stage for this research because it helped find other participants by asking the key participants who they can advise to interview so that the participants can satisfy the criteria mentioned above (Merriam & Tisdell, 2016). Table 1 illustrates the background information of the participants:

Table 1

Participants' background

	P1	**P2**	**P3**	**P4**	**P5**
research experience, current research	yes/yes	yes/no	yes/yes	yes/yes	yes/no
academic degree	PhD	Master of Science	Candidate of Science	Candidate of Science	Master of Science
teaching experience	28 years	10 years	20 years	15 years	13 years
field	Physics	Physics	Physics	Physics	Physics
	P6	**P7**	**P8**	**P9**	**P10**
research experience, current research	yes/no	yes/yes	yes/no	yes/no	yes/yes
academic degree	Master of Science	Master of Science	Master of Science	Master of Science	PhD
teaching experience	25 years	13 years	6 months	12 years	10 years
field	Engineering	Engineering	Engineering	Biology	Biology

The data was collected with the help of semi-structured interviews as this tool can provide a deeper insight into the research problem and more profound knowledge of a large amount of information (Hamilton & Corbett-Whittier, 2013). The interview is “a process in which a researcher and participant engage in a conversation focused on questions related to a research study” (DeMarrais, as cited in Merriam & Tisdell, 2016, p. 108). Initially, it was planned to interview 15 people to have 5 people for each department;

however, upon preliminary analysis it was revealed that there were no significant differences noticed across the departments, and the questions of what constitutes research and research process started to have similar answers which is the sign of saturation, when "no new concepts, categories, or ideas are being generated using constant comparison" (Vogt, Vogt, Gardner, & Haeffele, 2014, p. 393). Overall, 10 people from three departments of a Kazakhstani university were interviewed using purposeful (homogenous and snowball) sampling procedures.

All interviews were conducted face-to-face on the site at a time convenient for the participants. Prior to the interview the purpose and objectives of the research were outlined and consent forms, where they agreed to be audio-recorded, were signed.

3.4 Instruments

The main instrument which was used to obtain information was the interview protocol (See Appendix B). The information provided during interviews was audio recorded upon signing the consent form (See Appendix C). The interviews were semi-structured with open-ended questions as it allowed more flexibility. However, most of the questions were developed in advance. During the interview, it was possible to adjust them to elicit more detailed information and concentrate on points which were not very clear (See Appendix D). Each interview lasted from 20 minutes to 1 hour 20 minutes. The interviews were all conducted in the Russian language, except for two, which were held in Kazakh.

3.5 Procedures

In order to attract participants to take part in the study, an invitation email was sent to faculty members of the three departments outlining the topic of the research, the benefits of research, the procedure of the interview, and confidentiality issues. The portfolio of the participants was viewed on the official website of the university, which showed their

educational background, work experience, research interests, publications, and contact details. Initially, the invitation email was sent to ten faculty members who were chosen based on the above-given attributes. However, only four people responded to the invitation email and showed their interest to participate in the study. Later, two of these participants did not respond to my emails and did not take part in the interview as initially agreed. The other two participants who expressed a strong interest to participate in the interview and participated were from two different departments of Biology and Engineering. Overall, these two participants provided me with the contacts of three more faculty who agreed to take part in the interview as well.

Since there was no response from the Department of Physics, I decided to go on-site and find the participants at the university with the help of a gatekeeper. The gatekeeper helped me access the site and took me to the Department of Physics. I approached the head of the department with an official letter from my university, which asked for permission to conduct research at their site. She was pleased to participate in the study herself and introduced me to her colleagues so that I was able to take interview from four more participants of this department. The main incentive for faculty's participation was the opportunity to contribute to a better understanding of the current situation with research development at universities in Kazakhstan.

3.6 Data analysis

The data gathered from the interviews was fully transcribed by hand, and coded using axial and thematic coding (Merriam & Tisdell, 2016; See Appendix E). Interviews were transcribed in Russian and Kazakh languages, and then coded and analyzed in English. Also, excerpts from the interviews were translated into English and were included as part of the findings. To ensure the accuracy of the translation the excerpts were shown to an English teacher who possesses full command of both Kazakh and Russian languages.

She was asked to translate the English excerpts back into Russian and Kazakh, which were then compared to the original excerpts from the transcripts. All individually identifiable information was removed from the excerpts and the transcripts so it was impossible to indicate the participants. Minor changes were made in the English version of excerpts to ensure the precision of the language.

The data was first coded inductively. Such inductive approach resulted in taking a relatively similar approach to grounded theory in trying to make sense of the data. For the successful application of the grounded theory approach three main concepts were kept in mind: "constant comparison, theoretical sampling, and saturation" (Vogt et al., 2014, p. 392). Data analysis was conducted the day after the interview or during the week in order to cope with large amounts of information more effectively. Upon completing the process of transcribing and preliminary data analysis, new categories that emerged were analyzed in a table where the answers of all ten participants were put in rows according to the themes. This table allowed constant comparison between categories comparing the participants individually and looking for differences and similarities within and across the departments. It means that two stages of analysis were carried out: "the within-case analysis and the cross-case analysis" (Merriam & Tisdell, 2016, p. 234). In addition, upon identifying the first set of categories, new concepts and questions appeared and were asked in further interviews which is an example of theoretical sampling (Corbin & Strauss, 2008). Groups of concepts were generated based on similar answers which formed certain categories. The next step was sorting categories, where unnecessary categories were eliminated and new subcategories added.

3.7 Ethical issues

Ethical issues should be taken into consideration starting from formulating a research problem (Creswell, 2009). The research topic has to address the issue,

examination of which will be beneficial for the society and will not marginalize any groups Creswell (2009). The principles of ethics were sustained throughout the whole process of the research in accordance with the ethics procedures of NUGSE Research Committee. The data collection started only after receiving approval from NUGSE Research Committee.

All the participants prior to the interview were informed about the purpose and procedures of the study and were not deceived in any way. The researcher made sure that the participants were not put at risk at any stage and the participation took place on a voluntary basis. All of the participants had the inalienable right to withdraw from participation or refuse to answer the questions at any time. The confidentiality was guaranteed as the participants' names and the names of the departments remained anonymous and were substituted with pseudonyms. All audio recordings from the interviews were downloaded from my phone to my personal computer and later deleted from the phone. Then, they were organized in a separate folder with an encryption and password-secured without identifying the research project's name. The password is known only to the researcher so the folder is not accessible to any third parties.

3.8 Summary

In summary, I would like to present the criteria for evaluating the quality of this research paper. As it is quite difficult to apply the notions of reliability and validity due to a small sample size, I adopted some of the criteria designed by Corbin and Strauss (2008) to evaluate the quality of research such as applicability, contextualization of concepts, logic, variation, and sensitivity (p. 305). The findings of the study are applicable because they can be helpful for policy-makers to address the issue of university research more effectively. Also, there is an extensive literature review provided to familiarize readers with the Kazakhstani context and overall research development in the world which

explains all the concepts thoroughly. The findings are logical and make sense as they are supported by the literature. There is a certain variation in the findings because the concept of research is rather complex and can be regarded from multiple dimensions. Finally, the researcher demonstrates sensitivity because although the research question was formulated at the initial stage of research, the study was mainly data-driven.

Chapter 4. Findings

4.1 Introduction

The following chapter presents the findings on faculty's understanding and practice of research in a Kazakhstani higher educational institution. There are three main themes that emerged: the individual, social and the environment.

4.2 Individual perspective

The first theme is related to the individual perspective. In this section, I focused on the individual understanding of the concept of research by faculty members and how they carry out the research process. In addition, I investigated individual faculty's motivation to do research and balance between different roles a faculty member may assume in a HEI. The roles that a faculty member plays are important because they directly influence the process of research they are engaged in.

4.2.1 The idea of research. The idea of research is not homogenous and there are at least five major patterns in which a faculty may understand research. The first pattern refers to personal interest. Out of ten participants, seven identified research as interest. It can be understood the way that most faculty are interested in their chosen field of study, so it becomes one of the main reasons they are engaged in research. Thus, if they have a strong interest in some problem, they start researching it. One does not go without the other. This is an important point as without interest it is rather challenging to perform a job well and be enthusiastic about one's endeavor. However, this aspect would probably relate more to the question of motivation as one of the main reasons why a person starts a certain research project is because of his/her interest. This argument also concerns the person's curiosity as it is in the human nature to be curious about the environment, ask a lot of questions from childhood and try to find answers by ourselves when we grow up.

The second pattern is embodied in a deep investigation of a certain field which is closely connected with personal interest where a researcher suffices his/her thirst for knowledge. As was defined by Participant 1:

> Research is a profound investigation in a specific direction of a specific discipline; it is also your contribution to the field. (P1, Ph)

After gathering a lot of information about a certain phenomenon, a person becomes knowledgeable and studying it in more detail to the point he or she becomes an expert in this field. Overall, it can be seen that research starts with an interest which develops into the profound investigation of the question.

The third pattern relates to the novelty of research. In other words, apart from interest and investigation, research must discover something new that has not yet been found by other researchers. It should not be a mere copy of the previous research but should create a new way, method, concept or idea. As Participant 9 described research as:

> A set of scientific operations to study an object, to investigate its qualities and application, and find its novelty. (P9, Bio)

The fourth pattern regards research as an opportunity to realize one's own ideas and projects. It is true when people come up with an idea they want to implement it in real life. Before they can do that, it is necessary to conduct research. Research, in this case, will help identify the focus of the project, its pros and cons, ways of dealing with trade-offs and setting up the related strategies for its implementation. Moreover, research can be considered as a chance to bring benefit to the community. Participant 2 emphasized the importance of research as:

> Overall, research activity is, no matter whether it is done by a student, a master student, or a teacher, in any case, it should bring use to the society, not be confined by the research work itself, but make changes, bring innovations, as well as solve

> problems and tasks more effectively. In addition, it should bring benefit to the state and humanity in everyday life even if its impact is not so big. (P2, Ph)

Finally, research at university is also a “trend”. Research at HEIs is gaining its popularity; it is included as an important part of university missions and more and more faculty feel the urge to be engaged in research and produce publications.

However, upon careful analysis of the data, it seems that currently in Kazakhstan there is a general trend towards applied research, and the importance of fundamental research is undermined. For example, it can be seen across the three departments investigated that the Department of Biology received most of the support having a newly-equipped laboratory ready for conducting experiments. Conversely, the Department of Physics seemed to obtain less support due to the fact that it is a general education department which does not possess such resources and is more focused on theory. Participant 2 told about the necessity of student participation to develop research in their department:

> Our department does not produce specialties, students study in our department for only a semester, 15 weeks, after we don’t see them, that’s why we experience some difficulties with research. In order to carry out research, we need a team of students and master students. (P2, Ph)

Obviously, the importance of practical application of research is understood as it is seen as the way of solving existing problems in Kazakhstan. Yet, it leaves fundamental research on the margins and does not give space for it to develop along with applied research. For instance, Participant 5 stated the importance of practical application to develop economy:

> We lag behind such countries as Japan because we did fundamental research, if one invented the technology, integrated it, it becomes economically beneficial.
>
> (P5, Ph)

It seems that there is a negative attitude towards fundamental science to the point that it is seen as less important compared to applied science, and hence, the former is considered as not having a practical use. Currently, significantly less funding is allocated for fundamental research as preference is given to applied research. Participant 10 pointed out that:

> Our fundamental science is "mowed clean"; hence, it almost doesn't exist. If you propose the investigation of some fundamental mechanisms, you won't be approved in financial terms, so, everything is sent to applied research. But applied science is a mere elaboration, some kind of adaptation of already known processes to our conditions. Without fundamental science, there won't be science at all. Science is, first of all, a fundamental thing, and then everything else. (P10, Bio)

Generally, the idea of research seems to be complex and the question might be difficult to answer straight away without giving it a proper thought because, usually, we do not think about this concept in everyday lives. So, the process becomes automated without realizing its nature. In other words, a researcher who is used to conducting different projects on a regular basis does not pay attention to the steps that he/she undertakes as it becomes routine or habit. He/she is so immersed in their research that the process seems straightforward and obvious to them and they do not need to think about every step they take. Therefore, there is a need for faculty understanding of the research processes.

4.2.2 Research process. The two most important steps of research identified were the literature review and experiment. Literature review was named as an important and initial step in research by nine out of ten participants who explained it in the following

terms: “get acquainted with the world situation”, “theoretical work/review/preparation”, “literature review”, “learn all the terms and delve into the topic”. Participant 3 described her process of literature review:

> When I started, for example, first, I was sitting in the library and reading Kazakhstani scientists in my field, their works, dissertations, monographs. Then, I started reading Russian and foreign authors. Now we have internet access, it is open, and at any time we can find what we need on the internet. (P3, Ph)

The experiment was important for six participants, which can be explained by the peculiar nature of research where experiment can be applicable. Based on the participants’ responses research is typically started with literature review, setting up the purpose of the research, choosing methodology, and conducting experiment and analysis. The final step is consulting with a supervisor or a specialist to make improvements and receive an approval for a master or PhD thesis defense. This kind of approach was common among young faculty who recently obtained a master’s degree or faculty who supervise master and doctoral students themselves. Active researchers pointed out similar initial steps of research placing emphasis on determining the novelty or relevance of research in present time especially whether it is relevant for the Kazakhstani context. The last stage of their research results in the publication of an article or integrating the result into the industry. It seems that the perceptions vary because in most cases new discovery is not expected from a master level student. The main idea is to teach him/her the methodology of research and data collection and analysis procedures. Hence, when faculty do research themselves they have to take into account its novelty and relevance to be able to contribute to the existing pool of knowledge and publish in a respected journal.

However, when it comes to the actual implementation of research operation, faculty face such impediment as bureaucracy in public procurement which prevents on-time

delivery of materials and equipment. Participant 10 named it “circles of hell”. Public procurement is an extremely time-consuming process which can last for almost a year. Moreover, researchers have to be involved in this process themselves which distracts them from their main work. Participant 9 expressed a complaint about that:

> If you consider public procurement, to purchase from Russia and China is much cheaper. But according to the law in Kazakhstan, we must buy products only from local producers, but they overcharge and they don’t have all the preparations. Our university requires us to buy from locals. We do not have such opportunity to buy at our own expense. However, sometimes we have to buy something for ourselves. (P9, Bio)

It seems that the administration is obsessed with all the papers and reports one has to fill in on every step taken. This obsession can be understood as a way of preventing corruption because when it comes to funding, numerous reports help track the allocation of resources and expenditures. Conversely, it is a major distraction as faculty become frustrated when they have to compile this paperwork instead of concentrating on the process of research. The question arises here how faculty conduct research if they have to wait for certain reagents for almost a year. The answer is simple: Kazakhstani researchers learnt how to adapt if they want to survive:

> We are scientists, we adjusted. In other words, we store some amount in advance, if we have something left from the previous projects, we keep it. We borrow from each other because we cooperate with our colleagues. We, scientists, understand each other. (P10, Bio)

It shows that faculty understand each other’s difficulties because they share them and are ready to support each other.

4.2.3 Motivation. Faculty's motivation to do research can be driven by internal and external factors. The main external motivation for the faculty is obviously financial support. It seems that not all faculty are satisfied with the funding provided as some of them complained that the level of funding is rather low and there are no any financial incentives for them to conduct research. Participant 6 stated:

> First of all, there is very little motivation in Kazakhstan, because there is almost no funding, everything is at your own expense, that's why I think that science in Kazakhstan lags behind because money is not allocated and scientific-research work is not encouraged. (P6, Eng)

Low funding also makes science especially unattractive for young people. Thus, there is a brain drain not only to foreign countries but to other fields:

> I will give you an example, I go into our department store, in all boutiques you can see my students working. Those students, who are destined for something very different. Why? Because salaries are higher. (P10, Bio)

Thus, funding is the main external factor for faculty to conduct research as the idea of obtaining extra funding can motivate one to do research. Nevertheless, there are faculty who are enthusiastic and motivated by a mere personal or professional interest in science. Such people have a true interest in research, "burning eyes" and they are ready to stay despite the low prestige and payment for this work. Participant 10 called Kazakhstani researchers "not spoilt" as provided minimum sufficient equipment and funding, a passionate researcher will find ways how to work and prosper in limited conditions.

As mentioned earlier, one of the main internal motivating factors is a mere interest in research. Participant 4 pointed out the main motivating factor as:

> Interest. Interest in science. There isn't any other stimulus, nothing like that, only for myself, the biggest is interest. I like it, to mix something, to find something new, it is interesting for myself, first of all. (P4, Ph)

Personal and professional interest can actually be an important factor in retaining young specialists. Participant 8, who is a recent master graduate, stated:

> Maybe if I don't find any scientific interest, I will probably leave and return to the industry. (P8, Eng)

Also, one of the motivating factors for faculty to conduct research is being up-to-date and delivering students the most recent information on the subject. When faculty conduct research in their field, they become familiar with a lot of details and discover new facts which can be shared directly with students. This enables faculty to show their expertise and make students knowledgeable not only from a theoretical perspective but show them how something can be done in practice. Participant 3 uses research as a way of evoking her students' interest:

> Every time, I try to surprise my students, make them interested, but to make them interested, I should bring something new, not only what is given in their textbooks. For example, in the textbooks, we don't have some part of experimental work. (P3, Ph)

Another internal motivating factor is recognition. A researcher is ready to work under constraints as long as his/her work is recognized. There is no such need for a financial reward if there is a diploma or certificate which acknowledges one's contribution to research that would make a person stay in science and continue his/her work. Participant 10 shared an interesting story of his success:

> I was ready to give up everything. I even found a job for myself something as a manager. But we had one patent counsel, who sent my documents for a competition

> of young researchers in Kazakhstan, but I didn't pass. But he didn't stop and applied my documents for an international competition, where I won a gold medal. This recognition made me stay in science. (P10, Bio)

A surprising motivating internal factor is patriotism. If a citizen is a true patriot of his/her country, he/she will do everything for its development and prosperity. Research is one of the main ways to contribute to a country's progress and advancement; however, there is a trend of leaving science by young people in Kazakhstan. Participant 10 explained this by the lack of patriotism:

> There is no patriotism, no belief in the future of Kazakhstan…Thus, our youth are looking at West and America open-mouthed. Do you agree? I met a lot of young people in America, who delivered pizza, just delivered pizza, and they always asked me: "Why do you want to return to Kazakhstan?" Do you see? They don't want to come back. You see, our country has become unattractive to youth".
>
> (P10, Bio)

Participant 10 also added that Kazakhstani best scientists and researchers are invited to work abroad for a significantly higher salary and job prospects. Thus, the problem of patriotism should be seriously addressed to retain the "best brains" on the fields.

4.2.4 Faculty's roles. On an individual level, it is obvious that a faculty member has to carry out several roles to be successful in a university environment. For instance, the question of maintaining teacher/researcher balance always remains relevant. Participant 10 shared his view on teaching and research:

> The role of research in faculty's life? First, I'll tell you that these things are practically incompatible. Why? I will explain why. Because a faculty member at university is a big bureaucrat. (P10, Bio)

Heavy teaching load is one of the main impediments towards conducting research for some faculty. Apart from teaching, there is additional work performed by faculty such as filling in different reports, curator work, advisor work and other service work for which they do not get additional payment but which takes a bulk of their time. It seems that administration wants to overwhelm a faculty member with as much work as possible so that he/she does not have a spare minute to spend. Participant 8 suggested an interesting idea:

> Some managers seem to hold a belief that the more time a worker spends at his workplace, the more work he does. While in the West they long ago came to an idea that the less an employee spends at work, the more effective he is. At my university, in my opinion, it is the way that a person should always be at his workplace, fill in some reports, organize some educational-cultural activities, which do not relate to any science or education, this is hilarious. (P8, Eng)

It is clear that some faculty are irritated by this extra work which they perceive as a distraction to do research. Participant 3, who also holds a position of the head of the department, admitted:

> They get tired, you cannot require something from them; that is why, in order to do research, the teaching hours should be reduced at university. (P3, Ph)

On the other hand, there is a belief that there is enough time for experienced professors to do research as preparation for lectures does not take so much time anymore. However, beginning faculty experience more difficulties as they spend more time for lesson preparation. Participant 4 thinks:

> In the beginning, a teacher should only teach and after he gains experience, he can transfer to research. (P4, Ph)

Despite all the challenges, most of the participants agree on the importance of conducting research, but not everyone considers that it should be a requirement at university. Some faculty can be really good at teaching, they do not like doing research and they regard it as a distraction from teaching. For example, Participant 6 expressed her view:

> I think it should be optional. It is not compulsory for everyone to do research. Somebody can be a really good teacher educating students, so it should not be compulsory. (P6, Eng)

The opposite group prefers to do more research and does not want to be bothered teaching. It has always been challenging for administration to find the right balance between these two concepts. However, in such rapidly developing modern world it is hard to imagine how one can keep up-to-date without absorbing large amounts of new information, analyzing it and delivering to students:

> This is a very important part of the educational process. Because every year science changes, new facts are discovered. Now students are more active, they use the internet and can even find more credible information than you do. That is why it is very important to do research to give students correct and up-to-date information. (P9, Bio)

Thus, without research there is a danger of lagging behind and not developing one's professional expertise:

> Faculty's research is a very necessary and right thing. I will tell you why. A teacher analyzes the same information year by year, he delves into the details, processes this information year by year, he comes up with a lot of ideas. He reads a lot of literature, analyzes it and understands where the gaps are. You know like in Chinese acupuncture, they pinch you with a needle and the pain disappears. The

> same is with teachers. They know all the details, all the material, and can embrace a lot. (P10, Bio)

In addition, as mentioned by some of the participants those faculty who are involved in research can share real facts and practical skills from the process during the lessons, whereas those who are not, usually provide more theoretical material. Thus, research for teachers will only be beneficial from this perspective.

Another role that a faculty member can have at a university is a researcher-entrepreneur. Nowadays the idea of education, science and industry integration and promoting commercialization has led to a common belief that a researcher should be an entrepreneur and gain profit for the university. Participant 9 stated shared her view on cooperation with other sectors:

> I think that we should work more with entrepreneurs, probably, with some national companies, which have problems, they would give us an order and sponsor, not the state, but exactly these national companies should sponsor and some private firms. (P9, Bio)

However, three participants believe that researchers should only initiate the project but then pass it to the private sector because otherwise he/she stops being a researcher. Some researchers are interested in science itself and they do not possess the skills of an entrepreneur to sell his/her product. Due to the expanding process of commercialization, many people consider that it is right to be an entrepreneur to generate profit for a university. However, commercialization centres should be responsible for selling a product without bothering a researcher to do it on his/her own. Participant 10 expressed his concern:

> Departments of commercialization, this is clear, but now their main function is to strain a researcher, you know, to commercialize. Let’s say, for example, I created

> something, some formula, I created this. But then, I am a scientist, I am not a tradesman or a manager, I cannot do this, my main function is not to sell.
>
> (P10, Bio)

It seems that faculty feel under pressure due to a number of roles they have to perform at university. Probably, faculty's functions should be more clearly specified and distinguished in the contracts to avoid misunderstanding and dissatisfaction of what is expected from them.

4.3 Social perspective

The second theme concerns social perspective. Here, I tried to understand how internal collaboration within and between universities takes place and how they cooperate with their international colleagues. As internationalization is inevitable, there is no doubt that international cooperation affects the way research is carried out by faculty at HEIs. Moreover, another interesting concept that emerged from the social perspective concerned the Soviet legacy. It turned out that there are some differences in the perception of research that can be attributed to the Soviet legacy and contemporary research, where for instance there were notable differences in the way those Soviet-trained researchers interact with other younger researchers, who tend to be trained in a different paradigm.

4.3.1 Soviet legacy. The perception of researchers raised and formed in the Soviet period significantly differs from the perception of researchers of the contemporary time. One interesting comment made by Participant 8:

> I have a feeling that research is divided: there is a half which is left after the Soviet Union collapse, they teach and pass on their experience. On the other hand, youth follows a western model and tries to do everything differently. Here we can have a conflict and you know you can't have it both ways. (P8, Eng)

Nowadays Kazakhstan is trying to apply the western model of research because it wants to follow the example of developed countries. This creates some tension between the Soviet-trained researchers, who have a different style of teaching and usually force their ways of doing research, and the younger generation of researchers, who are more exposed to foreign culture through educational or mobility programs. Participant 10 criticized the Soviet system:

> In many institutions, let's say, there is still an old generation of scientists, they are our doctors, respected professors, and academics, they lead us, youth, by the system which they were taught in the Soviet Union. Thus, it means total obedience to one's boss, the absence of one's own opinion and no opportunity to realize one's own scientific ideas. (P10, Bio)

This might be because young people are slightly more biased towards the Soviet legacy as they have different beliefs and values after having studied or worked in America or Europe where they felt more freedom. Young researchers are more open to new ideas and they feel confined if their ideas are not taken seriously or if they are ordered what and how to do research. Another point mentioned by the participants relates to the old academic hierarchy which is distinct from the new three-tier education system. There are 'academics' or 'doctors of science' from the Soviet period who are considered to be higher in rank than PhD. For older generation, it is harder to understand how now one can hold a PhD degree in his/her late twenties. Another difference is that in the Soviet time it was typical for people to graduate from a certain higher institution and to continue working at the same organization for their whole life until the retirement age which was considered to be a sign of stability and loyalty. Nowadays, the trend is opposite and people, particularly researchers, are trying to work in different organizations to gain new experience. However, the contribution of the Soviet researchers, their classical methodologies and huge impact

on the development of science overall should never be underestimated. Eventually, Kazakhstani researchers have to decide whether they want to keep the Soviet legacy or they want to choose one model, apply its standards and strictly follow it.

4.3.2 Collaboration. Collaboration between colleagues in the same department or university mostly depends on an individual's ability to construct a useful network of colleagues. Nowadays there are no any barriers in communication so faculty and researchers can freely cooperate with each other, ask for consultancy or help in the project, exchange ideas and work together in the laboratories. Nevertheless, there are some people who are obsessed with their own brilliant ideas and they do not want to share with anyone due to the fear of having this idea stolen. Participant 4 criticized some researchers for being too discreet:

> We don't know who, where, what one does. It can be even so when one research is done by 2-3 people and they do not communicate, they even conceal from each other what they are working on. It can even happen in the same laboratory, 2-3 people in one laboratory work and hide from each other something super secretive. (P4, Ph)

However, when researchers know what their colleagues are studying they can collaborate and help each other overcome challenges with infrastructure or funding. Participant 4 stated that it is necessary for researchers in Kazakhstan to unite and help each other instead of hiding information on research as if it was a secret calling for creating a centralized website for information exchange.

4.3.3 International cooperation. Kazakhstan's science is not really developed at the international level particularly with regard to university research development which "is still low by international standards" (OECD, 2017, p. 22). Research at universities is growing but surely cannot compete with such developed countries as the USA, Germany or

Japan at the same position. Thus, there is no surprise that no participant named himself/herself a global scientist. Participant 4 explained it by saying:

> I cannot claim myself to be a scientist on a global scale, Kazakhstani scientist, yes. This is because there are few people abroad who know me, may be 2 or 3 people, that is all. (P4, Ph)

In order for our researchers to be known on an international level, there have to be more publications in international journals, more collaboration with international researchers and more global-scale projects.

However, it is worth noting that international cooperation is developing quite vastly. Russia and Belarus are among the most frequently mentioned countries of international cooperation. The biggest advantage of communicating with these countries is that researchers do not feel a language barrier as the majority of the population in Kazakhstan can speak the Russian language fluently:

> This, first, gives opportunities for elder generation to continue cooperation, develop, and those young people, who did not have a chance to learn foreign languages. (P10, Bio)

The USA, Japan, Belgium, Germany, France, Italy, Hungary, and China were also named among the countries of international cooperation. Mainly, international cooperation is carried out through participation in international conferences, internships, conducting collaborative research and collaborative publications. Thus, it can be seen that universities are interested in raising the profile of Kazakhstani scientists.

A surprising fact is that collaboration with Central Asian researchers seems not to be quite developed because no participant mentioned Kyrgyzstan, Uzbekistan or Turkmenistan during the interviews. Kazakhstani researchers are likely to look up to more developed countries because they probably believe they can adopt their systems and

methods to achieve the same results. In addition, when one publishes in collaboration with a well-acknowledged foreign researcher, there is a higher chance to publish in high-impact journals and, consequently, acquire international recognition.

4.4 Environment

The third theme relates to the environment, more specifically, the infrastructure and funding. The findings illustrate the way in which university supports and encourages faculty's research. Importantly, the three themes are not distinct but interrelated with each other as it is almost impossible for a faculty member to do research on an individual level without any social communication and without the use of infrastructure and funding offered by the environment.

Research support provided by university can be reflected in different dimensions. First, the biggest support that a university can provide is funding, for example in a form of payment for research projects, conference trips and internships abroad. However, funding was named as one of the biggest challenges when it comes to conducting research. Participant 4 explained:

> Universities do not have the opportunity to stimulate, grants have been cut, budget has been cut, even if the university wants, it cannot, there is no funding. (P4, Ph)

The main way how faculty receives funding for their research is grants from the Ministry of Education and Science, although they are highly competitive. Another problem is that the amount of funding received from the MES is not always enough to successfully complete a research project. It is interesting how Kazakhstani researchers overcome these challenges as they have to submit reports on the project and achieve some result in the end. Creative researchers come up with different ways in order to tackle such issues, for example, they call for help from their international partners and use personal international

contacts to apply for some external grants. Participant 10 went to the USA to deal with the lack of funding this way:

> I asked for help from my co-supervisor from America. I did research for my American chef, simultaneously I was working on several other projects, and at nights I was working on Kazakhstani project. (P10, Bio)

Infrastructure also plays an important role in conducting quality research. In order to carry out excellent research, it is necessary to have the cutting-edge equipment and access to relevant sources of information. The situation with the availability of the laboratories varies across the departments. The Department of Biology proudly boasted with the latest technology and newly-equipped laboratories that they possess, whereas the Department of Physics complained on the old and low quality equipment that they have to work with. For instance, Participant 5 pointed out that lack of laboratories prevents them from publishing in high-impact journals due to poor methodology:

> We do not have a basic laboratory. Laboratory is not equipped, I mean with modern equipments that meet international standards. (P5, Ph)

In terms of electronic resources, there are also some difficulties mentioned by the participants as not all of the highly-recognized journals are available. This is again an important part of university support because there are certain requirements to do research for faculty, but how they should deal with existing constraints is another question.

4.5 Summary

This chapter discussed the findings on faculty's understanding and practice of research from individual, social and environmental perspectives. The understanding of research is embodied in one's personal interest in a subject followed by a deep investigation of the issue, finding its novelty and use, and following the trend of research-oriented universities. An important feature to mention is that currently there is a strong

shift from fundamental to applied research. Generally, all faculty conduct research in a similar systemic way placing emphasis on its relevance, novelty, and applicability in Kazakhstan. Also, the fact that a faculty member may perform a number of roles at a HEI such as a teacher, a researcher, an entrepreneur, a curator, and other service-related positions should not be neglected because it may influence their research practice. It is interesting to note that faculty are more motivated by internal factors such as personal and professional interest, enhancing one's own knowledge and expertise, recognition and patriotism with funding being the only external motivation. The Soviet legacy also has an influence on faculty's understanding and practice of research dividing researchers into two camps: the Soviet-trained researchers and researchers following the contemporary way. In the era of internationalization, researchers now cannot be confined by the borders of only one country which has led to the development of international cooperation. Finally, the role of infrastructure and funding and the way they affect faculty's practice of research were also discussed in this chapter. The given findings were grouped, analyzed and discussed further in the next chapter.

Chapter 5. Discussion

5.1 Introduction

The following chapter presents the discussion of the findings following the framework based on individual, social, and environmental perspectives. In the Findings chapter, faculty's understanding and practice of research were investigated separately according to the given perspectives, while in this chapter they are integrated with the literature review and further analyzed and discussed presenting the whole research ecosystem.

From the findings, it can be seen that faculty's understanding and practice of research in a Kazakhstani university exist in the system, in which all three perspectives are closely connected and exert a certain influence on each other. For example, an individual faculty member's understanding of research and motivation to do research can affect the commercialization trend coming from the environment and vice versa. Since most faculty emphasize intrinsic motivations such as interest, a new discovery or bringing benefit to the society, it can become challenging to carry out commercialization properly because faculty do not perceive the role of an entrepreneur as their prerogative. In its turn, the environment mainly in the form of policies imposes bureaucracy which hinders effective work of a researcher who feels overwhelmed because of stringent regulations and numerous reports. In terms of the social perspective, inclination towards the Soviet perception or Western idea of research has its influence on the individual understanding of research and how faculty collaborate with each other and cooperate on the international level.

5.2 Perceptions of research

Individual understanding of research is based on two constituting components, namely the idea of research and motivation to do research at universities. From the

findings, it is clear that understanding of research does not represent a linear model and different perceptions of research are interconnected where one can arise from another.

The main constituents of research as identified in the findings are personal interest, deep investigation, finding novelty, and bringing benefit to the society. This model is similar to the one suggested by Akerlind (2008) in which he examined the idea of being a university researcher from four dimensions where the idea of a researcher's personal interest and bringing use to the society coincide. However, it is interesting to note that faculty do not perceive research as their academic duty, which is the first characteristic of a university researcher provided by Akerlind's model (2008). It is curious to understand research from the perspective of interest as for the Kazakhstani context this might be an important factor to pursue research taking into account limited funding and resources. Although academic research productivity can be influenced by the lack of research funds in a negative way (Nguyen et al., 2016), interest and curiosity have been identified as important factors for researchers in Kazakhstan to continue working despite existing challenges and constrained resources (Kuzhabekova & Mukhamejanova, 2017).

Another reason for such commitment might be patriotism which is an unexpected factor that has come about as research motivation among faculty. It might be deduced that if one perceives research as a duty towards the nation, he/she is less likely to leave the country for the sake of better conditions. Instead, he/she will be motivated to do research to contribute to the society or a small group by creating innovative ways of solving issues in a particular field (Akerlind, 2008). This is also the case in Iran where research at HEIs is thriving and producing tangible results despite the sanctions (Lai et al., 2016). The influence of patriotism on research has not been thoroughly investigated in the literature, but this factor might be one of the reasons of scientific success in the Soviet Union, where one of the main goals of research was "to further the interests of the state" (Bowen, 1962,

p. 433). Therefore, this factor might be further investigated by the policy-makers to understand its potential power on research development in Kazakhstan.

In addition, research is regarded from the perspective of discovering a new idea. Finding novelty or making a new discovery has also been indicated as the main characteristic of research in the literature (Akerlind, 2008; Brew, 2004; Edward, 2012; Kiley & Mullins, 2005). When research helps to come up with a new idea, this idea can be implemented into a real-life project and have its practical application which might be beneficial for the society. Practical application of the research results has been continuously emphasized by the participants across the interviews. This might be explained by the fact that the MES prioritizes the applied science by investing more money in this sector. The reason for this could be that in the Strategy 2050 it is stated that Kazakhstan should be among 30 most developed countries in the world, where research at HEIs can play a major role in boosting innovations and eventually economy of the country.

5.3 Past vs. Present

From the findings, it can be seen that there is some division between the Soviet-trained researchers and a younger generation of researchers who were taught in a different system and were more exposed to American or Western culture. The participants of the study who had this foreign experience complained about their inability to work under the supervision of the Soviet-trained leaders. The Soviet-trained researchers were described as more authoritative who expected more obedience from their younger colleagues. The reason for this might be that the Soviet science was largely politicized, which was the case because of the totalitarian political regime (Niyozov & Shamatov, 2006; Friedman, 1969). The Soviet people were used to a top-down approach in all fields and they understood the importance of conforming to the regulations. Although the hard sciences in the Soviet Union were advanced particularly in space and military industries, the creativity as well as

the development of social sciences were not encouraged to reduce the chance of evoking undesirable thoughts (Esengarayev, 2017). That is why it can be understood why the Soviet-trained researchers are more strict, formal and rigid in comparison with the researchers trained in the modern time who enjoy the freedom and are used to independence.

Since Kazakhstan is aiming to enter the top 30 most developed countries in the world, it is trying to adopt the best methods from the other developed countries. Therefore, in terms of research, more and more people obtain their education abroad or at least participate in academic mobility or staff mobility programs to expand their knowledge and gain more experience. The clash that occurs between the Soviet-trained researchers and a younger generation of researchers might be the result of following more Western traditions. The researchers of the contemporary time highly value academic freedom and autonomy, free-thinking and creativity, and an opportunity to participate in the decision-making, which are similar qualities of the Western science (Sjostrom, 2017). However, it should not be forgotten that it is impossible to apply all Western methods to the Kazakhstani research system due to the differences in funding and overall development (Kuzhabekova & Mukhamejanova, 2017). The best formula for future success might be not a mere imitation of the experience of the developed countries but rather a combination of the best traditions of the past and best practices of the present.

Keeping history and past legacy in mind, it should be mentioned that internationalization influences higher education in Kazakhstan as well as the cooperation between universities. From the findings, it can be suggested that faculty are more oriented towards developing international collaboration rather than the local network. It was revealed that Kazakhstani researchers prefer to cooperate with their international colleagues from developed countries such as the USA, Japan, China and some European

countries as well as Russia and Belarus. Cooperation takes places through staff mobility programs, international conferences, workshops, collaborative research projects, and publications. Such kind of interaction refers more to the outer circle, which implies an expanded network of academics in contrast to focusing on an inner circle which suggests establishing closer links among researchers (Becher & Trowler, 2001). The reason for working with developed countries is obvious as Kazakhstan has always tried to learn from the best practices inviting well-recognized international experts, adopting new methods or undertaking some kind of internships. It is true that academic mobility has a positive influence on faculty's professional knowledge by being involved in different academic settings, developing their expertise as well as expanding academic networks (Horta, 2013). Russia and Belarus are also among research partner countries due to their common history, proximity, similar research systems and the opportunity to communicate in the Russian language. However, it should be noted that developing faculty communities of practice within and between universities should be encouraged as it might be beneficial for Kazakhstani researchers in terms of exchange of ideas or providing some guidance (Monroe-Gulick et al., 2017; Nadelson, 2016; Shen, 2007).

5.4 Opportunity or Burden?

The environment has its influence on the ways faculty understand and practice research on individual and social levels. From the findings, it might appear that the environment exerts more stress on the faculty with regard to the commercialization and bureaucracy rather than providing support and opportunity for development.

Due to the promotion of commercialization centers at universities, there is a burden on researchers to produce results which might be integrated into the industry and bring commercial benefit. Thus, the participants of the study complained about the need not simply to conduct research but take on an entrepreneurial role. The problem with

commercialization is that the results produced by researchers at HEIs are not germane to the industry due to poor cooperation between universities and enterprises (OECD, 2017). According to the findings, faculty engaged in research did not express a strong desire to participate in the commercialization process as they do not perceive it as their academic duty and are more interested in conducting research itself. Another reason for some resistance from faculty towards this trend was mentioned that not every researcher possesses necessary merchant skills to sell a product and generate profit. In OECD (2017) Reviews on Innovation Policy of Kazakhstan, lack of entrepreneurial skills was also mentioned as one of the problems of successful implementation of the commercialization process. Although the training program for understanding the commercialization process was specified in the Law on "Commercialization of Results of Scientific and Technical Activities" (Akorda, 2015), it seems inadequate in terms of the course duration and not much focused on the development of specific entrepreneurial skills.

The last problem indicated in the findings which seems to irritate faculty is the amount of paperwork to be completed which is an integral part of teaching load as well as research work. The State Program on the Development of Education and Science for the Republic of Kazakhstan 2016-2019 underlines bureaucracy as one of the problems towards faster research development (MES, 2016a), but the MES appears not to be dealing with the problem effectively probably due to the lack of trust. Faculty feel annoyed by numerous reports that have to be submitted, but it should be understood that this is a way to promote transparency and prevent corruption (Adler & Borys, 1996).

5.5 Policy vs. Reality

The strategic planning of Kazakhstan is criticized for setting overly ambitious goals to be achieved in a limited timeframe (OECD, 2017). There are two sides of this coin: on the one hand, when the ambitions are so high, more effort and work will be contributed

towards their accomplishment; on the other hand, when there is such a strong pressure to meet certain indicators, there is a potential danger of concealing some facts of failure when the results are not achieved. Upon analysis of the strategic documents on education and science, it can be stated that most indicators concerning research development in HEIs comprise quantitative data, which is no surprise because it is easier to measure. However, the question of research quality should also be addressed to ensure the effectiveness of all policies implemented.

When the question of faculty's understanding and practice of research was investigated in this study, it was revealed that there is a certain mismatch between what is addressed in the policies and how faculty themselves perceive these issues.

One of the main strategic documents in the sector of higher education is the State Program on the Development of Education and Science for the Republic of Kazakhstan for the years 2016-2019 (MES, 2016a). Although this document covers both education and science, it is still more focused on the development of education at all levels. The integration of education, science, and industry is emphasized in this program, but the role of faculty in research at universities is not precisely outlined apart from certain indicators in the number of publications or the number of commercialized projects. Therefore, it is very interesting to understand how this integration will occur when education and science are still regarded separately even within this state program. This might also influence unwillingness of some faculty to undertake research because they do not perceive it as their academic duty.

The Law on "Commercialization of Results of Scientific and Technical Activities" (Akorda, 2015) also underlines the role of universities in the process of commercialization. However, according to the findings faculty mostly perceive commercialization as a burden on their daily activities. Although they understand the importance of developing

commercialization for establishing closer links with the private sector and gaining profit, they think that not every researcher can or should be engaged in this activity. This might be explained by the lack of management and entrepreneurial skills which were not necessary for fulfilling one's academic duty in the past. Such unwillingness to take on entrepreneurial role might also influence low interaction with the private sector and low applicability and relevance of university research results for the private sector. The same question arises in the case of the State Program of Industrial-Innovation Development 2015-2019 as it is not clear how university faculty participate in this program implementation which seems to result again in low interaction with the industrial sector.

Overall, it is obvious that the MES understands the existing problems with research at universities, but because the role of the main stakeholders, in this case, faculty, is not clearly specified, it might be one of the reasons which makes policy implementation challenging. The MES is concerned with the economic development of the country by promoting applied research and commercialization, but according to the findings, faculty are engaged in research because of personal interest or bringing benefit to the society. From the findings, it can be seen that faculty who are truly passionate about their profession can work even under constraints and in limited funding, infrastructure and resources as long as they are motivated by personal interest, curiosity and recognized by their institutions. Therefore, if the MES instead of focusing on the number of publications and research projects provided more support and took into account faculty's motivation, interests and development of skills, the integration of education, science, and industry would probably occur more effectively.

5.6 Summary

In this chapter, the research ecosystem in Kazakhstani HEIs was presented. The main idea of research lies in its simple interest for a researcher, which can be an important

stimulating factor for research to be undertaken in the first place. If a researcher is truly interested in one's own research, he/she will continue working despite the time, financial challenges and bureaucracy. It is interesting to note that research in Kazakhstan is still influenced by the Soviet legacy which is shown by some kind of confrontation in the interaction between those who were educated in the Soviet time and the contemporary generation. In addition, apart from the past, the research system in Kazakhstan is also influenced by the internationalization process. Therefore, the MES should take into account individual perceptions of faculty, the influence of the Soviet legacy and exposure towards internationalization when designing policies on research development.

Chapter 6. Conclusion

6.1 Introduction

In the discussion section, I integrated the main findings with the literature review, while in this chapter I will present a summary of the research results to answer the research question. This study was undertaken to understand faculty research practices in Kazakhstani HEIs and answer the following research question: How do faculty members understand and practice research in Kazakhstani universities? This chapter also provides the limitations of the study, implications, and recommendations for further research.

6.2 The idea of research

Kazakhstan is facing a transition period in research where there is a certain shift from the Soviet legacy, where the Academy of Sciences was the main research body, to a more contemporary model, where research is becoming an integral part of universities. Looking at the examples of the developed countries, it can be seen that research is considered to be a very strong factor influencing the rapid economic growth of a country. Therefore, the aim of the integration of education, science, and industry has been outlined in a number of strategic documents and policies of Kazakhstan with an emphasis on university research development.

The research question was composed of two main components such as understanding of research and research process. It was revealed that ‘research’ represents a complex phenomenon as it can be regarded from different perspectives, which is supported by the literature in which multiple variations in the definition of research are present. However, the most surprising finding of this study was that faculty understand research as a personal interest and are more motivated intrinsically rather than extrinsically. In terms of the research process, it is clear that research is carried out in a systemic way following a methodology peculiar to each discipline. However, there are certain challenges that hinder

faculty's more active engagement in research such as low level of funding and infrastructure, lack of time due to heavy teaching loads, lack of entrepreneurial skills for commercialization, and low level of English. Nevertheless, it is seen that personal interest and intrinsic motivation can be strong factors in faculty's willingness and persistence to do research despite the existing challenges. This results in a certain mismatch with what is expected from the faculty in the policies. As I discussed before, the policies seem to be imposing such concepts as the integration of education, science and industry and the process of commercialization from the top down without properly understanding faculty's perceptions on these issues. Although funding is considered to be one of the most important factors contributing to the research development, it can be seen from this study that faculty could actually be motivated by intrinsic factors such as interest or recognition. If the policy implementation starts from the bottom-up, giving voice to the faculty to better understand their needs and challenges, it is likely that there will not be such a strong emphasis on the quantitative indicators, but the quality would become a priority as faculty would embrace these policies more positively because their views would be taken into account.

6.3 Limitations

The main limitation of this research is that the overall sample (10 participants) is rather small to make the results of research generalizable for other HEIs. Also, the faculty interviewed represented only the departments of hard sciences. Therefore, the views of social sciences faculty were not taken into account.

6.4 Implications

Research conducted by faculty at HEIs can be of practical use to the society solving relevant issues and boosting innovations. Since research at universities is increasing its importance as can be seen from the university mission statements, the results of this study

might be useful for Kazakhstani policy-makers who design strategies for research development at HEIs. Policy-makers should take into account the intrinsic motivating factors for faculty to conduct research and build a dialogue with them to tackle the challenges they face. For example, they could reconsider competitive funding system, bureaucratic research procedures with regard to the public procurement and switch their focus from the quantitative aspects such as the number of publications and commercialized projects to a more qualitative aspect by providing support in learning English and developing entrepreneurial skills.

This research might also be useful for the private sector and industry because universities are eager to cooperate with them but the problem is that this cooperation still remains at a rather low level. This interaction can be mutually beneficial because the private sector can support universities in terms of funding and infrastructure, while universities can provide them with necessary research results. However, from the literature and findings, it is clear that one of the reasons of low applicability of university research results is lack of entrepreneurial skills which can also be addressed by the private sector by organizing some kind of workshops and training.

Finally, this study might be beneficial for the faculty themselves who can better understand research and their research practices to become active participants in research promotion at universities in Kazakhstan.

6.5 Recommendations

There are a number of issues that could be addressed for further research in Kazakhstan. First, commercialization has become one of the important areas to invest in universities. However, the problem is that the effectiveness of commercialization centers and their general work have not been thoroughly investigated and it leaves a number of questions such as the role of faculty in the commercialization process. The second topic is

the integration of education, science, and industry. It is necessary to study the links between researchers and industrial enterprises. This would probably contribute to a better cooperation and more relevant and applicable results in the future. Third, this paper is more focused on research understanding and process in general, but there is an important issue of research productivity which has not been addressed. It is quite important to evaluate not only the numbers but the quality of Kazakhstani publications and how research productivity can be increased. Fourth, as it was mentioned in the limitations, the perceptions on research by faculty from social sciences was not investigated which makes it an interesting area to explore as it is very much likely that the research results will significantly differ from the ones in this study. Fifth, the question of gender was not discussed in this paper. However, it would be interesting to explore the differences in research experience between male and female researchers in Kazakhstan. Finally, the question of the Soviet legacy was touched only slightly, which is important to study because it still has some influence on modern Kazakhstan. Such questions as the differences in the academic hierarchy in the past and now could be compared, or how the situation with hard and social sciences is different from the Soviet time.

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Appendices

Appendix A: CITI program certificate

Completion Date 02-Aug-2017
Expiration Date 01-Aug-2020
Record ID 23573175

This is to certify that:

Dinara Dauletbayeva

Has completed the following CITI Program course:

Students conducting no more than minimal risk research (Curriculum Group)
Students - Class projects (Course Learner Group)
1 - Basic Course (Stage)

Under requirements set by:

Nazarbayev University

Collaborative Institutional Training Initiative

Verify at www.citiprogram.org/verify/?w2b9f0f78-9270-45b5-9edf-287cb38145c9-23573175

Appendix B: Interview protocol

Thank you for your agreement to take part in this interview and thank you for your time. Could you please kindly share your educational background, work experience, and current research project if any?	**PLEASANTRIES**
1. Let's assume that I am your new student who does not know anything about research. Could you please share what is research for you? How would you explain what is research in simple words? 2. Let's again assume that I am your new student. Could you please describe and explain step by step a typical process of research. What is the journey of research from the beginning to the end without using any special scientific terms?	**CONCEPT OF RESEARCH**
3. What is your motivation or interest to conduct research? 4. What do you think about the role of research in the life of an academic? 5. How do you balance your teaching and research load? 6. How do you bring research into your classroom?	**TEACHING&RESEARCH**
7. Do you position yourself as a scientist or a Kazakh scientist? 8. How does the context of research in Kazakhstan fit into the global picture of research? 9. How do you collaborate with international faculty? 10. Who do you consider your main international collaborators? 11. How do you maintain your international network?	**INTERNATIONALIZATION**
12. How does your university support faculty research? 13. Could you tell approximately how your research is mainly funded? Are there any challenges when getting funding for a research project? 14. Is a researcher an entrepreneur? 15. Does research have to find practical application?	**FUNDING**
16. What other barriers do you encounter when conducting research? 17. How do you think faculty research can be improved? What recommendations could you suggest?	**CONCLUDING REMARKS**

Appendix C: Informed consent form

INFORMED CONSENT FORM

Research in Kazakhstani universities: exploring faculty's perspectives

DESCRIPTION: You are invited to participate in a research study on faculty research practice in Kazakhstani universities. This study is undertaken by Dinara Dauletbayeva, a master student of GSE program at Nazarbayev University. You are kindly invited to take part in an interview, which is absolutely on a voluntary basis. The interview will be audio-recorded, upon which it will be transcribed by hand and analysed thematically. If you wish to obtain a copy of the transcript, please feel free to let me know. The audio recordings will not be shown to anyone; all the recordings will be kept by me on my laptop secured with a password for a duration of 5 years.

TIME INVOLVEMENT: Your participation will take approximately 30-60 minutes.

BENEFITS AND RISKS: The benefits which may reasonably be expected to result from this study are personal contribution to the field of knowledge on faculty research practice in Kazakhstani universities as well as sharing good practices in the field of research. There are no risks for the participants associated with this study as the information will not be shared with anyone apart from the researcher herself and her supervisors. The information will be kept anonymous and confidential, and will not be shown to any third parties. To ensure anonymity and confidentiality, pseudonyms will be used and no individually identifiable characteristics will be revealed throughout this study. All the materials developed throughout this study will be stored on the researcher's laptop secured with a password.

PARTICIPANT'S RIGHTS: If you have read this form and have decided to participate in this project, please understand your participation is voluntary and you have the right to withdraw your consent or discontinue participation at any time without penalty or loss of benefits to which you are otherwise entitled. The alternative is not to participate. You have the right to refuse to answer particular questions. The results of this research study may be presented at scientific or professional meetings or published in scientific journals.

CONTACT INFORMATION:

Questions: If you have any questions, concerns or complaints about this research, its procedures, risks and benefits, contact the Master's Thesis Supervisor for this student work, **Assistant Professor, Chang Da Wan, changda.wan@nu.edu.kz**, +7(7172)705884

Independent Contact: If you are not satisfied with how this study is being conducted, or if you have any concerns, complaints, or general questions about the research or your rights as a participant, please contact the NUGSE Research Committee to speak to someone independent of the research team at +7 7172 709359. You can also write an email to the NUGSE Research Committee at gse_researchcommittee@nu.edu.kz

Please sign this consent from if you agree to participate in this study.

- I have carefully read the information provided;

- I have been given full information regarding the purpose and procedures of the study;
- I understand how the data collected will be used, and that any confidential information will be seen only by the researchers and will not be revealed to anyone else;
- I understand that I am free to withdraw from the study at any time without giving a reason;
- With full knowledge of all foregoing, I agree, of my own free will, to participate in this study.

Signature: _____ Date: _____

The extra copy of this signed and dated consent form is for you to keep.

Appendix D: Interview Sample

I: Давайте представим, что я Ваш новый студент, который ничего не знает об исследовании. Могли бы Вы объяснить, что для Вас значит «исследование»? Как бы Вы объяснили этот термин простыми словами?

P9: Ну, исследование, это комплекс каких-то операций, научных, с помощью которого вы исследуете свой объект, раскрываете его свойства, применение, и находите какую-то новую нишу, которую еще никто не определил, и вводите новизну для этого объекта исследования.

I: Давайте еще раз предположим, что я Ваш новый студент. Могли бы Вы описать и пошагово объяснить обычный процесс исследования с самого его начала до конца, не используя специальных научных терминов?

P9: Ну, первая стадия, это обзор литературы, то есть рассмотреть все материалы известные по данному объекту, затем, вы выбираете для себя цель, что вы именно хотите изучить и открыть для себя что-то новое, например. Затем, подбираете уже научный аппарат, приборы там различные, то есть все, что вам нужно для исследования. Затем, сама операция исследования, и потом апробация, проверка еще раз, и конечно уже в конце выводы, результаты, в виде публикаций, что-то такое, например, или внедрение в производство.

I: А вот, например, обзор литературы как обычно Вы проводите? Что Вы используете?

P9: Ну, на данный момент, конечно, это всем известный факт, интернет. Ну, ты используешь обзор, то есть литературу берешь из интернета, не та, что в открытом доступе, но и иногда приходится оплачивать научной библиотеке электронной и пользоваться оттуда. То есть сомнительную литературу нужно, конечно же, отсеивать сразу. Вот.

I: А вообще по доступу к электронным ресурсам? Вам достаточно, что вы имеете?

Ну, да, ну, у нас университет, имеет, например, если так смотреть, доступ дает по технологиям, например, каким-то, техническим параметрам. Ну, если чисто … брать, например, то, что я занимаюсь, то конечно, у нас доступа именно ко многим библиотекам нет, например.

P9: Именно по вашему направлению?

Да, по моему направлению.

I: Что Вас мотивирует заниматься исследованием?

P9: Ну, для меня мотивация, это интерес, в первую очередь. Интерес, в плане роста профессионального. Интерес личный. То есть, то, что мне нравится, сама вот эта вот. Сама работа исследования, например. Мне нравится что-то узнавать новое, проверять, устанавливать, применять на практике.

I: Что Вы думаете о роли исследований в жизни преподавателя университета?

P9: Ну, это очень важный, как бы, компонент образовательного процесса. Потому что с каждым годом наука меняется, новые факты устанавливаются и читать старый материал, студенту предоставлять. Тем более, когда сейчас студент более активный, он пользуется также интернетом, может найти информацию более правдивую, чем ты. Поэтому исследовать и проводить такие работы – это очень важно. Чтобы и студентам предоставлять правильную информацию, и современную, самое главное.

I: Как Вы распределяете учебную и исследовательскую нагрузку?

P9: Ну, на данный момент, так как я не занимаюсь научными исследованиями, поэтому большую часть времени я уделяю методической работе, то есть. А раньше, когда во время магистратуры, конечно, ну где-то 50% времени, ты тратишь на исследование.

I: А вот во время преподавания не мешает Вам?

P9: Во время преподавания, ну я даже с такой нагрузкой, как раньше и сейчас, например, я все равно старалась находить время и со студентами делала мини научные работы, например, по установлению …. Именно вот …, то есть, чтобы как этот, ну старалась выделять время по вечерам, каждый день, обязательно, по 3-4 часа уходило у меня на это все.

I: Внедряются ли исследования на уроках?

P9: Конечно, обязательно. Например, вот последний курс мой, …. Это вот все методики, которые я внесла в свои книги, это все, что мы проделали со студентами. То есть, апробацию провели этих опытов, установили, что в соответствии с гостами наши параметры совпадают, то есть, приборы все работают, поэтому эти работы я обязательно применяю на практике.

I: А почему вы выбрали именно данную область, в которой Вы работаете?

P9: Ну не знаю, мне … всегда нравилась. В школе я была в классе лицей …, поэтому. … мне не очень, а вот именно … меня интересует всегда. Мне интересно, знаете, …. Ну вот, поэтому, интерес есть личный когда.

I: А во время проведения исследования Вы встречаете трудности касательно выбора темы?

P9: Ну, конечно. Если рассматривать, как этот правильно сказать. Сейчас больше я занимаюсь именно, этот, провожу мониторинг …, чтобы доказать, что …, и даже лучше по многим параметрам. А если вот с другими тематиками смотреть, меня интересует, конечно еще, например, такие темы как сказать, …. То есть, …, все таки, наверное, есть какие-то методики, чтобы создание каких-то …, с помощью которых можно регулировать …. Вот эти тематики меня интересуют, … меня интересует, например, тоже. Но у нас нет такой базы, поэтому направление.

I: То есть здесь уже от базы отталкиваетесь? Что позволяет, то и будете исследовать.

P9: Да, от базы.

I: Вы позиционируете себя как ученого либо как казахстанского ученого? Вообще считаете ли Вы себя ученым, мировым?

P9: Ну, сейчас, я себя нет уже, потому что последние 3-4 года я только преподаю и уже каким-то исследованием вообще не занимаюсь. Хотя в этом году мы постарались подать 2 проекта по … и ну, если получится, теперь посмотрим, дальше опять начать исследовательскую деятельность ученого. Но сейчас на данный момент я больше преподаватель, просто.

I: А вот то, что вы подали пока еще нет результатов?

P9: Результаты вышли. Мы набрали около … баллов. Проект не прошел, но мы еще подаем в другие гранты.

I: Как Вы сотрудничаете с зарубежными преподавателями?

P9: Ну с зарубежными преподавателями я уже давно не сотрудничала. В магистратуре я имела такой опыт. Но потом, сейчас я имею общение только с парой преподавателей, которые нам преподавали на курсах английского языка, филологи, они тоже педагоги, вот с ними сотрудничаю по методике преподавания. И все.

I: А вот вообще кафедра? Или

P9: Ну у нас почти % остепененных преподавателей, стаж хороший. Они сотрудничают да с Россией, Германией, ну и Казахстан, внутренние свои ученые есть у нас.

I: Они проводят совместные исследования также?

P9: Да.

I: Каким образом Ваш университет оказывает поддержку исследовательской деятельности преподавателей?

P9: Ну, если смотреть в общем наш университет, конечно, он поддерживает, закупает новое оборудование, открывает лаборатории. Вот у нас внизу лаборатории по …, где проводятся, например, исследования …

I: Это новая лаборатория да у вас?

P9: Да, новая лаборатория. Скоро, не знаю даже, может начнут скоро работы какие-то. А так, конечно, есть у нас …. Вот эти специализации, они оснащены достаточно хорошо, но вот одна проблема – это госзакуп. То есть, это везде, даже в … вот сколько я смотрела. Если один реактив приходит, второго нет, например. Ну и работа стоит.

I: А почему так происходит?

P9: Не знаю. Ну, гос закуп, если так смотреть, например, закупать из России и Китая намного дешевле. Но по закону Казахстана мы должны приобретать продукцию только местных производителей, а они завышают цены, не все препараты у них есть, поэтому вот.

I: То есть это от закона получается?

P9: Да, от закона больше, и внутренне наш университет, они вот именно требуют, чтобы мы местных брали. А за свой счет покупать, конечно, у нас нет таких возможностей. Хотя иногда приходится покупать, для себя что-то брать.

I: А вообще как спонсируются ваши исследования? Получается, университет выделяет бюджет, определенные средства.

P9: Да. Университет, вообще, не выделяет никаких, то есть грантовых каких-то программ, со стороны университета нет. Наши все ученые и педагоги участвуют только в государственных грантовых программах. Хотя, вот я вообще считаю, что нужно больше с предпринимателями работать, наверное, вот, с какими-то национальными компаниями, у которых есть проблемы, чтобы они давали заказ и спонсировали, не государство, а именно вот нац компании должны спонсировать, и фирмы частные какие-то, например. Чего им не хватает.

I: Вот у вас же есть офис коммерциализации, допустим, через него тоже идет работа?

P9: Да, идет. Многие преподаватели пытаются оттуда подавать, ну все равно там, не знаю, лично мне кажется, там большая бюрократия, тоже тяжело, да.

I: Вы считаете, что исследователь является предпринимателем?

P9: Ну, я своим студентам всегда, работаю со …, всегда говорю, что вы должны быть как …, так и уметь внедрить потом свои навыки для создания своего личного бизнеса, а не работать на кого-то каждый, всю жизнь, поэтому это обязательный компонент, я думаю, ну это не всегда, не 100% выполняется. Некоторых ученых не интересует бизнес, а только само исследование, например, да. А если он амбициозен, конечно, поработает, освоится, в этой науке, например, и затем параллельно начинает что-то для себя создавать.

I: То есть, исследование должно иметь практическое применение?

P9: Обязательно. Да.

I: Какие еще трудности есть при проведении исследований?

P9: Ну, наши преподаватели, если чисто брать наш университет, они загружены. У нас очень большая нагрузка, учебная нагрузка. И получается что помимо самого преподавания, преподаватель должен готовить вот эти все материалы, у нас очень много бумаги, которую мы должны написать, там вот.

I: Отчеты?

P9: Вот не то, что отчеты, даже вот тесты, ты готовишь в 3 вариантах готовишь ... Потом требуют, например, есть понятие УМК, учебно-методический комплекс, у вас тоже есть, да. В нем есть все разделы, лекция-обзор, лабораторные и самостоятельные работы. …. Это все время берет, плюс какие-то отчеты, кураторская твоя, вообще непонятная. В общем. …. Поэтому все время на это уходит, и уже устаешь к концу дня, и ничего не хочется, если честно, и плюс материальная база, конечно, вот тоже, то чтобы лаборатории были хорошие и специализированные. Ну, даже и для учебных, например, процессов, тебе нужно учебное оборудование, и оно не всегда приходит. На кафедре нет технических специалистов, как раньше, техники-инженеры, которые делали калибровку или чинили этот прибор. Мы делаем это все сами. Мы не разбираясь, и то уже знаем, как все починить, где-то что-то сделать, например, поэтому это тоже опять.

I: А вот по публикациям, у вас есть какие-то требования, что вот кафедра должна выпустить столько-то публикаций?

P9: Да, это обязательно. Да, каждая кафедра, на каждой кафедре, как минимум в год, должно быть 3 публикации в международных изданиях с хорошим импакт-фактором. Это требуют обязательно. Ну, у нас есть профессора. Вот …, например, вот есть преподаватели-доценты, они стараются выпускать и как-то кафедру защищать, а простые ассистенты, конечно, молодые, у них таких возможностей нет, потому что мы нигде не числимся в лабораториях, поэтому у нас такого быть не может. Мы только, все мои публикации, последние, например, за 5 лет, это чисто методические публикации. Все.

I: И какие бы у Вас были рекомендации для улучшения исследовательской деятельности преподавателей?

P: Ну, в общем, я тоже считаю, что у нас должен быть вот спонсирование не только со стороны государства, …, но и со стороны национальных компаний, крупных компаний, вот именно технических, …, даже министерств, например.

I: А как можно их привлечь? Нац компании и частные компании?

P9: Ну, нужно, во-первых, наверное, сначала какую-то программу составить, и то есть ее массово опубликовать, чтобы вот привлекать. Потому что, вот насколько я знаю, зарубежом, государство вообще не спонсирует науку, это все делают вот компании. Например, у тебя возникли какие-то трудности с …, что-то нужно для него, он дает заказ, или объявляет конкурс для ученых и все они участвуют, и потом отбираются. И это не занимает такого большого времени, например, как у нас там, мы подали заявку и все документы в октябре и ноябре, а в январе только результат вышел, сколько, 4 месяца мы например потеряли просто так, почему это, это должно, мне кажется, в течение 2-3 недель мне кажется пройти и все, потому что у ученого есть свои результаты, это все видно на комиссии, они быстро посмотрели, и все, а не сидеть вот так. А государственные деньги нужно тратить на какие-то социальные больше программы, чем на спонсирование науки, я считаю.

Appendix E: Coding

Date interview was conducted: 03.04.18 Interviewer(s): Dinara Location of interview: University Participant: 9 (MS, work experience: 12 years, research exp: yes current research: no)			
Transcript	**Axial coding**	**Preliminary coding**	**Final thematic code**
Ну, исследование, это комплекс каких-то операций, научных, с помощью которого вы исследуете свой объект, раскрываете его свойства, применение, и находите какую-то новую нишу, которую еще никто не определил, и вводите новизну для этого объекта исследования.	A set of scientific operations to study an object, to investigate its qualities and application and find its novelty	Research	The idea of research
Ну, первая стадия, это обзор литературы, то есть рассмотреть все материалы известные по данному объекту, затем, вы выбираете для себя цель, что вы именно хотите изучить и открыть для себя что-то новое, например. Затем, подбираете уже научный аппарат, приборы там различные, то есть все, что вам нужно для исследования. Затем, сама операция исследования, и потом апробация, проверка еще раз, и конечно уже в конце выводы, результаты, в виде публикаций, что-то такое, например, или внедрение в производство.	Literature review, purpose, methodology, research operation, approbation, checking, results, publication, integration into industry	Research	Research process
Ну, на данный момент, конечно, это всем известный факт, интернет. Ну, ты используешь обзор, то есть литературу берешь из интернета, не та, что в открытом доступе, но и	Internet, reliable literature, sometimes you have to pay for the electronic library	Resources	Environment

иногда приходится оплачивать научной библиотеке электронной и пользоваться оттуда. То есть сомнительную литературу нужно, конечно же, отсеивать сразу. Вот.			
Ну, для меня мотивация, это интерес, в первую очередь. Интерес, в плане роста профессионального. Интерес личный. То есть, то, что мне нравится, сама вот эта вот. Сама работа исследования, например. Мне нравится что-то узнавать новое, проверять, устанавливать, применять на практике.	Interest, professional interest & personal interest, to know something new, check, apply	Motivation	Motivation
Ну, это очень важный, как бы, компонент образовательного процесса. Потому что с каждым годом наука меняется, новые факты устанавливаются и читать старый материал, студенту предоставлять. Тем более, когда сейчас студент более активный, он пользуется также интернетом, может найти информацию более правдивую, чем ты. Поэтому исследовать и проводить такие работы – это очень важно. Чтобы и студентам предоставлять правильную информацию, и современную, самое главное.	Very important part of the educational process. It is important to provide students with new and reliable information	Role of research	Faculty's roles
Ну у нас почти % остепененных преподавателей, стаж хороший. Они сотрудничают да с Россией, Германией, ну и Казахстан, внутренние свои ученые есть у нас.	On the institutional level there is collaboration, collaborative research	Internationalization	International cooperation