Development of university–industry partnerships in Kazakhstan: Innovation under constraint

Dilrabo Jonbekova [a,*], Jason Sparks [a], Matthew Hartley [b], Gulfiya Kuchumova [a]

[a] *Graduate School of Education, Nazarbayev University, Nur-Sultan, Kazakhstan*
[b] *Graduate School of Education, University of Pennsylvania, Pennsylvania, United States*

ABSTRACT

This paper examines university–industry partnerships (UIPs) in Kazakhstan. The study described here explored the kinds of collaborations with industry that universities have undertaken, their purposes and benefits, and the contextual barriers to such partnerships. Our findings suggest that UIPs in Kazakhstan remain weak and are largely limited to employers' involvement in teaching, the provision of internships for students, and technical consultancies. We argue that the goal of policy makers to develop robust research partnerships that contribute to innovation and economic growth is constrained by heavy faculty teaching loads, poor institutional support for research, constant reforms in the higher education system, and little consistency in the priorities of the fast-changing Ministers of Education.

1. Introduction

For over 70 years Kazakhstan was a republic of the Soviet Union. During that period universities played an integral part in the centrally planned command economy. Soviet higher education institutions across all fifteen republics were strongly linked to workforce production for different sectors of industry and the economy (Ahn et al., 2018; De Witt, 1961; Grant, 1968; Ross, 1960). At the time, higher education institutions were controlled by various ministries and tightly connected to associated economic sectors and industries themselves. The ministries oversaw the finance and operations of universities, while the Ministry of Higher and Secondary Specialised Education was responsible for their programmes' accreditations and teaching materials. The admission plans at higher education institutions were entirely based on the current Soviet five-year economic plan (Matthews, 1982).

The link between universities and industry in the Soviet period was explicit. Industry and ministries mandated the number of specialists needed in specific employment areas and determined the manner in which universities should prepare students for these specialties. All students were required to complete work placements during their time at university to obtain practical skills in their field of study. From the early 1930s, most graduates were also required to fulfil a two- to three-year work placement (Matthews, 1982). The twofold purpose of the

postgraduation work placement was to meet the five-year plan (Gosplan) across the Soviet Union republics and to ensure sufficient staffing in rural areas, which many graduates considered to be unattractive relative to urban areas (Grant, 1968; Matthews, 1982). In sum, collaboration between higher education institutions (HEIs) and industry primarily focused on preparing the industry workforce. Research collaboration was almost nonexistent, given the role of the Academy of Sciences as the primary research institution (Grant, 1968), a key distinction between Soviet and Western HEIs (Smolentseva, 2003). The disintegration of the Soviet Union in 1991 began a period of significant change in the education system and economies of the newly independent republics (Silova, 2011; Heyneman, 1998, 2011; Merrill, 2011). It had important implications for links between HEIs and industry in policy and practice, especially in the first two decades of the new century.

On December 10, 1991, Kazakhstan declared its independence and began transitioning from a centrally planned command economy to a more market-oriented economy. Owing to its rich resources of oil and gas, and the desire of government leadership to invest in education, numerous educational reforms were introduced (Sagintayeva et al., 2017). HEIs were less tied to particular economic sectors or industries; new forms of HEIs (private, joint-stock) and fields (e.g., business management) were established (Heyneman, 1998); and, significantly, Kazakhstan joined the Bologna Process in 2010, with the goal of

re-orienting higher education to European and western models (Ahn et al., 2018). The desired outcome of Kazakhstan reforms was an interest in trying to foster more autonomous and innovative institutions. This proved challenging. The concept of institutional autonomy was contrary to the command and control system with which institutional leaders were familiar (Hartley et al., 2016). Also, Kazakhstan's public expenditure on education remained below international benchmarks. In 2014, state spending on education was less than 3% of its nominal GDP. On higher education sector the spending was approximately 0.3 %. This required HEIs to depend on private sources, primarily tuition (OECD, 2017).

Despite important reforms that ceded control of academic curricula from the Ministry of Education and Science (MoES) to HEIs, the Ministry continued to define educational policies and priorities, regulate funding, and prepare quality standards (OECD, 2017). The law on Academic and Institutional Autonomy of Higher Education Institutions in 2018 offered HEIs significant autonomy in determining their futures, with an important dimension being the development of partnerships with industry in ways that would contribute to the innovation and development of the Kazakhstan economy.

The importance of university–industry partnerships (UIPs) has been highlighted in numerous government policies and strategy documents, including (i) 2025 Strategic Development Plan of the Republic of Kazakhstan (SDP), (ii) 2010–2014 State Program of Forced Industrial and Innovative Development of Kazakhstan (SPIID), (iii) 2015–2019 State Program of Industrial-Innovative Development of Kazakhstan (SPIID-2), (iv) Strategy Kazakhstan 2050: New Political Course of the Established State (SK2050), and (v) both 2016–2019 and 2020–2025 State Program of Education Development of the Republic of Kazakhstan (SPED). The benefits and significance of university–industry collaboration have also often been emphasized in national addresses given by the first president of Kazakhstan, Nursultan Nazarbayev. He highlighted the importance of UIPs for improving the quality and relevance of higher education, preparing students for the labour market, and, most importantly, for spurring innovation to strengthen the economy of Kazakhstan through applied research with industry (Akorda, 2018).

Kazakhstan has also looked to promising efforts of other countries that have placed an emphasis on promoting UIPs. For example, in England, under the Transforming Workforce Development Programme, the government financially supported HEIs by increasing employer engagement (Basit et al., 2015). Partnerships were developed through industry-funded postgraduate programmes in Australia (Forsyth et al., 2009) and through industry-funded university research and development in Canada and the United States (Crespo and Dridi, 2007). In like manner, HEIs in Kazakhstan, under the influence of national research and innovation policies together with governmental support, have started establishing commercialization centres, student incubators, and technoparks. Thus far, however, these initiatives are primarily focused on commercializing intellectual property and receiving quick commercial returns. Less has been done to develop a sustainable culture of engagement with industry (OECD, 2017).

Although the emphasis on UIPs for research and innovation is clear in governmental policies, Kazakhstan lags behind in key areas of support. For example, national investment in research remains modest (UNESCO, 2016). The proportion of faculty with doctorate degrees is less than 50 % (OECD, 2017). A university culture that conceives of research as a central aspect of faculty work remains undeveloped (Jonbekova, 2020); specifically, poor conditions remain for university faculty to conduct research (Kuzhabekova and Ruby, 2018), and there is a notable lack of trust and engagement between actors (OECD, 2017). Finally, an increased focus on UIPs is reflected in the requirements for universities competing for state funding in the form of study grants. According to the latest governmental document, HEIs are evaluated by the graduate employment rate and their position in the ranking of Atameken (Atameken, 2019), the national chamber of entrepreneurs of the Republic of Kazakhstan that annually assesses university academic

programmes, taking into account graduates' career prospects (employment rate, average income, work stability, job search duration), quality of academic programmes (employers' engagement in curriculum development and delivery, focus on practical skills), student achievements in terms of student mobility, and the existence of university support centres for students' research application initiatives.

Despite the national emphasis on developing UIPs to foster innovation, little empirical work has been done seeking to understand how this is being approached at the institutional level. This exploratory study examines how institutional leaders describe the development of UIPs at this important stage of transformation in higher education policy and practice. More specifically, we have sought to understand to what extent these university–industry partnerships promote innovation in both higher education and the Kazakhstani economy. The study focuses on university–industry partnerships at two universities in central Kazakhstan. The following research questions guided the study: (1) What are the current forms of university–industry partnerships?; (2) What are the benefits and challenges of collaboration with industry?; (3) What are the supporting factors for developing effective and sustainable university–industry partnerships?

It is our hope this study sheds light into the current state of UIPs in Kazakhstan and may help university leaders and policy makers understand the various emerging factors that promote or impede this important work.

2. Literature review

University–industry partnerships are not new phenomena globally or in Kazakhstan. Studies and government reports have emphasized the importance of developing links between universities and industry. Although the purposes of such collaborations may be similar across higher education, the forms, extent, challenges, and risks are context specific. In this paper we use Plewa and Quester (2008, p.212) definition of *university–industry partnerships,* which they define as 'trusting, committed and interactive relationships between university and industry entities enabling the diffusion of creativity, ideas, skills and people with the aim of creating mutual value over time'.

UIPs have a number of key benefits. Such partnerships have aided in the development of new study programmes (Forsyth et al., 2009; Plewa et al., 2015). They have increased research productivity and enhanced opportunities for faculty and students to participate in research (Laursen et al., 2011; Turk-Bicakci and Brint, 2005). UIPs have led to advances in innovation and technology. They have established new funding streams for universities and have enhanced student employability (Thune, 2011; Bernarte, 2014). Furthermore, UIPs may politically benefit institutions 'such as the enhancement of reputation or institutional prestige and responsiveness to government initiatives' (Prigge, 2005, p. 224).

Universities engage with industry in field-specific ways (Perkmann et al., 2011) that primarily encompass in two areas: joint research activities and development of educational programmes. Research collaborations may involve joint research projects, the provision of funding by industry for specific university research (Campbell and Blumenthal, 2000; Harman, 2010; Rahm et al., 2000), the establishment of research parks and the leveraging of the research capacity of universities and industry (Prigge, 2005), and the provision of feedback on the practical relevance of university research. Educational collaborations include a wider range of activities, including developing new educational programmes, revising existing programmes, and involving employers in teaching, mentoring, supervising students and activities related to skills and competency development (Salminen-Karlsson and Wallgren, 2008).

Other activities that fall under the UIP umbrella include career fairs, career advisement activities, apprenticeships, internships, recruitment programmes, and investment or equipment loans (Harman, 2010; Prigge, 2005; Thune, 2011). Other forms of collaboration include faculty consultancies, employers serving on university advisory boards, and lifelong learning activities, such as continuing education courses, skills

development for employees of companies, and development of training packages for specific organizations (Brandt et al., 2009).

Collaboration with industry benefits students, faculty, education programmes, research output, and university reputation overall. Engagement with industry informs faculty and senior leadership on labour market needs, allowing them to adjust the relevance and quality of education programmes and further the strategic development of institutions (Prigge, 2005; Thune, 2011). With access to industry, students gain work-relevant skills, develop entrepreneurialism, and create professional networks (Cameron-Jones and O'Hara, 1990; Harman, 1999; Prigge, 2005; Thune, 2011). Involvement of outside industry experts can improve the quality of faculty research (Kauppila et al., 2015), foster research area expertise, and provide important opportunities to test practical application of research findings (Lee, 2000). Most importantly, UIPs help faculty gain access to scarce research resources, such as cutting-edge industrial laboratories and expensive materials (Crespo and Dridi, 2007), creating new opportunities for faculty research, greater research productivity, and increased academic publications (Harman, 2010).

Additionally, partnerships can assist universities in cutting costs, particularly those related to students funding, faculty salaries, and research. Studies suggest that faculty who collaborate with industry receive conference support and are more satisfied with research equipment, PhD students, and the intellectual environment of their department (Harman, 1999, 2010). Industry can also be an additional source of funding for students' scholarships, fellowships, cultural and athletic events, facilities, and equipment (Crespo and Dridi, 2007; Harman, 2010; Prigge, 2005). UIPs also provide adjunct faculty, faculty salary, research, and equipment for laboratories (Kauppila et al., 2015; Prigge, 2005; Valentín, 2000). Broadly, UIPs can have a positive impact on the profile and quality of programmes and prestige of universities (Harman, 2010; Thune, 2011).

While the literature describes many benefits to UIPs, it also points to complexities and risks. The challenges include practical difficulties, cultural differences between universities and industry, disputes over intellectual property rights, and conflicts of interest. One of the key challenges in developing partnerships is the absence of incentives that encourage faculty participation in partnership initiatives (Siegel et al., 2003; Karlsson et al., 2007). Furthermore, faculty lack of expertise or skill in establishing and maintaining contacts with industries can hinder the development of collaborations (Basit et al., 2015). Yet, when partnerships are developed, lack of role clarity for both partners can present a challenge (Barnes et al., 2002; Barbolla and Corredera, 2009; Prigge, 2005). Scholars point out that differing organizational cultures and environments, universities' unrealistic expectations, and HEI bureaucracy can all hinder UIP success (Siegel et al., 2003).

Other challenges to UIPs involve conflicts of interest over research priorities; allocation of personnel, financial, and material resources; and communication and secrecy. Drawing on evidence from several studies on partnerships, Prigge (2005) argued that UIP risks for HEIs include a shift from basic research to applied research and product development, compromises in academic integrity, constraints on the open and timely dissemination of research results, narrowing of research topics, pre-empting research and teaching preparation time, and encouraging the migration of faculty to partner organizations. Moreover, industry-funded research can result in conflicts between UIP researchers as well as tensions between university departments (Harman, 1999). UIPs can also change standards and practices in university promotion and tenure policies (Harman, 1999). Industries have been criticized for focusing heavily on quick-fix solutions rather than building sustained relationships with HEIs (Kauppila et al., 2015). Some scholars are concerned that large partnerships put at risk the critical value of higher education, arguing that universities are increasingly operating like for-profit organisations (Press & Washburn, 2000 in Prigge, 2005). As Richard Florida (1999, in Prigge, 2005, p. 67) stated, 'universities are far more important as the nation's primary source of knowledge creation and talent rather than as a vehicle for pumping out commercial inventions'.

Nevertheless, despite the critiques, challenges, and risks, research shows that UIPs are an important national and institutional policy priority, with manifest success in many western universities. Research on partnership in nonwestern contexts—particularly postsocialist contexts such as Central Asia—is limited, something the present exploratory case study inquiry seeks to inform.

3. Framework

The Triple Helix model illustrates the importance of university–industry–government interaction in facilitating the conditions that lead to innovation in a knowledge-based society (Etzkowitz, 2003). The three versions of the Triple Helix model (Etzkowitz and Leydesdorff, 2000; Leydesdorff and Etzkowitz, 1998; Varblane et al., 2008) enabled us to examine the state of UIP development, to understand the successes and barriers as they relate to the broader issues in management and governance of the higher education sector, industry, and the economy. Triple Helix I—the statist version—is where the state involves university and industry and develops directly mutual relationships. In this model, the state is the driving force. This model was apparent in command economies, particularly the former Soviet bloc and Eastern Europe (Varblane et al., 2008). Triple Helix II—the laissez-faire version—is an arrangement where industry, university, and government act separately and interact only modestly across strong borders, with industry serving as the driving force. The Triple Helix III configuration entails overlapping institutions that take on each other's role and produce hybrid organisations. The Triple Helix model suggests that equal partnership between university, industry, and government is key to innovation and development of the knowledge-based economy (Etzkowitz, 2002, 2003; Etzkowitz and Dzisah, 2007; Etzkowitz and Leydesdorff, 1999; Etzkowitz, Webster et al., 2000). As we discuss in our findings and discussion sections, the absence of equal partnerships is one of the underlying reasons for the weak collaboration in Kazakhstan and the challenges for UIPs to spur innovation.

In examining how current UIPs in Kazakhstan lead to policy makers' goal of innovation in higher education and the economy, we use Lundvall et al.'s (2002; 2009) two modes of innovation, the science-based STI (Science, Technology, Innovation) and the experienced-based DUI (Doing, Using, Interacting). Within the UIP literature (Zavale and Macamo, 2016, p. 248), STI-innovation encompasses 'exchanging disembodied/non-rivalrous knowledge products (e.g. patents, technology), whose usage exempts the bodily presence of their producers' (p.248). The DUI-innovation 'involves innovating through embodied/rivalrous knowledge, through personal skills and capabilities' (p.249). The STI innovation mode derives largely out of R&D capacity and related collaborations, an example of which are patents and technology prototypes that are demanded by the industry. DUI innovation is aimed at enhancing organisational and interorganisational learning, and it refers to the training of critical and skilled knowledge workers who are capable of using their competence and interactive capabilities to innovate within and across organisations (Zavale and Macamo, 2016). The research literature suggests that the STI mode of innovation is more common in developed countries whereas the DUI mode is predominant in developing countries.

4. Methods

Data for this study were gathered between May and November 2018 in the central part of Kazakhstan. We reviewed websites of a number of universities and selected two designated joint-stock universities that seemed to have a substantial amount of active engagement in industry. These universities' dedication to and active involvement in UIPs was also acknowledged by the National "Atameken" Chamber of Entrepreneurs, which rated most of their academic programmes as top or above

average in 2018. Unlike designated state universities, which constitute the majority of universities in Kazakhstan (45 out of 128), joint-stock universities have greater autonomy in setting institutional UIP priorities and policies. University A was established in the early 1990s as a joint-stock university. University B was established during the Soviet period and granted a status of joint-stock university in the 2000s. We focused on universities with active industry engagements because we wanted to explore rich stories about various forms of UIPs in Kazakhstani universities, as well as challenges and best practices. Moreover, we were interested in exploring how universities that had only recently been granted autonomy were able to develop partnerships. Universities with limited UIPs could not provide such data because of the absence of experience in initiating, developing, and supporting partnerships. Moreover, the selected universities specialize in specific fields important for the country's socioeconomic policy; and this became an additional rationale for choosing these universities, as they appeared among those universities targeted by industries and businesses as key academic partners for developing UIPs. These universities also provided us with disciplinary difference. While University A focuses mainly on social science fields, programmes at University B centre around STEM fields. This disciplinary difference in academic programmes of the universities was specifically targeted to explore the state of UIPs across different disciplines and programmes. The two universities in this exploratory case study are uniquely positioned to provide us with insights into emerging UIP issues and experiences with immediate value to current discussions and debates on UIP policy and practice in the field, as well as provide us with a basis for future larger scale research into the most pertinent issues in UIP across various regions of the country.

In order to choose a relevant sample within each case site for our study, we reviewed the websites of all the schools at the chosen universities and identified departments and faculty with active collaborations with industry. We further refined our sample after our interviews with senior leadership produced recommended departments and faculty most actively engaged in partnerships. A similar approach was taken by other studies (Crespo and Dridi, 2007; Slaughter et al., 2002; Slaughter and Rhoades, 2004).

Consistent with qualitative case study methodology (Stake, 2010; Yin, 2003), semistructured interviews lasting for about an hour were held with senior leadership (provost, vice-provosts), deans of departments, and faculty on each of the two case sites. Having such a variation in the sample enabled us to triangulate and validate the data gathered from the different institutional actors. Key characteristics of the sample are presented in Table 1. At each of the universities, we interviewed two members of the senior leadership, two department heads, and six to seven faculty. The final sample consisted of 21 participants.

Based on the analysis of relevant literature, interview protocols were developed for data collection. The main method for data collection was face-to-face semistructured interviews. In one case, a telephone interview was carried with a participant. Interview questions centred around (i) the nature of partnerships and how they are initiated and developed, (ii) benefits and challenges of collaboration with industry, and (iii) supporting factors and potential barriers to developing effective and

Table 1
Characteristics of sample.

University	Field	Role	Number of Participants
A	Social sciences	Rector	1
A	Social sciences	Vice-rector	1
A	Social sciences	Department Head	2
A	Social sciences	Faculty	6
B	STEM	Rector	1
B	STEM	Vice-rector	1
B	STEM	Department Head	2
B	STEM	Faculty	7
Total			21

sustainable university–industry partnerships. Interviews were coded using Nvivo. The coding process was guided by inductive and deductive approaches based on thematic data analysis and took two stages. First, two researchers coded all interviews separately using a preliminary codebook developed based on previous research and review of the transcripts. Then, identified codes and themes were finalized in discussion with all researchers involved in the study. Data was analysed by individual cases first, and then analytical cross-case analysis (Ragin, 2013) was conducted to compare the two cases and identify similarities and differences and to provide answers to our research questions. While the study provides valuable insights for practitioners and policy makers and contributes to the literature on partnerships, the relatively small sample does not allow for generalisation of the findings to all higher education institutions in Kazakhstan. It is important to mention that we worked in earnest to keep the participants and their institutions confidential. This need for confidentiality requires that we not describe specific institutional features, such as departments, teaching programmes, or even research areas.

5. Findings

5.1. Purposes of university–industry partnerships

The participants from the two institutions in this study pointed to two key purposes for engaging in university–industry partnerships: (i) improving the quality and relevance of higher education and (ii) enhancing students' future employability. According to the majority of participants, collaboration with industry was important for understanding recent market trends and integrating students' theoretical knowledge with practice, thereby improving the quality and relevance of the education provided. Many participants claimed that certain skills are better taught by employers in order for students to gain firsthand experience and learn how to apply theory to practice. As one participant noted:

> There are courses which are better taught by practitioners who are every day in the field experiencing what happens in agriculture, rather than by faculty who, in other words, do not get out of their office all day. Employers' engagement in teaching is crucial for students to gain first-hand experience and develop their practical skills. (University B, senior leadership)

Similarly, several other participants expressed the importance engaging with industry by noting the Russian proverb 'Luchshe odin raz uvidet chem sto raz uslishat', which means that it is better to see something once than to hear about it one hundred times. In short, our participants believed that these partnerships offered excellent opportunities for experiential education.

The second most prominent purpose of university–industry partnership was enhancing students' employability, which was a significant concern at both universities. According to several participants, employability of graduates is a key performance indicator (KPI) that the Ministry of Education and Science (MoES) uses to rank universities and determine the number of state scholarship grants that universities receive annually. A senior leader at University A noted that 'employability is one of the key indicators of our university effectiveness'. Another senior leader at University A also pointed to the aspirations of the government, saying, 'We must have 100 % employability of our graduates. A good indicator of employability also helps to attract more students and increased funding from the government'. Analysis of the MoES website confirmed that employability of graduates is a key performance indicator along with salary of graduates (MoES, 2018). Therefore, collaboration with industry was seen as an opportunity to understand the requirements of employers and the latest labour market and economy trends, and for students to obtain the most employment-relevant knowledge and skills.

Joint university–industry research was mentioned least by participants in both cases and very rarely described as a purpose of collaboration with industry. Only at University B, where their programmes largely focus on technical areas, did senior leadership describe a planned shift away from the Soviet model of universities exclusively preparing workforce for the economy, to research and extension systems. He noted a key priority is UIP research used for commercialisation; however, as we discuss in the next section, for now such research remains only a plan. At University A, only one example of research collaboration was mentioned. One of the faculty members interviewed acknowledged that lack of collaborative research was an issue, saying that 'as a researcher, a big issue I see is absence of research collaborations with industries that fully nullifies university research potential'.

Overall, it seemed that due to University A being a relatively new university, the focus was heavily on partnerships related to meeting the employability key performance indicators set by MoES to improve the status and prestige of the university and to obtain more funding. Another explanation can be the system of financial bonuses and promotion applied at this university. According to the university policy, faculty can focus on teaching, research, or services depending on their preferences and expertise. In other words, research is not expected from of all faculty. Financial bonuses are awarded based on achievements in any of the three areas.

In comparison to University A, University B expects research-related outcomes from its faculty. With the stated purpose of developing research and commercializing research results, University B invests in young faculty with research potential by supporting opportunities for faculty to study at reputable universities abroad as well as faculty research initiatives. Moreover, where University A's mission is focused on providing students with 'quality and relevant higher education', University B strives to develop itself as a research university. In addition to meeting the requirements of MoES, it appeared that university mission and vision defined institutional policies and practices with regard to UIPs. Furthermore, participants at both universities highlighted that collaboration with industry was important to attract additional funding, which helps them offer scholarships, organize events, and improve facilities. Although University B has some healthy developments in initiating and implementing a few research partnerships, overall, the purposes of UIP at both universities resemble the Soviet model of partnerships with industry, where the focus was largely on the supply of workforce for the labour market rather than research.

5.2. Forms of partnering

We identified four main forms of partnerships with industry: educational programmes, student employment, consultancy work, and research. The two most prominent forms of collaboration are those related to the involvement of employers in educational programmes and activities associated with improving students' future employability. With regard to educational programmes, both universities involve employers in significant ways. This involvement includes not only teaching courses on a part-time basis but also the joint development of exam papers, co-supervising undergraduate and graduate students' diploma/ thesis projects, and revising curriculum. All of these forms of partnerships are aimed to equip students with quality and relevant education to enhance their employability. Both universities have developed a business council that consists of university senior leadership, faculty, and employers. According to the senior leadership at both universities, the business council meets once or twice a year to review the curriculum. As part of this process, they described employers contributing to the revision of existing programmes as well as the introduction of new courses. For example, the head of a department at University A noted that, together with their partner employer, they developed a course that is partially certified by the employer. Given that employers were involved in developing courses, the university also included them in developing questions for exam papers for those courses in order to ensure that both

theoretical and practical knowledge of students was assessed. In order for faculty to understand the latest trends in the market and the practical aspect of their field, University B has started making arrangements for their faculty to work in the industry for some time every four to five years to gain practical experience. Although this seems to be happening at a limited scale, the aim is to increase such arrangements over the years.

Partnerships related to enhancing students' employability include internships in the industry and organizing career fairs jointly with employers. The importance of partnerships in these areas was emphasized by one faculty at University A, who noted:

Employability of our students is a key indicator of the effectiveness of our programme, and one key indicator of MoES to rate universities. Currently, we are one of the leading universities on the employability rating and hopefully will stay on the top of their rating list in the future as well.

Consultancy work was another form of collaboration with industry. Examples of such collaboration at University A were consulting government agencies on development and revision of policies and legislation and conducting training courses for government agency employees. University A appeared to be heavily involved in such collaboration with the government owing to faculty expertise in particular areas and, arguably, being a leading university in specific fields in Kazakhstan. University B was also involved in consultancy work, but more through assisting private companies and firms develop business plans and implement their business ideas. Senior leadership and faculty perceived this work to be highly efficient, as their ideas have been incorporated into polices and legislation that were put in place at the national level. University B appeared to be most efficient in its engagement with private companies in developing and implementing business ideas. The most vivid example of this was consulting large businesses on planning and setting up a fish farm that was claimed to be providing food to a large number of restaurants in Kazakhstan.

Research collaborations were the least emphasized form of collaboration mentioned by participants from both universities. University A provided only one example of research collaboration. University B appears to have more research collaborations, but the several examples provided by participants indicate that these collaborations are largely related to the university's technical and applied programmes, which in many cases require a research component. Moreover, the institution's ability to develop research partnerships may be also related to its long history and established networks in the country. In contrast to University A, University B seemed more research-oriented in general. As mentioned earlier, senior leadership was determined to move away from the focus on workforce preparation to become a research university capable of generating knowledge useful for the economic and social development of the country.

5.3. Benefits of partnerships

Partnerships with industry yielded several benefits for both universities, including those to students, faculty, and the university at large—each consistent with the purposes and forms described above. For students, the benefits were described as gaining practical skills, enhanced employment opportunities, and, in a few programmes, additional certification of their skills by the employer. Involvement of employers in teaching was perceived to be crucial for obtaining quality and relevant knowledge and skills.

Benefits for faculty lie in improved knowledge, particularly regarding practical aspects of their field, increased financial benefits, and opportunity to influence government policies, particularly for those involved with developing and revising government policies and legislation. At University A, collaboration with industry was linked to receiving financial bonuses and promotion. Faculty at both universities noted that engagement with industry helped them to not only apply

their knowledge in practice but also exchange experiences with employers, develop networks, and stay abreast of the latest developments in their field:

> *Technology is developing at a rapid pace. Engagement with employers allows faculty to understand new developments in the field and drives them to update their own knowledge and ensure the relevance of what they teach in a classroom. (Faculty 2, University B)*

Moreover, the faculty emphasized that partnerships with industry enabled them to apply the results of their research in practice and also provide social and economic benefits. As one faculty member put it:

> *For us it is important to conduct research that can be applied in practice. We do not want to do research that will sit on the shelf, collect dust and will not benefit anyone. (Faculty, 2, P4, University A)*

There were also numerous benefits to universities at large. According to participants from both universities, partnerships enabled them to get additional funding. University A reportedly used such funding for student scholarships and events that benefit the university. According to senior leaders at University B, that institution used the funding received from its collaborative research with industry to conduct further research and equip laboratories.

Partnerships with industry were also seen as a way to improve the status and rating of these universities:

> *The prestige and rating of our university depends on the employability of our graduates. Annually the Ministry of Education and Science ranks universities based on their graduates' employability. Therefore, we need to collaborate with employers to enhance the employability of our students. (University A, senior administrator)*

The fact that employability is one of the key performance indicators of universities in Kazakhstan partially explains why the benefits of partnerships are largely discussed in employability terms rather than in terms of research or other areas. By increasing the prestige of their university through employability, senior leadership from University A was hoping to attract more students, which would in turn generate more grants from the government.

5.4. Barriers to partnerships

5.4.1. Industry-related challenges

Although both universities identified a range of benefits to UIPs, several challenges were described as impeding the success of existing partnerships or the development of new partnerships. Some of the challenges are industry related, while others are located within universities. However, a major inhibiting factor appears to be related to the wider education systems and practices.

One industry-related issue appeared to be that employers had little interest in or commitment to partnering with universities. Participants stated that often employers do not see UIPs as anything other than internships for students. Additionally, many employers do not even maximize the potential of those internships. For example, many participants described employers assigning menial tasks to student interns, such as making coffee or photocopies, instead of engaging them in substantive work. Additionally, some employers are quick to sign partnership agreements but do not invest time or funding in the partnerships. However, as the head of a department at University A noted, 'we are becoming more selective and removing such employers from our list of partners'. For University A industry selectivity is underpinned by their desire to build a strong reputation in the competitive higher education market by enhancing their graduate employability in large and prestigious companies, which will in turn equip students with the knowledge and skills required by such employers. Consequently, University A described a strategy in which they would establish partnerships with large reputable companies, learn which skills and specialists

they need, and through such partners create opportunities for their students to develop relevant knowledge and skills. This was done mainly by inviting people from the company to speak to students and arranging for student internship placements at such companies. However, one major issue inhibiting collaboration appeared to be the unwillingness of employers to collaborate with universities unless required by senior government officials, who personally intervened:

> *The problem is the authoritarian systems that we have in Kazakhstan. If tomorrow Senior Government Official X tells employers to go and collaborate with universities, they will come and work with us. (University A, head of department)*

Although mentioned less frequently, a few participants stated that the challenges in the education system in the aftermath of the Soviet Union disintegration may be another reason for the little interest on the side of employers to collaborate with universities:

> *After the collapse of the Soviet Union, the status of the teaching profession significantly declined. Due to low salaries, poor working conditions, and unattractiveness of the profession, university faculty are no longer respected the same way they used to be respected in the Soviet time. This is another reason why industry has little interest in collaborating with us. They do not see us as experts in our field. (University B, Faculty 3)*

Some participants believed that partnerships with industry weakened over the last 20 years. A senior leader from University B explained this weakening by stating that,

> *Twenty years ago production in [nationalized] industries was quite high and provided more opportunities for universities to engage and involve students. Today, production is low and most companies are privatized which do not have much interest in engaging with universities. (University B, Faculty 1)*

However, the weakening of partnerships can be also explained by the fact that in the Soviet period universities were tightly linked to specific Ministries and related industry, and thus collaboration between them was compulsory. In the independence period and the market economy, industries are no longer so directly tied to universities, and collaboration is not compulsory aside from, as described above, those few cases where individual government officials intervene.

5.4.2. University-related challenges

Participants identified some of the most pronounced university-related barriers to forming participations as lack of time or motivation by faculty because of a heavy teaching load, low salaries, and little incentive. However, University A reported having more success in involving faculty in partnerships due to additional financial bonuses and linking partnership efforts to promotion. In contrast, University B reported more challenges in engaging faculty in research partnerships, due to a significant proportion of faculty close to retirement age with little motivation to engage in additional work at that stage of their career.

However, as noted by a senior leader at University B, the lack of faculty UIP participation is also partly linked to the continuity of the Soviet model of a teaching university, where professors have status as theoretical experts in their field and do not believe that they need a research-basis for teaching:

> *Our academic society is very conservative...it is difficult to make changes and reforms...it takes a while to prepare all these reforms, explain them to faculty, to find the right people and even to replace some people. For example, now when we are trying to push faculty to go to [companies] and ask to find out what is happening and where we can help, they say no, no, I am [an academic] professional, I will wait until they come and ask me what I should do...In the last 3–4 years, we replaced around maybe 30 % of our faculty, most of whom were in their retirement age.*

It is clear that some university leadership feel that the Soviet model

of the university continues to influence the work of universities today, particularly as it relates to partnerships. Because of the separation of teaching and research in the Soviet period, some university faculty apparently still do not see their role beyond teaching and service to the university. Moreover, considering the state role in the Soviet times for planning and controlling university work, it is the view of some participants that some faculty still appear to be waiting for a government mandate to shift their academic responsibilities beyond merely teaching.

Another important challenge to UIPs is management. At both universities, there was no dedicated office or administrative positions with explicit responsibility for managing UIPs. Nor did either case have a specified budget allocated to UIPs. UIP management was distributed across multiple administrative sites; for example, at both universities a career centre managed student internships, while other UIP work was located in the relevant faculty departments and distributed across administrators and faculty. Our findings suggest a need for greater institutional support for UIP management, particularly with the institutional goals for increased partnerships in the future.

5.4.3. 'When the solution becomes the problem'

While government support was perceived to be a crucial factor in developing partnerships and overcoming challenges, some of the factors inhibiting the development of effective and sustainable partnerships stem from government systems and practices. The accounts of our participants suggest that constant changes and reforms, and little consistency in the priorities across MoES administrations, not only make it challenging to develop partnerships but also difficult to make other MoES mandated improvements in education:

…how many Ministers did we have? Each Minister of Education introduced new reforms, as a result of which we lost quite a bit in education… We may have gained something, however, I think we lost more than we achieved… (Head of department, University B)

The quote above is in reference to the experience of the preceding three years, during which the Minister of Education and Science has changed three times, with one working only for five months. Each presented ambitious and diverse agendas but had too little time to implement them. In an echo of the quote above, criticism of the frequently changing Ministers has been growing in media, with headlines such as 'Changing Ministers and unchanging situation' (Tatilya, 2010), 'Gani Kasymov is tired of the frequent change of ministers of education in Kazakhstan' (Kruglova, 2016), 'The Ministry of befuddling' (Yuritsyn, 2018), 'Reforms and experiments of Yerlan Sagadiev as Minister of Education' (Madikhojaeva and Batenova, 2019), and 'Kazakhstan says goodbye to good education' (Suleev, 2020). These articles raise important questions about the diversity of ministers and agendas in a short span of time and the potential to achieve any of the proposed reforms, as well as the potential to achieve the goals of the first Presidents of the Republic of Kazakhstan for this nation's universities to become internationally competitive and contribute to the innovation of Kazakhstan's economy.

The reported lack of coordination between different government agencies is described as another impediment to university–industry partnerships and other developments within universities:

I'll tell you what the problem is. The Ministry of Education and Science does not have the right instruments to develop and support partnerships. The Ministry of Industry and Trade [MoIT] has the instruments but does not have research…. In other words, MoIT has legs but no brain and MoES has a brain but no legs. So the body that connects the brain and the legs is missing. Let's take the paradox of extension which is implemented globally by research institutes and universities. But our policymakers decided not to give us [universities] extension and decided to give that to the Chamber of Entrepreneurs - Atameken. So instead of giving the money to universities for an extension, they gave it to Atameken when the brains

needed to implement extensions are here at the university. People sitting there do not have the relevant background. Now they come to us, hire our faculty, and the funding for that is bypassing us… I think the issue is the lack of coordination between agencies and the politics of governance in this area. (Head of department, University B)

Furthermore, our findings show that apart from heavy teaching loads, university faculty and management are constantly dealing with bureaucracy, specifically countless paperwork requests from government agencies which prevents them from dedicating more time to development of UIP and other academic work:

Except for our academic work, we have to deal with lots of paperwork. Too much paperwork these days. The Ministry sends requests, also other subordinate departments and committees under the Ministry send requests… 'Here, send us your answers to these questions'. Responding to such requests takes an entire day. If we dealt only with our academic work, then we would have time to go and visit companies and they would come to visit us to develop partnerships. But when you are often occupied with such paperwork, [partnership] is left aside. Both faculty and heads of departments are overloaded with work and are here every day from 8 a. m. to 8 p.m. (Head of department, University B)

These findings suggest that while policy makers may have the best intentions for universities, some government practices and systems are creating challenges rather assisting in solving the problems their policies are designed to address.

5.5. How are partnerships developed? Who are the partners?

Considering the fact that partnerships with industry existed even during the Soviet period, we were interested in how partnerships are initiated and developed today. Although some of our participants claimed that there is no formal requirement to collaborate with industry, our findings and analysis of secondary data point out that universities most actively collaborate in areas that are required of them by the government and its policies. These areas include student internships, which are mandatory as part of dual education, and employer involvement in the examination process, which is also compulsory. These are same areas in which universities were mandated to collaborate with industry even in the Soviet period.

In other areas, particularly research, partnerships are not systemized and instead develop in an ad hoc way, primarily due to limited resources, heavy teaching loads, limited autonomy, and frequently changing priorities of education policy makers. However, even with the limited resources and other barriers discussed earlier, both universities have made partnerships a priority and placed a lot of effort in developing new forms of partnerships, particularly involving employers in curriculum revision and research.

Although current collaborations mainly stem from the drive to meet government key performance indicators for employment, senior leadership at both universities felt that collaboration with industry is crucial for understanding the market and remaining competitive with other universities. However, we found that both universities aspire to not merely respond to market changes and demands but to inform those changes and developments:

Nowadays the education system is ahead of the labour market. Many industries are not developing much, and therefore using old systems and practices. By collaborating with them, we have an opportunity to update them on the latest developments in the field and at the same time increase their awareness about the skills that our students and graduates can offer. (Head of Department, University A)

Current collaborations are predominantly happening at the local level, with agencies and companies that are in geographical proximity. This can be explained by the easy access and lower cost of such collaborations. However, University B has some international partner

industries, which might be ascribed to it being a more established university with more networks and perhaps more funding. However, these international relationships might also be ascribed the institution's areas of expertise, which may be appealing to international partners. While University A had some collaborations with government agencies, both universities predominantly collaborate with private companies, which arguably have greater interest, capacity, and financial resources.

An interesting key enabling and success factor in the development of current partnerships is the alumni network. Within both universities, a majority of the partnerships involved the university's own alumni, who are involved in teaching, serving on business councils, revising curriculum, joint consultancy work, as well as arranging for internship for current students.

Improving existing partnerships and developing new ones, according to our participants, requires more resources, time, identification of clear benefits for industry, and building of trust and reputation of the university in the public eye. However, the most important factor for developing more effective and sustainable partnerships appears to be relationships and networking with government officials:

Unfortunately, we are all victims of this authoritarian leadership style. And whenever something is coming from the top, it is immediately implemented. You might be surprised with the pace of implementation of ideas coming from the top. And then I thought to myself, wow, that's easy, I need to get to the top and then all the graduates will be employed and programmes will be changed. I have to find a way to get to the top. (Head of department, University A)

6. Discussion and conclusions

These two institutions have experienced healthy developments in university and industry collaboration and, despite significant challenges, both senior leadership and faculty are making great effort to create and improve partnerships. However, our findings also suggest that, viewed from the perspective of the university, partnerships between universities and industry are weak and largely limited to the DUI (Doing, Using, Interacting) innovation model. Industry engagement with the university is largely focused on involving employers in part-time teaching, placing students for internships within companies, organizing career fairs, and creating technical consultancies. Examples of the STI model of partnerships (Science, Technology, Innovation), including collaborating on research projects and developing research products, were extremely limited. Our findings are consistent with studies conducted in developing countries (Kruss et al., 2012; Zavale and Macamo, 2016), which illustrate that, because of the challenges encountered in the development of human capital and limited resources (e.g., technological capability), developing countries often have weak UIPs that are not knowledge-intensive. Our findings confirm other scholars' claims about developing countries' partnerships being limited to the DUI model of innovation because of their low research capabilities (Lall and Pietrobelli, 2002; Lundvall et al., 2009; Zavale and Macamo, 2016).

Based on the findings from our exploratory study, important challenges to UIPs in Kazakhstan appear to be related to the continuity of a top-down management approach of the higher education system, a poor research environment, and difficult working conditions for university faculty. Although universities are no longer tied to a particular sector of the economy as in the Soviet period (Heyneman, 1998), and have been granted relative autonomy (Hartley et al., 2016) to forge their own paths of UIP development, findings from our two case studies suggest that they continue to be heavily controlled and influenced by MoES. Contrary to the narrative of policy makers promoting UIPs as a means to spur innovation through applied research, the accounts of university stakeholders in our study suggest that the current situation is strikingly similar to the Soviet period, when partnerships were exclusively focused

on preparing the workforce and universities were not sites of research (Grant, 1968; Graham, 1994). Our findings are consistent with recent literature in which research partnerships were found to be extremely limited partly due to underdeveloped research culture, poor conditions for research, and faculty not having dedicated time and resources for research (Jonbekova, 2020; Kuzhabekova and Ruby, 2018). Interestingly, given the national policy emphasis on research and innovation, research outcomes are not yet a part of performance indicators set by MoES, which may be an additional factor for the limited partnerships in this area. As such, the environment for innovation stemming from partnerships with industry appears to be at an early stage of development, with universities still grappling with legacies of the past as they begin to transform into the future imagined in policy and in the aspirations described by participants in our study.

We conclude that despite significant challenges, senior leadership and faculty have the best intentions and plans for UIPs to be structured and managed in line with the Triple Helix II model, where university, industry, and government work together under an equal partnerships agreement with overlapping support to each other. However, current UIPs illustrate the continuity of statist Triple Helix I model, where the structure of partnerships is heavily influenced by the state, and one that is prevalent in command economies (Varblane et al., 2008). Our findings indicate that universities are largely developing partnerships in areas that are set as a key performance indicator by MoES, most notably in the area of students' employability. The concern with meeting key performance indicators set by the government points to a strong state involvement in the development of UIPs, a model that appears to be inherited from the Soviet period. Our findings suggest that such a model limits the potential of universities to contribute to innovation.

Three implications can be drawn from the findings. Firstly, the need to acknowledge that UIPs in low- and middle-income countries, particularly countries like Kazakhstan that transitioned from a centrally planned command economy to a free market economy, are influenced by the inherited systems and practices of their Soviet past, as well as by the structure and conditions of their economy and education. As suggested by previous studies (Kruss et al., 2012; Zavale and Macamo, 2016), UIPs in Kazakhstan are also mainly embedded in weak and informal collaborations with industry, with a limited knowledge-intensive component. Secondly, the need to recognize that it is possible for developing and middle-income countries to create knowledge-intensive UIPs that can contribute to innovation through research and product development, but that these are possible only if required support and conditions are created for higher education institutions. A key move in Kazakhstan might be for the state to grant universities greater autonomy, lessen their burden to respond to MoES priorities and paperwork, and better align policy strategy for UIP contribution to innovation. Thirdly, to develop partnerships that can boost innovation, government needs to increase investments in research at universities and, in collaboration with higher education institutions, provide relevant policy support and structures to enable faculty to develop their research capacity and engage not only in basic research but also product development. Nevertheless, we suggest that higher education institutions cannot look to the Ministry alone to lead changes, but greater and more equal collaborations are needed across the three stakeholders (university, industry, government) to develop more effective partnerships. The findings supports the theory of Triple Helix II model, stating that the quality of UIPs for innovation development depends on active, equal, and continuous engagement of the three partners—university, industry, and government.

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