https://doi.org/10.31489/2025Ec1/43-51

JEL J24 Received: 09.10.2024 | Accepted: 08.01.2025

ORIGINAL RESEARCH

Human capital in the field of commercialization: assessment of the competencies of technology transfer specialists

Sanat Kozhakhmet[1], Turdalina Sharbanu[2]*

Abstract

This research article examines the crucial role of human capital in the commercialization of scientific research. It highlights the "Valley of Death", the gap between scientific innovations and their market application, especially in countries moving from planned economies to market-oriented structures. The study highlights the need for trained Technology Transfer Specialists (TTP) who serve as intermediaries between academia and industry, facilitating the transformation of research results into commercially viable products and services. These specialists should have a wide range of qualities. The authors analyze the competencies required for TTP, dividing them into basic skills such as technical understanding and intellectual property management, and soft skills including communication and strategic thinking. The study has identified significant gaps in the current TTP competencies in Kazakhstan and highlights the urgent need for specialized training programs. The recommendations include the creation of targeted educational initiatives, reviewing university hiring practices to attract professionals with business acumen, and creating opportunities for continuous professional development. The aim of the study is to increase the efficiency of commercialization offices and, ultimately, contribute to the development of Kazakhstan's innovation ecosystem and economic growth. This study provides a methodological framework for further educational initiatives in the field of technology transfer.

Keywords: human capital, competencies of specialists, hard skills, soft skills, innovation, interrelation between industry and universities.

Introduction

In the scientific literature, the term “Valley of Death” is often used to denote the existence of a huge gap between new scientific discoveries and their introduction to the market (Dean & others, 2022) (Moradlou & others., 2023) (Calza & others., 2020). This gap is even more pronounced in countries with a history of planned economies and a science-push innovation model (Inzelt A., 2015), where scientific discoveries are implemented through a vertical system, moving from scientific institutes to design bureaus and then to factories, all guided by central planning and government orders. After the transition to a market economy, the previous links between science and business were lost, and new mechanisms of interaction are in the nascent stage. For example, in the international ranking of the Global Innovation Index, Kazakhstan ranks 81st and despite its good position in the ratio of patents for inventions (39th place) and utility models (10th place) to GDP, in terms of collaboration between industry and universities, the country ranks 117th (WIPO, 2023).

At this stage, it is necessary to develop horizontal links between stakeholders according to the Triple Helix model and open innovation model (de las Heras-Rosas & Herrera, 2021) (Ferdinands & others, 2023). In this context, along with the need to develop human capital in the field of science, there is an urgent need to cultivate human capital in the field of commercialization and technology transfer.

Commercialization specialists (term used in Kazakhstan) or Technology Transfer Professionals (TTPs) are an important link in bridging the gap between innovative research and its practical application in industry. Their experience and skills play a key role in ensuring the transition of new technologies from the laboratory to the market (Takata & others, 2022) (Gao & Haworth, 2016). The skills needed by TTPs can be divided into two main categories: technical skills (hard skills) and soft skills.

The review of literature shows that hard skills include technical understanding of products or processes developed by scientists (Mom & others, 2012); skills in the field of intellectual property rights management (IPO) and licensing (Mom & others, 2012) (Takata & others, 2022) (Gao & Haworth, 2016); and project

[1]Oxford Brookes Business School, Oxford, UK, sanat.kozhakhmet@gmail.com
[2*]Institute of Economics CS MSHE RK, Almaty, Kazakhstan, shturdalina@gmail.com (corresponding author)

management skills (Takata & others, 2022). Among soft skills, the most notable are: communication skills with various stakeholders; networking to establish and maintain relationships with partners; negotiation skills to establish mutually beneficial cooperation (Mom & others, 2012) (Sapir, 2021).

In addition to the above, TTPs need such skills as understanding of market trends, business strategies, marketing and skills to create and develop new enterprises, including startups (Mom & others, 2012). Entrepreneurial skills are also important in supporting the commercialization process (Takata & others, 2022).

Effective commercialization necessitates the active engagement of management and the participation of employees, underscoring the critical role of collective team involvement (Cerpentier & others, 2024). Specialists in the commercialization of scientific outcomes must not only possess domain-specific expertise but also demonstrate the ability to establish effective linkages between the academic and industrial sectors. The successful commercialization of research findings requires specific managerial competencies, including the capacity to construct a compelling narrative on the integration of novel technologies into future business ecosystems, as well as the ability to analyze potential networking scenarios to achieve commercialization objectives (Kenzhaliyev & others, 2021; Medlin & Törnroos, 2015).

When systematizing the key competencies of professionals involved in the commercialization of national technologies, the following attributes can be identified:

1. *Commercial Alertness* — the ability to recognize market opportunities and anticipate potential threats.

2. *Market Context Learning* — an in-depth understanding of customer needs and proactive engagement with stakeholders.

3. *Organizational Agility and Alignment* — ensuring that a firm's structure remains flexible and adaptable to dynamic market conditions.

4. *Credibility Building* — fostering trust and establishing a strong reputation within the market and among key stakeholders (Munoz-Penas & others, 2024).

These competencies are particularly relevant to employees of Technology Transfer Offices (TTOs). However, some researchers attempt to commercialize their scientific discoveries independently, circumventing TTOs. Several factors motivate this decision, including confidence in their own entrepreneurial skills, previous negative experiences with TTOs, peer influence, and challenges in establishing collaborations with external partners. Many academic entrepreneurs perceive TTOs as lacking the necessary expertise to provide effective commercialization support (Halilem & Diop, 2025; Nieto Cubero & others, 2021).

The motivations driving scientists to commercialize their research vary widely. While financial incentives serve as a significant factor, intrinsic motivation to develop practical applications for scientific discoveries also plays a crucial role (Huegel, 2024; Sohail & others, 2023). Nonetheless, a common barrier to successful commercialization is researchers' limited awareness of the importance of intellectual property protection, which can hinder the effective transition of innovations from academia to industry (K. Ismail & others, 2012).

Technology Transfer Office personnel serve as intermediaries between academia and industry, facilitating the commercialization of university inventions. Their responsibilities encompass managing technology transfer processes, overseeing licensing agreements, and fostering industry collaborations (Modic & Suklan, 2022). Despite the pivotal role of these coordinators, there remains a notable gap in the scientific literature concerning their characteristics and impact on the commercialization process (N. Ismail & others, 2015).

Table 1– Competencies of Technology Transfer Professionals

Competencies	Definition
1	2
Entrepreneurial skills	The ability to develop and implement business strategies, including understanding the market, analyzing competition, and customer needs.
Managerial skills	The ability to manage projects and teams, set goals, and monitor progress, which is especially important in complex product development processes.
Communication skills	The ability to communicate effectively in both written and oral form, which includes the presentation of ideas and the establishment of partnerships.
Decision-making ability	The ability to make informed decisions based on the analysis of various factors and risks.
Adaptability and flexibility	Willingness to change in the process of commercialization, as well as the ability to quickly respond to new opportunities and challenges in the market.
Commitment to learning	The desire to continuously develop one's skills and knowledge, including aspects related to business and commercialization.

Competencies	Definition
1	2
Technical knowledge	A deep understanding of your field of research, which allows you to evaluate the commercial potential of scientific results and make informed decisions.
Experience and knowledge	It is important that technology transfer specialists have significant experience and knowledge in the field of technology commercialization and intellectual property. This includes understanding licensing processes, patent management, and industry engagement.
Strategic thinking	The ability to strategically plan and understand the long-term goals of both the university and the business helps to navigate the complex interests of both sides.
Note — created by the authors based on (Cerpentier & others., 2024; K. Ismail & others, 2012; N. Ismail & others, 2015; Kenzhaliyev & others, 2021; Modic & Suklan, 2022) *sources*	

Considering that in Kazakhstan, commercialization or technology transfer offices in most universities, with the exception of national research universities and Nazarbayev University, began to form relatively recently, it can be assumed that there are gaps in the competencies of TTPs. With the growth of government funding for science and the introduction of tax incentives for businesses that invest in scientific research, the profession of technology commercialization is becoming relevant and assessing the current situation is of great importance for formulating strategies for the development of human capital in this area.

The purpose of this study is to analyze the competencies of employees of commercialization offices in universities of Kazakhstan and develop recommendations for the development of human capital in the field of technology transfer.

The primary research components of this section, including the methodology, results, and discussion, were prepared by senior researcher Mr.S. Kozhakhmet. The abstract, introduction, and conclusion were authored by Turdalina Sh.K., who also contributed her perspective to the discussion section. The survey and data analysis were conducted by Mr.S. Kozhakhmet, while the article formatting and submission to the editorial board were carried out by Turdalina Sh.K.

Methodology

To understand and develop the interaction between stakeholders in technology transfer, it is important to study the individual characteristics that form the human capital necessary for a strategic partnership (Albats и др., 2020). As TTPs play key role in connecting science and industry, we used parallel mixed method approach to explore competencies and skills of TTPs in universities in Kazakhstan. Using both qualitative and quantitative method simultaneously helped us to complement and enhance results from each approach (Schoonenboom & Johnson, 2017).

To quantitively assess the competences of TTPs, we adopted the scale from Report for Knowledge Commercialisation Australasia “Knowledge Transfer in Australia: Is there a Route to Professionalisation?”. This TTP assessment scale consists of 18 indicators such as entrepreneurship development, legal knowledge, marketing and promotion, intellectual property and compliance, social networks, business knowledge, knowledge transfer administration, development and mentoring, qualifications and experience, knowledge and information flow, information technology, administration and management, influence and networking, strategic thinking, knowledge management, culture, beliefs and values, collaboration (teamwork) and communication.

The respondents assessed each competence (see Table 1) at four levels: Level 4 — Expert, this is a clear strength of mine; Level 3 — Proficient, I am capable and effective in this area; Level 2 — Intermediate, some development in this area would be beneficial; Level 1 — Needs Improvement, I require significant development in this area.

In addition, two more answers were presented: N1 and N2, where N1 is unrelated to my position and N2 is unrelated to the profession of technology transfer.

The study adopted convenience sampling. The online questionnaire was compiled in SurveyMonkey and data was collected in February and March of 2024. The link to the questionnaire with a description, as well as an invitation letter indicating the voluntary and anonymous participation in the study, was sent directly to the heads of the commercialization offices and vice-rectors for science by mail. Additionally, to attract more respondents, the link was also sent to Whatsapp groups on science and commercialization.

Qualitative data was collected through semi-structured interviews with employees of commercialization offices in universities in Kazakhstan and scholars who had direct contact with these offices in implementing

commercialization projects. Nine interviews were conducted in February and March of 2024. Table 2 contains information on participants.

Table 2. Information on participants

#	Status	Position	Organization
1	TTO	Deputy Director of the Commercialization Office	State University
2	TTO	Head of the Commercialization Office	State University
3	TTO	Deputy Director of the Commercialization Office	State University
4	TTO	Vice-Rector for Commercialization	Private University
5	SCI	Scientist-Entrepreneur	Own Company
6	TTO	Director of the Commercialization Office	State University
7	TTO	Vice-Rector for Science	State University
8	SCI	Scientist, Project Leader	State University
9	SCI	Scientist, Project Leader	State University
Note — created by the authors			

Out of nine participants, six were employees of Commercialization or Technology Transfer Offices (TTO) and three were scholars engaged in commercialization projects. All participants provided informed consent and agreed for the interviews to be recorded. The recording was transcribed and analyzed in Dedoose software.

Results

The survey involved 25 managers/employees of commercialization offices in Kazakhstan. 8 of these work at public universities, 10 at private universities, 4 at public research institutes and 1 respondent at a private research institute. The distribution of respondents is shown in Figure 1.

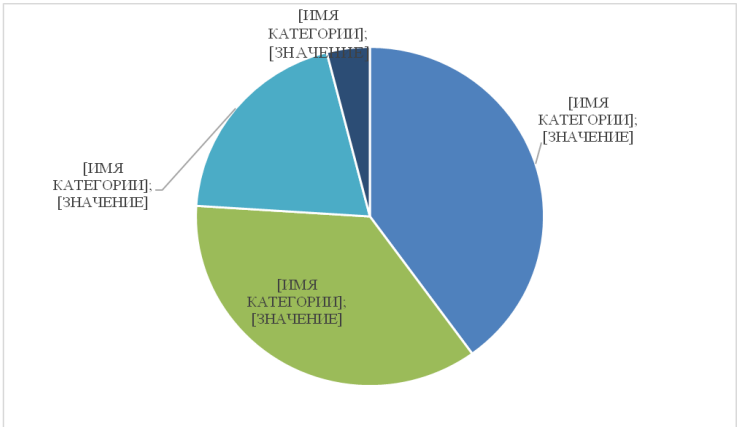

Figure 1. Organizations of respondents

Note — compiled by the authors

Participants of the survey had different backgrounds and various experience levels. The mean experience of respondents in the field of commercialization is 9.6 years, the median is 6.5 years. The respondents had education and work experience in the following fields:

1. Technical and IT areas:
- Petroleum engineering
- Engineering (including engineering, electrical engineer and technical)
- Computer Science
- IT
- Construction
- Transportation services

2. Economic and business directions:
- Economics
- Business & marketing
- International relations, economics

3. Natural Sciences:

- PhD chemistry science
- Biology
- Physics

4. Educational and humanitarian directions:
- Pedagogy and methods of primary education
- Jurisprudence

The majority of respondents are mid-career specialists (48 %), the proportion of novice specialists and senior specialists was 26 %. Figure 2 shows data on the level of respondents.

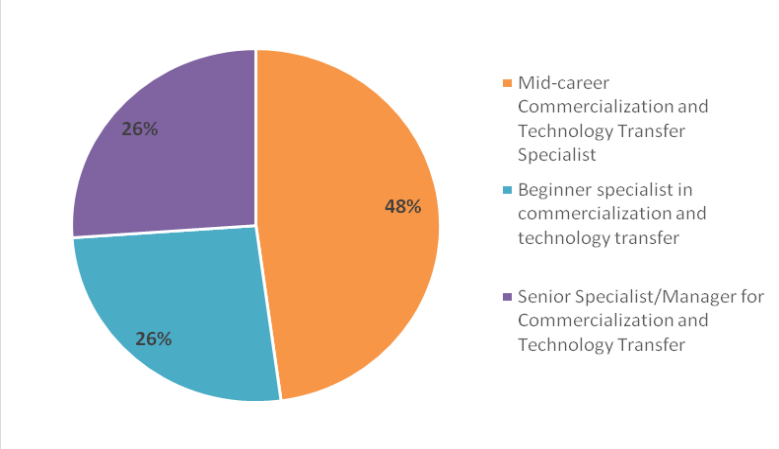

Figure 2. The level of respondents

Note — compiled by the authors

Competencies of employees of the commercialization offices

The aggregated results of the competence assessment are shown in Figure 3 and reflect the current level of competencies in the commercialization. A score of 2 indicates an average level of competence, 3 indicates an above-average level, and 4 indicates a high level of competence.

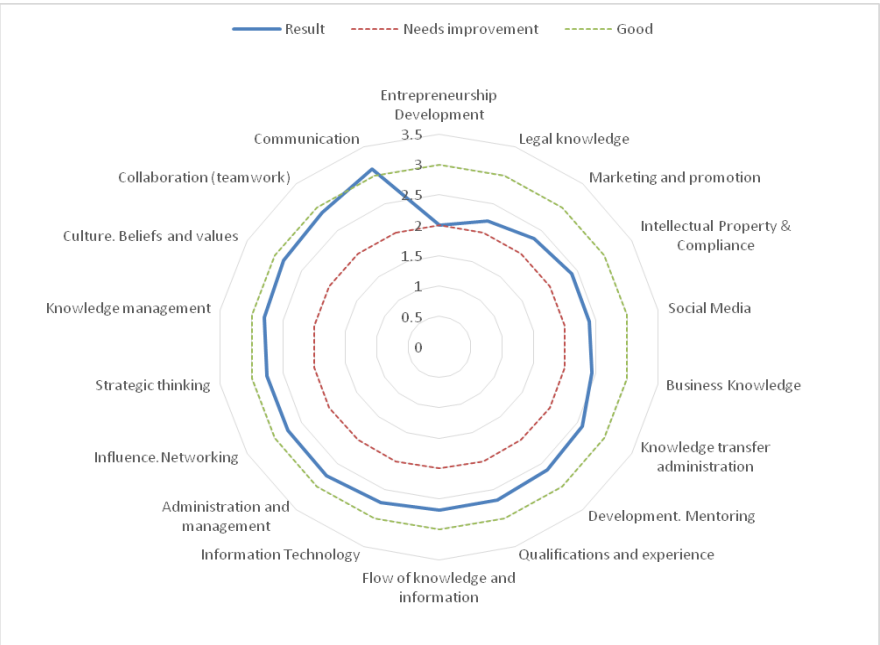

Figure 3. Competencies of employees of commercialization offices

Note — compiled by the authors

The figure shows that the most developed competence is “Communication” with a score of 3.12, which indicates an above-average level. This highlights that the commercialization offices have effective communi-

cation and interaction skills, which are critical for successful knowledge transfer and research commercialization.

Competencies such as "Collaboration" and "Knowledge Management" are also rated above average (2.88 and 2.80, respectively), indicating a good level of teamwork and knowledge management in the organization.

On the other hand, "Entrepreneurship Development" has a score of 2.00, which indicates the average level of this competence. This may indicate that although commercialization offices are able to support entrepreneurial initiatives, there is potential for further development in this area.

Other competencies such as "Marketing and Promotion", "Business Knowledge", and "Knowledge Transfer Administration" are also rated closer to the average level (in the range from 2.32 to 2.60), which may indicate opportunities for improvement in these areas.

Overall, the data show that the commercialization offices have above-average competencies in the areas of communication, collaboration and knowledge management, but there is potential for improvement in the areas of entrepreneurship development, marketing and promotion, as well as business knowledge. The values and distribution of the respondents' responses are shown in Table 3.

Table 3. Competencies of employees of commercialization offices

Competencies	1	2	3	4	N1	N2	The average value
The development of entrepreneurship. Encouraging and supporting the development of entrepreneurial abilities among researchers, administrators and students.	6	7	6	3	2	1	2,00
Culture, beliefs and values. To share the culture, beliefs and values of the unit (for example, a culture of action and willingness to commercialize, the ability to adapt to change, behave honestly, ethically and respectfully).	1	7	8	8	1	0	2,84
Cooperation (teamwork). Work in collaboration with other people to achieve common goals.	1	10	5	9	0	0	2,88
Strategic thinking. Conducting analysis, developing a strategy and transforming a strategy into actions and results.	2	9	7	7	0	0	2,76
Marketing and promotion. Converting market knowledge into commercial opportunities and promotion management.	5	10	7	3	0	0	2,32
Business knowledge. Budget management, decision-making and information management.	5	8	8	4	0	0	2,44
Administration of knowledge transfer. Effective management of knowledge collection, storage and dissemination.	2	10	9	4	0	0	2,60
The flow of knowledge and information. Ensuring an effective flow of information, taking into account the objectives of knowledge transfer.	1	10	10	4	0	0	2,68
Knowledge management. Knowledge management from its creation or collection to the achievement of goals.	1	9	9	6	0	0	2,80
Communication. Communication and interaction with other people to ensure the transfer of knowledge.	0	7	8	10	0	0	3,12
Influence. Networking, negotiation, persuasion and establishing mutual understanding.	1	12	4	8	0	0	2,76
Social network. Using and supporting the use of social media for interaction.	3	11	9	2	0	0	2,40
Intellectual property (IP) and compliance. Management of the creation, protection, assignment and protection of IP rights.	4	9	6	5	1	0	2,40
Legal knowledge. Management of intellectual property licenses and other legal knowledge transfer agreements.	6	12	3	4	0	0	2,20
Administration and management. Managing the effectiveness and improvement of an Organizational Unit and its work.	4	7	5	9	0	0	2,76
Development. Conducting professional development, mentoring and coaching.	4	7	8	6	0	0	2,64
Information technology. The use and support of information and communication technologies.	2	8	10	5	0	0	2,72
Qualifications and experience. The presence of an academic degree or work experience in the industry in the field of technology transfer.	6	5	5	9	0	0	2,68
Note — compiled by the authors							

The absolute majority of respondents agree that specialists in the field of commercialization need business development skills, but unlike other competencies, two respondents indicated that it is not related to their position and one respondent indicated that it is not related to a profession related to technology transfer.

The interviews confirmed the results of survey and showed a significant deficiency in the competencies of the directors and staff of commercialization offices, especially in terms of market knowledge and business skills. Many employees previously held administrative positions at universities and lack experience working in corporate settings. As indicated by one of the participants:

"There are few technology commercialization specialists in Kazakhstan because these are people who know two languages. People who know the language of science and the language of business. They speak both languages. Such people exist, but they are few" (Participant 5).

While there is an agreement that TTPs are doing well in communication and administration, general concern was about the lack of business acumen and any market experience.

"Mainly, this is a function of technology transfer, and people working in technology transfer offices may possess these administrative skills. These could be people from university administration who understand business to some extent, they know the university very well, but they lack investment experience" (Participant 4).

Employees of commercialization offices mention that they lack sufficient skills and have to learn on the job while implementing projects:

"We lack commercialization skills. We have the theory but not the skills for practical application, no competencies. We learn from cases ourselves" (Participant 6).

At the same time, there are almost no special courses or programs for the professional development of commercialization office staff.

"The commercialization office has 4 people, and we also bring in external experts to help us. There was an external expert who helped develop competencies. I think it's necessary to train and develop these competencies. They don't have specialized education. For example, the director is a physicist, a candidate of mathematical sciences, and it's difficult for him because of this" (Participant 7).

"...and there are no projects or programs for improving the qualifications of the existing specialists" (Participant 3).

"We don't have a specific university or even mini-courses on commercialization where our employees could improve their qualifications and work effectively" (Participant 2).

These results indicate the need for professional development for existing staff of commercialization offices in Kazakhstan. Given the lack of specialists in the labor market the bachelor level minor program or master level tracks can be introduced in order to ensure the supply of graduates with necessary skills.

Discussion

The evaluation of employees' skills in Kazakhstani commercialization offices reveals important advantages and disadvantages for these offices. Their exceptional proficiency in knowledge management, collaboration, and communication is a valuable asset. Proficiency in this area is essential for successful information transfer and research commercialization, as it promotes strong relationships between stakeholders. The respondents' prior administrative positions at academic institutions, where these abilities are highly regarded, are probably the source of this competency level.

However, our research also shown some deficiencies in areas such as entrepreneurship development, marketing, promotion, and business knowledge. These gaps are particularly concerning given the critical role these competencies play in successful technology commercialization. The results suggest that while current TTO have administrative and communication skills, they often lack practical business and market experience. This is a significant barrier to effective commercialization, as highlighted by the participants' feedback during interviews.

The analysis of competencies among specialists in the field of commercialization in Kazakhstan has not been previously explored, highlighting the significant scientific novelty of this research. The authors propose the establishment of specialized programs and courses aimed at training professionals in technology transfer. This study can serve as a methodological foundation for the development of similar educational initiatives.

The findings of this study may serve as a foundation for reassessing the personnel policies of universities and research institutions, facilitating the recruitment of specialists with expertise in investment and entrepreneurship. Furthermore, the study suggests developing a system to incentivize the active participation of such professionals in innovation commercialization. Ultimately, the adoption of these recommendations has

the potential to enhance the effectiveness of commercialization offices, thereby contributing to economic growth and the advancement of Kazakhstan's innovation ecosystem.

Kazakhstan can be characterized as transition to a market economy which requires the development of horizontal links between stakeholders, according to models like the Triple Helix and open innovation. This shift underscores the urgent need for specialized training and professional development programs for commercialization specialists. The current educational and professional training infrastructure does not fully support the development of these essential skills.

Conclusion

The survey results, along with qualitative insights from interviews, shows that professionals involved in commercialization have a strong need to enhance their business acumen. Participants pointed out that there is a severe lack of experts who can successfully close the knowledge gap between commercial demands and scientific research. This scarcity highlights the need for focused educational initiatives, such as professional MBA, mini-MBA and certification programs.

The overall shortage of human capital in the field of knowledge translation necessitates the development of bachelor's-level minors and master's-level tracks to equip graduates with skills in technical evaluation of research results and business acumen for assessing commercial value. Universities and research organization may also reevaluate their hiring and renumeration policies to bring in people with investment and entrepreneurial experience to commercialization offices and provide them with additional bonuses or profit-sharing arrangements.

The practical significance of this research lies in formulating specific recommendations for enhancing personnel training in the commercialization of scientific research. Based on the identified deficiencies in entrepreneurial, marketing, and business competencies among specialists, it is recommended to design and implement targeted educational programs, such as professional MBA programs, mini-MBA courses, and certification programs. Additionally, it is proposed to revise undergraduate and graduate curricula to integrate skills necessary for assessing the commercial potential of research outcomes.

In summary, addressing these competency gaps is crucial for fostering a robust ecosystem for innovation and commercialization in Kazakhstan. By investing in comprehensive training and development programs, the country can enhance the effectiveness of its commercialization offices, thereby driving economic growth and innovation.

Acknowledgment: This research for this article is funded by the Science Committee of the Ministry of Science and Higher Education of the Republic of Kazakhstan. Project title — Improving the mechanisms for effective regulation of the applied R&D projects commercialization (BR21882077)

References

Dean T., Zhang H., & Xiao Y. (2022). The role of complexity in the Valley of Death and radical innovation performance. *Technovation, 109*, 102160.

Moradlou H. et al. (2023). Using not-for-profit innovation networks to transition new technologies across the valley of death. *International Journal of Operations & Production Management*, *44*, 3, 591–616.

Calza F. et al. (2020). Moving drug discoveries beyond the valley of death: the role of innovation ecosystems. *European Journal of Innovation Management, Emerald Publishing Limited, 24,* 4, 1184–1209.

Inzelt A, (2015). Re-aligning the Triple Helix in post-Soviet Armenia. *Triple Helix, 2*, (15).

WIPO. Global Innovation Index 2023, 15th Edition. Retrieved from https://www.wipo.int/global_innovation_index/en/2023/index.html

de las Heras-Rosas C. & Herrera J. (2021). Research Trends in Open Innovation and the Role of the University. *Journal of Open Innovation: Technology, Market, and Complexity, 7,* 1, 29.

Ferdinands R., Azam S.M.F., & Khatibi A. (2023). The work in progress of a developing nation's Triple Helix and its impact on patent commercialization. The case of Sri Lanka. *Journal of Science and Technology Policy Management,* Vol. 15 No. 4, pp. 839-862.

Takata M. et al. (2022). Nurturing entrepreneurs: How do technology transfer professionals bridge the Valley of Death in Japan? *Technovation, 109,* 102161.

Gao J.H. -H., & Haworth N. (2016). Servicing academics and building relationships: the case of two university commercialisation offices in Australia. *R&D Management, 46,* 2, 653–663.

Mom T.J.M., Oshri I., & Volberda H.W. (2012). The skills base of technology transfer professionals. *Technology Analysis & Strategic Management, 188,* 9, 871–891.

Sapir A. (2021). Brokering knowledge, monitoring compliance: technology transfer professionals on the boundary between academy and industry. *Journal of Higher Education Policy and Management, 43,* 3, 248–263.

Cerpentier M. et al. (2024). Employment protection laws and the commercialization of new products: A cross-country study. *Research Policy, 53,* 7, 105039.

Tolin G. & Piccaluga A. (2025). Commercializing technology from university-industry collaborations: A configurational perspective on organizational factors. *Journal of Business Research, 24,* 115105.

Kenzhaliyev O.B. et al. (2021). Conditions to facilitate commercialization of R & D in case of Kazakhstan. *Technology in Society, 67,* 101792.

Medlin C.J., & Törnroos J. -Å. (2015). Exploring and exploiting network relationships to commercialize technology: A biofuel case. *Industrial Marketing Management, 49,* 42–52.

Munoz-Penas J., Clarke A.H., & Evald M.R. (2024). Building a commercialization capability: A dynamic capability view. *Industrial Marketing Management, 117,* 344–355.

Halilem N. & Diop B. (2025). "Meet me at the backdoor": A multiple case study of academic entrepreneurs bypassing their technology transfer offices. *Research Policy. 54,* 2, 105156.

Nieto Cubero J., Gbadegeshin S.A., & Consolación C. Commercialization of disruptive innovations: Literature review and proposal for a process framework. *International Journal of Innovation Studies. 2021, 5,* 3, 127–144.

Sohail K., Belitski M., & Castro Christiansen L. (2023). Developing business incubation process frameworks: A systematic literature review. *Journal of Business Research, 162,* 113902.

Huegel M. (2024). University scientists' multiple goals achievement: Social capital and its impact on research performance and research commercialization. *Technovation, 135,* 103065.

Ismail K. et al. (2012). Problems on Commercialization of Genetically Modified Crops in Malaysia. *Procedia - Social and Behavioral Sciences. 40,* 353–357.

Modic D. & Suklan J. (2022). Multidimensional experience and performance of highly skilled administrative staff: Evidence from a technology transfer office. *Research Policy, 51,* 10, 104562.

Ismail N., Nor M.J.M., & Sidek S. (2015). A Framework for a Successful Research Products Commercialization: A Case of Malaysian Academic Researchers. *Procedia - Social and Behavioral Sciences. 195,* 283–292.

Albats E., Bogers M., & Podmetina D. (2020). Companies' human capital for university partnerships: A microfoundational perspective. *Technological Forecasting and Social Change, 157,* 120085.

Schoonenboom J., Johnson R.B. (2017). How to Construct a Mixed Methods Research Design. *KZfSS Kölner Zeitschrift für Soziologie und Sozialpsychologie, 69,* 2, 107–131.