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Analysis of Innovation Management in Higher Educational Institutions Based on Perceptions Formed among the Teaching Personnel

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Abstract

The workforce's competency defines the efficiency of production in the country and, therefore, the welfare of the population. Higher education institutions play a considerable role in this as they prepare the workforce for the organizations in the country. Designing a high-quality workforce requires universities to keep up with the new technologies and innovations in higher education. Thus, managing innovation is the highest priority for higher education institutions. The present article aims to investigate the perceptions developed among the teaching personnel of higher education institutions, which will serve as an evaluator of innovation management efficiency. The research method has been adapted to fit the research problem and goals. The limitations of the research are that it is limited to several universities located in one city and may not fully reflect the situation in other cities. To fulfill this aim, an expert interview has been prepared, which assesses the perception and attitude towards innovations and innovation management efficiency. The analysis incorporated answers of 20 respondents employed at higher education institutions. The expert interview answers have been categorized and synthesized to reveal the hidden patterns and prepare practical recommendations for policymakers and future researchers. The analysis findings are that the teaching personnel has sufficient knowledge of the innovations in the educational sphere. Moreover, they are willing to engage in innovative processes by creating or using existing solutions. However, the study reveals funding-related issues and a necessity to adjust the university remuneration and internal policy to motivate greater engagement in innovation management.

Keywords: Economy, Education, Strategic Management, Innovation Management, Development.

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Профессорлық-оқытушылық құрам арасында қалыптастырылған ұсыныстар негізінде жоғары оқу орындарындағы инновацияларды басқаруды талдау

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Түйін

Жұмыс күшінің құзыреттілігі елдегі өндірістің тиімділігін, демек, халықтың әл-ауқатын анықтайды. Бұл ретте жоғары оқу орындарының рөлі зор, өйткені олар елдегі ұйымдар үшін жұмыс күшін дайындайды. Жоғары сапалы жұмыс күшін дайындау университеттерден жоғары білім саласындағы жаңа технологиялар мен инновацияларға ілесуді талап етеді. Осылайша, инновацияларды басқару жоғары оқу орындары үшін ең жоғары басымдық болып табылады. Бұл мақала инновациялық менеджмент тиімділігін бағалау критериі ретінде қызмет ететін жоғары оқу орындарының профессорлық-оқытушылық құрамы арасында қалыптасқан түсініктерді зерттеуге бағытталған. Зерттеу әдісі зерттеу мәселесі мен мақсаттарына сәйкес бейімделді. Зерттеудің шектеулері оның бір қалада орналасқан бірқатар университеттермен шектелуі және басқа қалалардағы жағдайды толық көрсетпеуі мүмкін. Осы мақсатты орындау үшін инновацияларды қабылдау мен қатынасты және инновацияларды басқару тиімділігін бағалайтын эксперттік интервью сұрақтары дайындалды. Талдау жоғары оқу орындарында жұмыс істейтін 20 респонденттің жауаптарын біріктірді. Сауалнама жауаптары жасырын заңдылықтарды ашу және саясаткерлер мен болашақ зерттеушілер үшін практикалық ұсыныстар дайындау үшін санатталған және синтезделген. Сараптама қорытындысы бойынша педагогикалық ұжымның білім беру саласындағы инновациялар туралы жеткілікті білімі бар екені анықталды. Сонымен қатар, олар бар инновациялық шешімдерді жасау немесе пайдалану арқылы инновациялық үдеріске қатысуға дайын деген қорытынды жасалынды. Сондай-ақ, зерттеу қаржыландыруға қатысты мәселелердің бар екенін және инновациялық менеджментке көбірек қатысуды ынталандыру үшін университеттің сыйақысы мен ішкі саясатын түзету қажеттілігін көрсетеді.

Түйін сөздер: экономика, білім беру, стратегиялық басқару, Инновациялық менеджмент, даму.

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Анализ управления инновациями в высших учебных заведениях на основе представлений, сформированных среди профессорско-преподавательского состава

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Аннотация

Компетентность рабочей силы определяет эффективность производства в стране, а значит, и благосостояние населения. Значительную роль в этом играют высшие учебные заведения, готовящие рабочую силу для организаций страны. Подготовка качественной рабочей силы требует от высших учебных заведений идти в ногу с новыми технологиями и инновациями в сфере высшего образования. Таким образом, управление инновациями является наивысшим приоритетом для высших учебных заведений. Целью настоящей статьи является изучение представлений, сложившихся среди преподавательского состава высших учебных заведений, которые будут служить в качестве критерия оценки эффективности управления инновациями. Метод исследования был адаптирован в соответствии с исследовательской проблемой и целями. Ограничения исследования заключаются в том, что оно ограничено рядом университетов, расположенных в одном городе, и может не полностью отражать ситуацию в других городах. Для достижения этой цели подготовлены вопросы экспертного интервью, в котором оценивается восприятие и отношение к инновациям и эффективности управления инновациями. Анализ включал ответы 20 респондентов, работающих в высших учебных заведениях. Ответы на вопросы обследования были классифицированы и обобщены для выявления скрытых закономерностей и подготовки практических рекомендаций для практиков и будущих исследователей. Результаты анализа показывают, что преподавательский состав обладает достаточными знаниями об инновациях в образовательной сфере. Кроме того, они готовы участвовать в инновационном процессе путем создания или использования существующих инновационных решений. Вместе с тем исследование показывает наличие вопросов, связанных с финансированием, и необходимость корректировки вознаграждения в университетах и внутренней политики, с тем чтобы стимулировать более активное участие в управлении инновационной деятельностью.

Ключевые слова: экономика, образование, стратегическое управление, инновационный менеджмент, развитие.

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Introduction

Schumpeter introduced innovation management and R&D management concepts in the twentieth century in his fundamental work "Capitalism, Socialism and Democracy" (Schumpeter, 2002). Even though the concept has been discussed for several decades, organizations still face challenges in managing innovations and research and development (R&D). The reasons include the reluctance to invest in operations that are not obviously and simultaneously profitable to the organization and the rapid pace of changes taking place in organizational theories, innovations, and technology. Trends change so fast that organizations cannot keep up with them. Higher Education Institutions are not an exception, as they also need to implement efficient practices of R&D management and innovation management. The competition among the universities is becoming tight, forcing each to work towards building a strong brand image by increasing quality, attracting teaching staff, and implementing innovative approaches in the study process.

For Kazakhstan, enhancing the quality of tertiary education is a strategic goal that can provide a high-quality workforce to the companies by a ripple effect. The problem of the innovative approach to preparing a skilled workforce has been discussed by several scholars such as Kirdasinova et al. (2016), Mukhiyayeva et al. (2017), and Sadyrova (2021) et al. Kazakhstan as a rapidly developing country, needs to invest in education and ensure adoption of existing global innovations in this sphere. Moreover, another research work dedicated to evaluating positions of Kazakhstani universities in international ratings, written by Uvaleyeva et al. (2019), mentions the significance of generating and applying new technologies to the study process in acquiring higher rankings. Moreover, it can be concluded that despite all the work done up to date in the field of boosting innovative activity, there is a gap between the skills and knowledge the industries need and the universities provide (Hausman, 2022). Thus, developing and applying innovations in higher education institutions is a pressing issue for educators and practitioners. This is why the problems of the research are being investigated.

Innovation in educational organizations heavily depends on human capital. That is to say, the readiness, willingness, and general perception of the teaching personnel of the higher education institutions toward innovation management is a significant factor in its development. This is closely tied to the problem's relevance, which lies in the urgent and continuous necessity to cope with the innovations produced in education and industry. Only by engaging heavily in innovation management will the higher education institutions be able to make a high-quality workforce. By this statement, the present work aims to reveal the perceptions of the teaching personnel regarding innovation management. The insights can be further used to increase the efficiency of innovation and R&D management or to introduce adjustments to it.

The present work will employ qualitative analysis, which will be based on primary data collected from open-end questions.

Literature review

Innovation management in educational institutions, including tertiary education, has been a focus of many researchers. Especially with the shift in the format of education from conventional to hybrid, online, or platform-based, and with the never-stopping pace of innovation creation, the topic of enhancing innovation practices in higher education institutions has gained significant attention from theorists and practitioners. For instance, a recent study on the subject was conducted by Tejedor et al. (2021) studied the perceptions of the teaching staff of the changes in educational processes caused by the COVID-19 pandemic. The study integrated the responses of 573 teachers from three countries. The study has found that the restrictions arising from the pandemic and the urgency of overcoming it have sped up the innovation implementation process. However, the staff was not entirely ready to comprehend the new tools and approaches. Thus, there was a considerable gap in the preparedness of the teaching personnel to work with up-to-date technology. Similarly, De las Heras-Rosas & Herrera (2021) provide evidence that universities worldwide have started collaborating closely with entrepreneurs. Moreover, the authors hold the view that R&D will be the main criterion for university performance measurement in the future. This conclusion has been made based on the analysis of 349 scholarly articles written on innovation and development in education. On-field research conducted by Dong & Tu (2021) among university students of different levels proves that an innovative educational setup increases the success of the students in their jobs and their willingness to conduct their own business. The methodological framework, as employed by Dong & Tu (2021), will be used in the present article. This will allow studying innovation management's phenomenon developed in the education industry. Furthermore, Theeranattapong et al. (2021) emphasize the significance of proper university management policy in building an inter-organizational

relationship, which will enforce innovation creation and implementation. These factors can be studied through the prism of individual perception of the teaching staff, which deals with all innovative processes in universities.

To sum up, from the analysis of the existing literature, it becomes evident that innovation management in education, especially in tertiary education, is a significant issue. Moreover, the findings are that the universities need to carefully consider their policies towards it to keep up with global trends, as discussed by authors such as Dong & Tu (2021) and Theeranattapong et al. (2021). Nevertheless, it becomes clear that the sphere of education is affected not only by the work of the universities' management and the boards but also by global events such as pandemics, by changes in the industry, and, the attitudes and aptitudes of the human resources that deals with all that changes. Thus, studying the perceptions of the teaching personnel is an important part of the puzzle of understanding the current state of innovation management in tertiary education and its path of development.

Methods

It is evident that the success of implementing changes in the workplace and the educational processes requires a positive attitude and proper understanding of those changes and innovations. Thus, learning the teaching staff's perceptions regarding innovations and innovation management allows the management to take timely actions to adjust the process for the highest efficiency. Therefore, a deeper understanding of the process will be formulated in the present paper's result of the research conducted in the present paper.

The research aims to find answers to the following questions:

How can innovation management in tertiary education organizations be measured?

What are the university teachers' perceptions of innovation management at the workplace?

How do teachers' perceptions influence innovation management in universities?

To find answers to the research questions, the present work uses qualitative research as it suits the aim of the study and helps to reach a deep understanding of the opinions of the teaching staff that deals with the innovation management process. The study has been conducted based on primary data collected by the researcher using the Google Forms link sent to the respondents. The study was conducted based on the expert interviewing of 20 respondents, all of whom were employed as teaching staff in higher education institutions in Kazakhstan. Respondents have been granted anonymity as completing the expert interview did not require signing names or workplace. Moreover, they were labeled as Respondents 1, 2, and 3 or r1, r2, and r3. The respondents were chosen among teaching staff with three and more years of teaching experience in the same institution.

Considering the scope of the research, expert interviewing has been selected as the most suitable research tool as it has been proved to help retrieve the particular expert knowledge by analyzing the perceptions of individual respondents (Döringer, 2020). Moreover, as asserted by Von Soest (2022), expert interviews provide strong analysis by integrating the understanding, which is not only knowledge and practice-based but also combines internal and external expertise. The present research employs the expert interviews as discussed by Döringer (2020), Von Soest (2022), and Jain (2021) but also widens the variety of question types to make a satisfactory conclusion.

The questionnaire has been designed to include demographic questions, knowledge level questions, and open questions regarding innovation management in their place of work. After collecting the data, a thematic analysis was conducted to reveal the responses' patterns. After the repeating ideas have been categorized and classified, each has been examined deeper to draw relevant conclusions.

Results

After the expert, the interview has been published, and a link was sent to the Respondents. The collected primary data reveals the following. The demographic image of the respondents is illustrated in Figure 1 below.

According to the data, the respondents mainly consisted of female university teachers aged 30-35 and 45 and older. For the sake of the present paper, the perception will be viewed from different dimensions such as attitudes, opinions, understanding, etc. Eleven respondents were in their thirties, while the other nine were forty and more.

The respondents' knowledge level was distributed in the following way (Figure 2).

Thus, all of the respondents had scientific degrees, where seven respondents had master's degrees, three respondents were acquiring, and four respondents had received PhD degrees. Other respondents had a higher scientific degree than the professor.

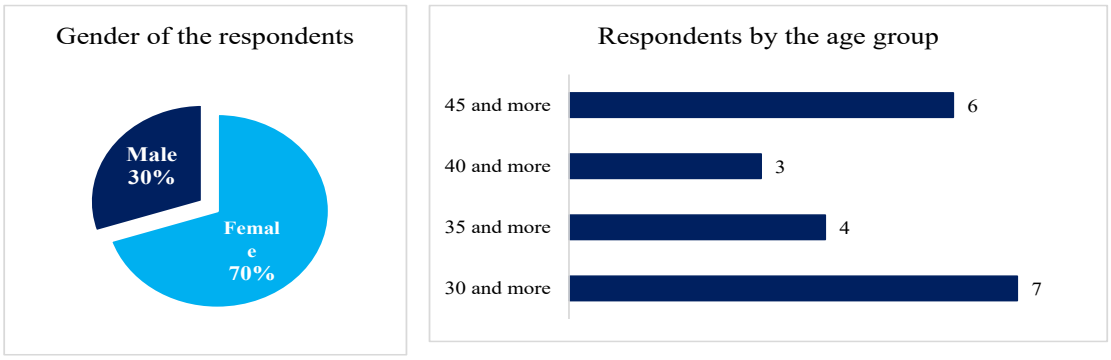

Figure 1 – Demographic image of the respondents

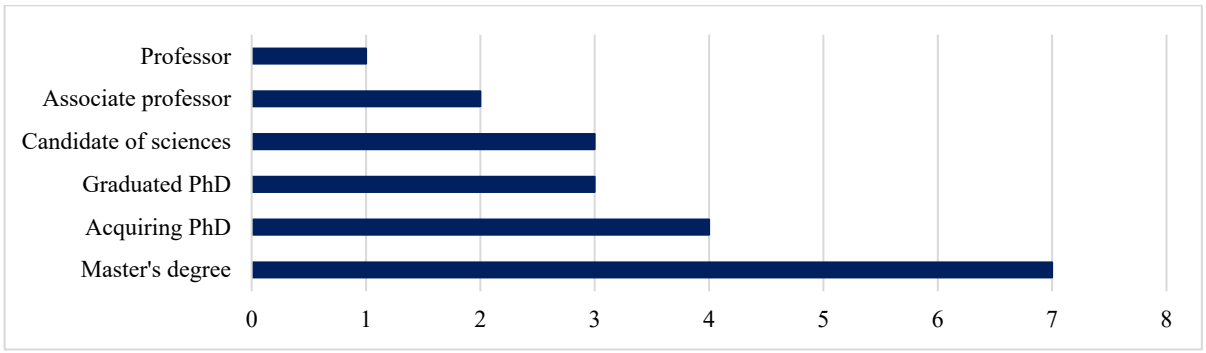

Figure 2 – Knowledge level of the respondents

For the next question, the respondents were required to write any amount of the phrases that were associated with innovations in higher education institutions (HEIs). Twenty respondents noted 135 expressions. The responses were grouped into categories, and the number of mentions was counted and organized in descending order.

Thus, it is clear that teachers have a wide perception of the innovations in the workplace that concern using advanced technologies, adjusting the established conventional systems within the university, expansion of cooperation with representatives of different groups. However, the most mentioned feature of the innovation at the workplace was the digitalization of the study process and using distance or online learning elements. The phrases №1, 3, 9, 10, 12, and 15 are related to distance learning and the digitalization of education. The cumulative number of mentions for this group is 51 or 38%.

Table 1 – The phrases associated with innovations in Higher Education Institutions mentioned by study respondents

	Phrases	Quantity
1.	Digitalization of the study process	16
2.	Flexible curriculum	14
3.	Distance learning	12
4.	Virtual reality	12
5.	Collaboration with universities	10
6.	Collaboration with industry	9
7.	Exchange teachers program	9
8.	University-based research centers	9
9.	Asynchronous online learning	8
10.	Hybrid classrooms	8
11.	Robotics	7
12.	Synchronous online learning	4
13.	Exchange students program	4
14.	Artificial intelligence	3
15.	Expansion of the scope of the EIS	3
16.	3D technology	2
17.	Collaboration with students	2
8.	Absence of participation-based assessment	2
19.	Competency-based learning	1

The responses related to carrying out reforms in the educational system within the university were №2, 5, 6, 7, 13, 17, 18, and 19. The cumulative number of mentions for this group is 51 or 38%.

The following category could be described as introducing the latest technology to the study process. These technologies included virtual reality, artificial intelligence, three-dimension technology and robotics. There were 24 mentions and phrases under the numbers 4, 11, 14, and 16 from Table 1 that corresponded to the named group. This category made up 18% of the responses.

The last category (number 8) concerns opening the university's research center and engaging both the students and the teachers in its work. One may argue that there are classes of applied skills in many departments in the universities. However, the respondents meant organizing a hub where students can use their skills and monetize them. Thus, before graduating, the students will be able to grasp the skills essential for their career path. Nine people mentioned this as an innovational adjustment to the learning process, making up 7% of all responses.

All mentioned can be classified and illustrated in the following form (Table 2).

Table 2 – The phrases associated with innovations in Higher Education Institutions mentioned by study respondents

Category of phrases	Quantity	Portion, %	The average number of mentions
Digitalization and online learning	51	38%	8,5
Reforms in the teaching system	51	38%	6,4
Applying new technology	24	18%	6
Organizing the research center	9	7%	9
Total	**135**		**7,5**

The following question asked the respondents was about their understanding of the factor that would facilitate the implementation progress. The respondents were given ten criteria and had to rank them from 1 to 3, where one is a low impact, two is an average impact, and three means the high impact on the progress of the innovation implementation.

The results were sorted in descending manner and displayed in Table 3 above. The leading factors rated as the most significant in 87% and 85% of the cases are material remuneration and internal innovation funding. In other words, the respondents strongly supported the idea that financial support was the main driving force. The other criteria were external funding in the form of grants and scholarships and the university policy. Out of the leading five criteria, only the university policy criterion did not have a monetary form. Thus, higher education institutions should consider the innovation management enhancing conditions when revisiting this corporate document.

Table 3 –Factors facilitating the progress of innovation implementation and success of innovation management

Reference number	Factors	Quantity	% out of the max possible
c1	The material motivation of employees: bonuses	52	87%
c2	Internal funding	51	85%
c3	External funding grants	44	73%
c4	Changes in university policy	44	73%
c5	External funding from the government	39	65%
c6	Changes in national accreditation requirements	39	65%
c7	Changes in policy	34	57%
c8	Changes in international ranking criteria	32	53%
c9	Changes in international accreditation requirements	29	48%
c10	Non-material motivation i.e., acknowledgement/ appraisal	26	43%
	Average	39	65%

The figure above illustrates to what extent the respondents graded the aforementioned factors (Table 3) high or low. The maximal value is 30, and Figure 3 shows the extent to which the respondents believe it is possible to facilitate the progression of innovations in their workplace. The average sum is 19.5 scores out of 30, which is 65%. The peculiar finding derived from Figure 3 is that only 9 out of 20 respondents showed confidence over 65%. Five had confidence lower than 75%, and the others were between 75% and 85%. In other words, the personnel of the higher education institutions does not firmly believe in the success of the innovation management that is carried out in their workplace.

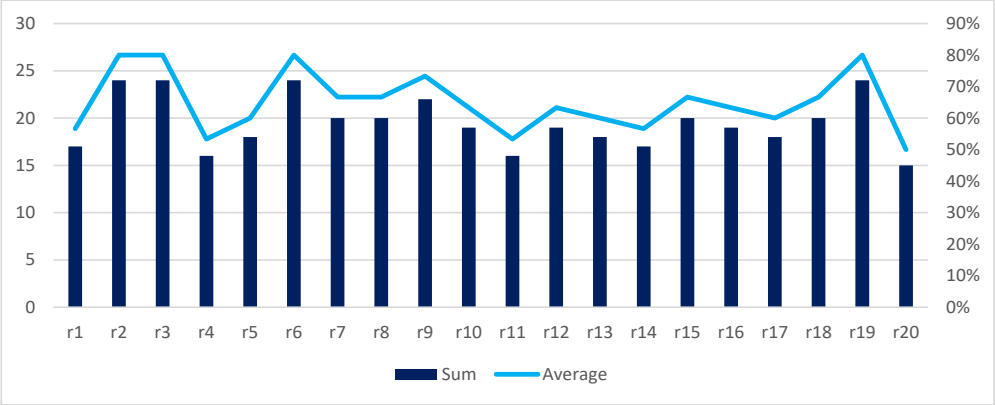

Figure 3 –Grading sum and average of the factors facilitating the progress of innovation implementation and success of innovation management

For the last part of the expert interview, respondents were asked to rate their willingness to engage in innovation management as a proactive, active, or reactive participants. In the question, the respondents were asked to answer if they were ready to create innovations themselves (proactive innovation management); or if they were prepared to learn innovations from other institutions and adapt them to the workplace; alternatively, if they were ready to learn and use the ready innovative product in teaching practice. The fourth option was not to engage in any innovative activity. None of the respondents chose to abstain from the innovations. The other three options were selected in the following manner.

Figure 4 – Willingness to take part in innovation management

In conclusion, the analysis of the collected expert interview responses signifies the generally positive perception of innovation and innovation management at higher education institutions. At the same time, certain obstacles to its development have been named, such as funding and material motivation of the teaching personnel. In general, the respondents were willing to engage in innovative activity and innovation management in reactive, active, or proactive ways.

Discussion

To interpret the analysis results, it is essential to define innovation management at higher educational organizations. For instance, Stone et al. (2008) have identified ten features of innovation that can be briefly expressed as the following: innovation is a complex risk involving a process that aims to create a new service or a product to increase the economic value, and, which uses tangible and non-tangible assets to make it. The main input is knowledge, and the main output is knowledge. However, the output of innovation involves a great deal of uncertainty. In other words, not necessarily the investments into innovative processes will produce a service, a product, or knowledge that will add to the company's value. Johannessen et al. (2001), in their work dedicated to studying measures and metrics of innovation management, identify six ways of innovating in the workplace. They are to create new products or new services, find new production or organization methods, entering or creating new markets, and finding new supply sources.

The list of innovation outcomes can be supplemented, and the development of new systems, infrastructures, business models, and operations, proposed by Gupta (2009) and Stone et al. (2008) can be added to the list. It means that the company can innovate in different directions and levels of operation. Considering such a wide area of application of innovations, the assessment of the innovation involves various methods and tools. In fact, innovation management can be evaluated using several methods such as data, financial inputs, or by counting the new ideas generated. However, all of the mentioned methods have both advantages and disadvantages. The main goal in measuring innovation is to understand whether innovation management is performed efficiently. To continue, Rhéaume & Gardoni (2016), Stone et al. (2008), and Richtnér et al. (2017) agree on the phenomenon that innovation management has a controversial feature, where not allocating resources will result in a significant worsening of the quality of the products and services in the long term. At the same time, some funds allocated to the innovation may have zero or negative returns. Thus, to maintain a positive return on the investments made to the innovational activity, efficiency needs to be managed. In this regard, an issue discussed by Rhéaume & Gardoni (2016) concerns the idea of the dependence of the organizational level innovation on the individual learning that subsequently gets transferred into the latter. In other words, without educating the employees and properly managing the human capital in this regards, the organization cannot expect to succeed in innovation management.

Despite all the articles described above, the question of the role of human capital in innovation management in universities has not been thoroughly studied. That is why it is important to understand how the human capital represented by the teaching personnel of the universities perceives innovation management and the ways it is being implemented in their respective workplaces.

The literature reviewed above indicates there are relatively few references or models to help the university to innovate in management to improve the universities performance. Therefore, providing a model to guide how university leaders may base their innovation management factors is crucial. This way, we offer an integrated framework of management innovation that highlights the primary constructs and outcomes adopted by Volberda et al. (2013). As most innovations are associated with product development, this study highlights management practices as a process innovation in responding to the trend. While there is a growing body of in-depth qualitative research that provides insight into the sequence of events that occurs during process innovation, these studies have not systematically analyzed the organizational capabilities that fuel management innovation, mainly in an educational organization (Rajiani & Ismail, 2019). Dynamic capabilities are defined as a firm's "ability to integrate, build, and reconfigure internal and external competencies to address rapidly changing environments (Piening and Salge, 2015). To sum up, innovation management includes modifications in how and what managers do in determining directions, making decisions, harmonizing activities, and encouraging people.

The perceptions found using the analysis signify the generally positive attitude towards innovative activity and innovation management among the respondents. The respondents had a sufficient understanding of the innovations taking place in the sphere of education, which included the changes in the form of teaching, the application of new technologies to the study process, and teaching technology itself. Moreover, the respondents have indicated the problems holding rapid development back. Mainly, this was the funding difficulties, the problem connected to internal policies of the universities and others. Considering that the competence and the attitude of the workforce is a direct driving force of the quality of education and the success of the higher education institution, the findings can be used in practice in the process of adjusting the current innovation management policies in the universities.

Conclusion

To conclude, innovations and innovation management in the sphere of higher education play an important part in the development of other industries, as it serves as a starting point for the workforce of the whole country. The innovations are developed continuously, and higher education institutions need to have a policy of innovation management. Taking into account that the policy's developers and users are mainly the teaching personnel of the universities, the present article has studied their perceptions of the current state of innovations, innovative activities, and innovation management at their workplace, understanding of which can be used to improve the processes in innovation management and enhance the quality of the teaching.

The findings of the qualitative analysis revealed the general awareness of the Kazakhstani university teachers of the current global trends in teaching. Moreover, the expert interview

results signify the teachers' willingness to participate in creating and developing innovations in the workplace. However, the analysis also discovered restrictions to the innovation management and implementation, such as the scarcity of funding, the weak internal policies, and the low material motivation of the personnel. The university personnel in developing the innovation management policy can use these conclusions. Moreover, the research can be replicated using a greater amount of respondents to enhance the quality of findings further.

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