

# **The role of universities in the development of public sector innovations**

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### **ABSTRACT**

Studies on public sector innovation often treat this type of innovation as something that emerges within public sector organizations. However, innovation theory argues that external sources of innovation are more fruitful sources of ideas. We claim that universities must be treated as a mandatory element in public sector innovation. This paper is aimed at clarifying the place of public sector innovation in the classification of innovations currently used in the literature. It also seeks to conceptualize an approach for future research on the topic. Our primary goal is to identify the role of different actors in the development of public sector innovation. We analyze the advantages and disadvantages of different forms of university involvement in public sector innovation. The paper consists of two parts. The first defines concepts of innovation in general and public sector innovation viewed as a variation on social innovation. The second is dedicated to an analysis of the experience of Russian universities in enhancing collaboration between actors in the public innovation system.

**Key words:** public sector innovations, social innovations, innovation system, universities, Russian Federation

### **Introduction**

Starting at the beginning of the 20<sup>th</sup> century, innovation became one of the most discussed topics in economics. Unfortunately, the overuse of this concept by many researchers made it meaningless by the end of the century. As of now, there is no clear agreement on the meaning of innovation and different types of innovation (Baskaran and Mehta 2016). The primary application of this term was dedicated to the development of commercial entities. Schumpeter and, later, Porter coined commercialization as the main feature of innovation. According to Porter, it is “a new way of doing things (termed invention by some authors) that is commercialized” (Porter 1990). He emphasized that “a new way of doing things” must be new for a firm or organization, even if it is known by other organizations and successfully implemented there. Nevertheless, the principle of “local newness” was not supported by many other researchers and was lost in the discussion, as was described in a recent literature review (Garcia and Calantone 2002).

Over the last twenty years, a typology of innovations has been developed, which has paved the way for social innovation (Hernandez-Ascanio, Tirado-Valencia, and Ariza-Montes 2016), pharmaceutical innovation (Hughes 2011), open innovation (Dahlander and Gann 2010) and public sector innovation (Potts and Kastle 2010), to say nothing of well-known and thoroughly investigated technological, product, and process innovation.

When considering various types of innovation, different researchers assign different meanings to these types. As a result, it is now problematic to describe and analyze innovation and innovative development by relying solely on common terms without specifying the concept.

The research on commercial innovation conducted by numerous researchers has convincingly shown that innovation activity cannot be regarded as a mono-activity of the enterprise concerned. The result of innovative activity is supposed to increase the effectiveness of each actor. And as soon as we mention effectiveness, the requirement to determine the effectiveness of innovation activity for all participants in the innovation process immediately arises. The perception of the effectiveness of the same process is different even within a single organization. Thus, the attitude towards innovation can be different, or even diametrically opposite. In such a case, can the implementation of a new idea be considered an innovation if its effectiveness is positive for some participants and negative for others?

Each actor perceives the concept of innovative development based on his own goals and definition of effectiveness, which leads not only to misunderstandings, but also to mutually exclusive positions in relation to innovation (Etzkowitz 2003). De Bruin and Read (2018) came to similar conclusions when considering social innovation in New Zealand.

## **Public sector innovations in the realm of social innovations**

A study of works on public sector innovation demonstrates that there are two dichotomous approaches to its definition. According to Flynn and Asquer (2017), the public sector should include not only state and municipal government organizations, but also all state-owned and municipal enterprises. The authors argue their position with the assumption that the goal of state-owned and municipal enterprises is not to obtain commercial benefits, but to provide public goods for the entire population. This position was developed in Zizlavsk (2014). According to the authors, public sector innovation is similar to commercial innovation. However, the evaluation of such innovation should take into account the public goods that are created for the entire population. It should be noted that adherents of this definition of public sector innovation rightly point out the fundamental difference between innovation and novelties. Innovation is determined not by the novelty of the idea, but by the positive effect which these ideas bring to actors and which is unattainable any other way (Flores and Zapata 2018).

Another group of researchers believes that state and municipal government innovation should be classified as public sector innovation (Mulgan, 2007). The authors rightly, in our opinion, classify this type of innovation as a social innovation, since they believe that the activities of the state and municipal government are aimed at improving the living standards of the population (Vieira et al. 2018). According to Bloch and Brugge (2013), the definition of public sector innovation “share[s] a number of common elements with the definition of innovation in the business sector, but also some important differences. For example, the notions of conceptual and policy innovations reflect how the public sector differs from the private sector. There is also a greater tendency to describe innovations in more general and less technical terms than for the business sector”.

We believe that the point of view of the second group is more justified in terms of studying public sector innovation. If we focus on the study of the ultimate goal of innovation, then we must recognize that the fundamental or principal difference between commercial innovation and public sector innovation is the determination of the principal actor.

The innovative activity of a commercial organization is aimed at obtaining benefits for commercial stakeholders, primarily the owners of the enterprise. One may argue that technological development is for the benefit of people, but there are many examples of a more effective (from the users' point of view) technology losing the innovation battle to a less effective technology because the latter has been aggressively promoted by its owners.

Drawing an analogy between public sector innovation and approaches to promoting commercial innovation can only cause bewilderment. Even if a commercial enterprise is state-owned, its innovative activity is commercial in nature. This allows us to conclude that public sector innovation should be considered as a special case of social innovation.

The second issue in need of clarification is the novelty of implemented ideas. Based on a systematic review conducted by (De Vries, Bekkers, and Tummers 2016), it can be argued that researchers have not found a consensus on the issue of novelty. We can cite the authors' conclusions about the diversity of points of view on novelty, but it is best to agree with the conclusion that most researchers base their definitions on the classic definition by Rogers: "An innovation is an idea, practice, or object that is perceived as new by an individual or other unit of adoption" (2003, p. 12). Thus, it should be recognized that innovative activity should not be aimed at idea generation, but at the search for new ways to solve problems in the organization, including the adaptation of previously known solutions.

Having recognized the admissibility and necessity of using external experience of innovation activity, one should search for potential sources of innovation. It is proposed to distinguish between two types of sources for new ideas or innovations - functional and conditional - as a determinant of this search. Functional sources determine the source of new ideas, while conditional sources determine the conditions of their emergence.

The definition of "functional sources of innovation" was first given by von Hippel (1988). By studying various organizations, von Hippel revealed the existence of functional relationships through which all organizations involved in the innovation chain of added value receive income from a new product, process, or service. The list of the most important sources of innovation is as follows: inter-governmental sources (Light 1978), external organizations facing similar problems (West and Bogers 2014), collaboration (Sorensen and Torfing 2011) and, last but not least, research organizations and universities (Laursen and Salter 2004). Research organizations and universities are not limited to participation at the development stage. They seek to expand their presence in subsequent links of the profitability chain.

Conditional innovations are the second type of innovation sources that determine the formation of public sector innovation. This type of innovation source has been reviewed by A. Afuah (2003). Systematic and targeted innovation requires public sector organizations to have the special ability to consider any circumstance as an opportunity to create and implement innovation. The author believes that public sector innovation should not be based on luck or a

random event. This means that innovation should be expected and not unpredictable. Therefore, it is appropriate to raise the question of which conditions are required for the emergence of innovation. The answer may lie in a list of five sources of public sector innovation, based on the results of A. Afuah's work:

1. Unexpected occurrences;
2. Non-congruity;
3. Sudden demographical shifts;
4. Shifts in perceptions, attitudes and values;
5. New knowledge.

Observing this list, one wonders to what extent public and municipal government organizations are qualified to withstand unexpected occurrences and sudden shifts? This leads us to believe that innovation cannot be an internal affair of individual organizations. It is necessary to implement a systematic approach in order to understand innovative processes.

The concept of an innovation system has been actively discussed in the scientific literature over the past thirty years. Typification of innovative systems occurs either by spatial attributes (global, national, regional) or by sectoral attributes (Carlsson et al. 2002). (Phillips et al. 2015) believe that a social innovation system should be added to this classification due to the growing interest in social innovation among researchers. Of particular note is the work of Moolaert, MacCallum, Mehmood, and Hamdouch (2013), which defines social innovation as "an emerging phenomenon, a theoretical construct and an ongoing field of research within a world of social transformation" (p. 2). Based on the aforementioned results, the essence of a social innovation system should be defined as an institutional framework that creates the necessary conditions and resources for effective public service activities aimed at improving the living standards of the population.

We define a social innovation system as an integral set of interconnected agents, their interaction and institutions that determine the norms of interaction, pursuing the goal of the sustainable improvement of the living standards of the population by creating, disseminating and introducing new knowledge and technologies. Agents are defined as separate individuals and organizations (commercial, state, and non-profit) that carry out activities aimed at achieving individual goals. Based on individual goals, agents form a set of the agro-innovation system agents, which are regarded as elements of a social innovation system. (Klein et al. 2013) rightly believe that in order to define a social innovation system, it is necessary to determine the participants of the system, since it should be "founded on cooperation and consensus building".

Based on the presented definition, the elements of a social innovation system are:

- population;
- public sector (state and local government);
- public organizations;
- research and education sector;
- innovation infrastructure.

The population (primarily the population of the region) is the main object of activity of a given social innovation system. Improvement of living standards is seen as the main goal of social innovation policy. The public sector is represented by federal authorities, regional administrations, and local governments. The administration of a region is a participant in the public sector at the regional level, while local authorities participate at the local level.

The scientific, educational, and research sector is represented primarily by educational institutions. At the same time, it should be noted that research activities are carried out by research organizations, which can also be attributed to public organizations.

Innovation infrastructure can be considered an integral part of the social innovation system. However, we prefer to identify it separately in order to emphasize its importance for the formation and development of the system. In our opinion, innovation infrastructure should include innovative organizations that contribute to the formation and development of the social innovation system. General innovation infrastructure can be divided into informational, organizational and financial infrastructures.

Considering social innovation system, we should note the institutions behind its development (Popov et al. 2016). The formation of a social innovation system must be based on a special institutional mechanism to provide collaboration between system actors (Popov, Veretennikova, and Omonov 2016).

Researchers of social innovation systems have not paid sufficient attention to identifying the causal relationship of processes occurring in a social innovation system. The correct identification of the causes and consequences of innovation processes will correctly assess the very essence of social innovation and, therefore, the formation and development of the social innovation system.

The formation of a social innovation system should be exclusively regarded as a dynamic social process. This means that the methodology of a social innovation system should be significantly different from the methodology of economic innovation systems. It is necessary to determine the functions performed by a social innovation system to understand the methodology of its formation. The analysis of how innovative systems function is based on analysis of ongoing processes and historical events (Hekkert et al. 2007). While studying administrative innovation, (Moreno et al. 2015) concluded that organizational functions are predictors of administrative innovation. According to (Jung, Lee, and Workman 2016), public motivation must be considered as an important but neglected aspect of innovation function.

The proposed formation paradigm of a public sector innovation system allows us to determine its main functions:

- information;
- regulation and coordination;
- research;
- administration;
- distribution.

The information function should be the main function of a public sector innovation system, since the innovation activity of any element and, accordingly, the formation and development of the system itself should be based on reliable information about regional socio-economic development. This function should also include policy development for public sector innovation.

The regulatory function is aimed at creating a regulatory environment for innovation activity. A public sector innovation system involves conflicting interests of system agents. For the effective formation and development of a system, it is necessary to develop rules and regulations that determine the behavior of system actors. The coordinating function is aimed at organizing the joint activities of participants in a public sector innovation system, as well as identifying and selecting priorities for its formation and development. The research function is aimed at creating innovation. Moreover, this function should be aimed at forming innovative capabilities and creating incentives for their development. The administrative function is the main one for the public sector, but in a public sector innovation system it should be considered equivalent to the other functions because a public sector innovation system can be successfully developed only if all administrative functions are properly performed. The distribution function is aimed at mobilizing and distributing the resources involved in a public sector innovation system.

However, this approach to determining the correspondence of functions and elements in a public sector innovation system leads to insufficiently correct results. This occurs because an important factor in the formation and development of a public sector innovation system falls outside the scope of the research: the ability of key elements to fulfill their functions.

The innovation capabilities of actors are the main factors ensuring the implementation of a social innovation system. While studying open innovation activities, (Cheng and Chen 2013) concluded that open innovation activities favorably affect the dynamic innovation capabilities of actors thanks to the nature of open innovation. We believe that the authors' conclusion is adequate in terms of social innovation.

However, only using this concept is not enough to study innovation activities. It is necessary to understand the sources of the emergence and development of innovation capabilities in system actors. Based on the knowledge triangle concept, which is used to identify sources of social innovation, universities should be recognized as the main idea generators. In fact, universities act as gatekeepers of innovation systems (Meissner and Shmatko 2017), defining information distribution processes among system actors.

Recognition of the role of universities in a social innovation system requires particular attention to the innovation capabilities of universities not just as actors of an innovation system, but also primarily as actors of public sector innovation (Maassen and Stensaker 2011). (Cervantes 2017) believes that the innovation capabilities of universities significantly depend on "the country-specific peculiarities of educational systems, diversity within HEIs themselves and the functions they perform" (p. 27). We should also note another important factor in the generation of knowledge and competences in universities. Based on the analysis of numerous authors and their own research, (Maassen and Stensaker 2011) suggest that the historical development of universities led to shielding them from external surroundings.

The purpose of our study is to investigate universities' innovation capabilities as an actor and a source of knowledge and competences for a public sector innovation system. A number of studies have been conducted on the innovation capabilities of universities and the factors that affect their gatekeeper role. This study will focus on these factors in the context of innovation studies from the perspective of university students from Russia. The main focus is to identify the impact of the educational environment on public administration students.

We do not plan to study all aspects of university activities as actors in a public sector innovation system. Instead, we focus on one issue, which, nevertheless, should be recognized as one of the most important issues in determining the capabilities of universities: how well universities fulfill their function of training innovative personnel for public administration. We believe that a higher education system should develop students' intentions to undertake innovative activity. In order to determine the effectiveness of innovation training among university students, we decided to determine the level of students' intentions to undertake innovation. Unfortunately, this topic is not properly represented in the scholarly literature. Therefore, we followed the path blazed by researchers of entrepreneurial intentions. We adapted the research model of entrepreneurial intentions to study intentions regarding public sector innovation.

## **Methodology**

A comprehensive literature review of different factors and innovation intentions serves as the basis for the development of a conceptual framework for this study. Three hypotheses were derived to be tested empirically. The purpose is to identify the most dominant factors affecting intention towards innovation. The focus of the study is Russian students' intentions towards public sector innovation.

Therefore, to develop a conceptual framework for the study, different connecting variables were presented based on the literature, the theoretical support, and the problem of the study. Based on the following explained variables, a conceptual framework was developed.

The conceptual model is based on age, gender, experience, and family involvement in public administration. In addition, attitude towards public sector innovation, perceived behavioral control, subjective norms, and the educational environment were also tested as factors associated with innovative intention.

In arranging the hypotheses for this study, certain factors were examined to discover their impact on public sector innovation intention among students. The factors explained below were selected from related empirical studies. The internal consistency and reliability will be tested by employing different statistical tests on the collected data.

In career selection, some researchers considered the role of experience. This factor is mostly included in the previous research as a demographic variable. To consider experience as a model in innovative intention, public service employment needs to result in experience



acquisition. In any case, experience has different effects on innovation intention. Thus, the following hypothesis was developed.

H1: Public sector employment experience is positively associated with innovation intention among Russian students. The presence of public service employees in the family is positively associated with innovation intention among Russian students.

Public service employment in families may affect career decisions and thus serve as a role model. The target sample of this study is family members who could influence career selection choice. Based on the above assertion, the following hypothesis was developed.

The role of the environment in innovation intention has been included in many studies. However, more attention is still required to find the impact of education on innovational behavior. The role of the university environment in innovation intention is unclear in previous studies: therefore, hypothesis 2 was developed to check the impact of the university environment on students' intentions towards public service innovation.

H2: Educational environment as a contextual element has a positive impact on innovation intention amongst Russian students.

Based on the literature and the theory of planned behavior, the following hypotheses were developed:

H3: Attitude towards public sector employment has a positive impact on public sector innovation intention among Russian students. Perceived behavioral control has a positive impact on public sector innovation intention among Russian students. Subjective norms have a positive impact on public sector innovation intention among Russian students.

The research questionnaire was obtained from a review of different literatures. Different constructs of the same topic have been tested in cross-cultural studies. The questionnaire comprises of eleven variables, as explained in the research model. It has two main parts: the first consists of demographics and personal information, while the second consists of questions on the different variables used in the study. The questions related to the constructs on the theory of planned behavior were obtained from Liñán and Chen (2009) while the questions relating to the university innovation environment were obtained from Autio et al. (2001). This enabled the questionnaire to cover all the research variables. The dependent variable of this research consists of 6 items, with innovation intention as the main construct. The questionnaire was designed on a five-point Likert scale ranging from disagreement to agreement, with (1) representing strongly disagree, (2) disagree, (3) neutral, (4) agree and (5) strongly agree. The students received a hardcopy of the questionnaire distributed by the researcher himself. After collecting the data from the pilot study, a reliability and internal consistency test was conducted through Stata: the results show a Cronbach alpha value for all the variables ranging from 0.71 to 0.85, as shown in Table 1. This means that the questionnaire is valid and reliable.

Table 1 presents the summary of the Cronbach alpha obtained for the five constructs used in this study. The scale items for each construct were derived from previous studies on innovation intention among students.

**Table 1: The Cronbach alpha values obtained from this study**

<b>Construct Name</b>	<b>Number of Items</b>	<b>Cronbach Alpha Value</b>
Innovation intention	6	0.769
Attitude towards innovation	6	0.839
Perceived behavioral control	5	0.821
Subjective norms	4	0.784
Educational environment	4	0.761

Source: Author

The populations selected for this study are graduate and undergraduate public administration students from Ural Federal University and Perm State University. Homogenous sampling was used. A group of public administration students from bachelor's and master's programs was selected in order to test the conceptual model of innovation intention.

The developed questionnaire was distributed among the students. The data were collected in three phases in 2018-2019. During the data collection process, the professors and management team of the department were approached to distribute the questionnaire among students. Hard copies of the questionnaires were distributed among students during lectures, while a Google form was sent to their emails with the help of professors. However, some students' emails did not register a response, so their fellow students were requested to send the questionnaire via VKontakte (VK, a Russian social media platform). This social media software was the third source of data, since most students have an account on this site in order to communicate with others. The same link was then sent to the students of Perm State University with the help of alumni from Ural Federal University. These data collection methods were chosen because:

1. They allowed us to easily increase the size of the sample.
2. Convenience in data collection and analysis.
3. Large numbers of respondents can be gained quickly and inexpensively.

The demographic profile of the respondents is divided into gender, age, occupation, level of education, and family members working in public administration. The information from the demographic profile is presented in Table 2.

**Table 2: Demographic characteristics of students**

Items	Total amount (n=247)	
	N	%
Gender		
• Male	98	39.7
• Female	149	60.3
Age		
• 15-20	65	26.3
• 20-25	173	70
• Above 25	9	3.6
Occupation		
• Full-time student	189	76.5
• Employed and student	58	23.5
Level of education		
• Bachelor	200	81
• Master	47	19
Do you have a family member who works in public administration?		
• Yes	73	29.6
• No	174	70.4

Source: Author

An aggregate of 247 students fruitfully completed this questionnaire, as shown in Table 3. The outcome of the statistical analysis test, especially the mean test, demonstrates that the students' opinions range widely from one construct to another.

**Table 3: Descriptive statistics for Russian students**

	N	Minimum	Maximum	Mean	Std. Deviation	Variance
Innovation intention	247	1.00	5.00	2.8191	.79263	.628
Perceived behavioral control	247	1.00	5.00	2.4838	.63239	.400
Attitude towards innovation	247	1.40	5.00	2.9380	.86862	.754
Educational environment	247	1.00	5.00	2.4585	.83984	.705
Subjective norms	247	1.00	5.00	2.2399	.99893	.998
Valid N (listwise)	247					

Source: Author

## Results

As explained earlier in the section on the development of the hypotheses, different studies have produced different results on the connection between gender and innovation intention. In this study of Russian students, the difference of intentions is given in Table 4 (based on the age of the respondents). For Russian students, subjective norms were found to have a low impact, which means that they can be different between males and females. The most significant difference was found for subjective norms (mean= 2.46, SD= 0.94,  $p < 0.05$ ) among males: these can be affected by the students' close circles (e.g. family, friends, peers, relatives, etc.). However, in terms of overall innovation intention, no significant effect was found in the sample of Russian students.

**Table 4: Independent sample t-test for Russian students: sample with gender**

Variables	Male (n=97)		Female (n=149)		Sig.	
	Mean	SD	Mean	SD	T	Sig
Innovation intention	2.8244	.82632	2.7221	.77272	-0.10	0.94
Perceived behavioral control	2.3844	.61501	2.5492	.63716	-202	0.066
Attitude towards innovation	2.9286	.90963	2.9442	.84328	-206	0.891
Educational environment	2.5816	.81685	2.3775	.84760	1.88	0.061
Subjective norms	2.4643	.94841	2.0923	1.00688	2.99	0.006

Source: Author

In the conceptual model of this study, a variable from the literature was developed to find out the impact of having public sector employees among one's family on students' innovation intention. To find out the impact, an independent t-test was applied: the results are shown in Table 5. The results of this test show that having a family member with such employment affects perceived behavior control in Russian students. Furthermore, family members' involvement in public administration also has a significant effect on innovation intention, with the mean= 2.87, SD=0.75,  $p < 0.05$ . The results show that students whose family members work in public administration are likely to become public servants in the future.

H2: The educational environment as a contextual element has a positive impact on innovation intention amongst Russian students.

**Table 5: Independent sample t-test for a Russian student sample with family members working in public administration**

Variables	Having a family member in public administration (Yes) (n=73)		Having a family member in public administration (No) (n=174)		Sig.	
	Mean	SD	Mean	SD	T	Sig
Innovation intention	2.8704	.81713	2.7979	.75388	3.05	0.002
Perceived behavioral control	2.3995	.78011	2.5192	.76929	3.04	0.003
Attitude towards public administration	2.9671	.81067	2.9256	.98186	0.75	0.453
Educational environment	2.5993	.77603	2.5993	.77169	1.58	0.114
Subjective norm	2.4863	.80405	2.1365	.90143	1.19	0.234

Source: Author

In testing this particular hypothesis, analysis of a Pearson’s correlation test was conducted to measure the degree of relationship between educational environment and innovation intention in the sample. The results are presented in Table 6. The outcome of the analysis of the two-tail test revealed that there is a significant positive correlation at a level of 0.01 ( $p < 0.05$ ). This is an indication that educational environment significantly influences Russian students’ innovation intention. Therefore, we accept hypothesis H2.

**Table 6: Correlation matrix for various factors among Russian students (n=247)**

	II	PBC	ATI	EE	SN
Innovation intention	1				
Perceived behavioral control	.402**	1			
Attitude towards innovation	.442**	.389**	1		
Educational environment	.597**	.415**	.661**	1	
Subjective norms	.567**	.247**	.470**	.776**	1

\*\* . Correlation is significant at the 0.01 level (2-tailed). N = 247.

Source: Author

According to Hair et al (2003), a high level of multicollinearity increases the chances of an insignificant result from a good predictor in the model. To observe the Variance Inflation Factor (VIF), a tolerance collinearity analysis was performed. The accepted criteria for multicollinearity were a maximum value of 5.0 for VIF and a minimum value for tolerance of 0.10. The results of the multicollinearity test are shown in Table 7.

**Table 7: Multicollinearity analysis for a sample of Russian students**

<b>Construct</b>	<b>Tolerance value</b>	<b>VIF</b>
Perceived behavioral control	0.795	1.258
Attitude towards innovations	0.549	1.821
Educational environment	0.271	3.685
Subjective norms	0.394	2.536

Source: Author

After multicollinearity analysis, the values in the table were detected. According to the accepted criteria, all the values of the VIF were less than 5.0: the lowest tolerance value was 0.271. The results show that multicollinearity was found in the data of this study.

## **Discussion**

This main purpose of this study was to compare the preference of public administration students for becoming public servants in the transitional Russian economy. The educational environment and its influence on students' innovation intention was specifically analyzed alongside necessary variables. Therefore, this research deems it necessary to explain the intention of youth towards innovation. It was essential to investigate the factors that affect the innovation intention of students. After analyzing the data, it is prudent to give a final conclusion, recommendations, and future research directions, just as in many other empirical studies.

The first aim of this study was to confirm the applicability of the theory of planned behavior in investigating the innovation intention of students in Russia. Based on the theory of planned behavior (TPB), three hypotheses were developed. To test these three hypotheses, a Pearson bivariate correlation was performed. The three constructs of TPB consist of attitude towards innovation, perceived behavioral control and subjective norms (Table 8).

In the testing of the first hypothesis, attitude towards innovation scored  $\alpha=0.01$ ;  $p<0.05$ . Therefore, attitude towards public administration will influence the intention of Russian students towards innovation. Similarly, the second hypothesis results based on the construct of (TPB) was perceived behavioral control; after the Pearson correlation was performed, the same value,  $\alpha=0.01$ ;  $p<0.05$ , was observed. For the third construct of TPB, the hypothesis was tested to check

the impact of subjective norms: the results of the Pearson correlation showed values of  $\alpha=0.01$ ;  $p<0.05$ . The social pressure perceived by an individual while performing a certain innovative behavior is called a subjective norm.

**Table 8: Summary of hypotheses**

H1. Demographic factors are positively associated with innovation intention among Russian students.	Accepted
H2. Attitude toward innovations has a positive impact on innovation intention among Russian students.	Accepted
H3. Perceived behavioral control has a positive impact on innovation intention among Russian students.	Accepted

Source: Author

Educational environment was one of the variables used to compare the influence of the university environment on students' innovation intention. For this purpose, a hierarchical regression analysis was conducted to find the impact of educational environment on the innovation intention of students. After interpretation of the data, we noticed a 14% change in the values of the coefficient of determination ( $R^2$ ) in the Russian student sample. This revealed that the educational environment has an impact on Russian students' intention towards innovation.

Age: the independent t-test of the data shows a slightly higher value in one of the constructs in the theory of planned behavior in each group. A slight change after the t-test was found in subjective norms: this means that students older than 25 may have social interaction with people who can influence their career choice to become public servant.

Gender: in the independent t-test on gender, an impact was also found. For Russian students, the innovation intention in males was slightly higher than in females. In this sample, the impact of gender on the subjective norm was found to be significant. This means that gender has an impact on future career decisions in Russia.

Experience: the result of the t-test of student experience on different variables shows no impact. This may be due to the age of the respondents: most of them (76.5%) are full-time young students with no job or self-employment experience.

Family members' involvement in public administration: we developed a hypothesis that the presence of public servants in a family may affect the innovation intention of other family members. In the case of students from Russia, after the t-test the results show that there were 73 students (in a sample of 247) whose family members are involved in some kind of public administration activity. The presence of public servants in a family has a positive impact on Russian students' intention towards innovation.

## **Conclusion, Recommendations and Implications**

The traditional function of universities (teaching and awarding diplomas to students after the completion of their studies in various disciplines) is not only increasing the number of job seekers but also creating a burden on the economy. Russian universities are not an exception to this continuing phenomenon. Therefore, there is a need for a paradigm shift to enhance social and economic development through the production of adequate public servants.

University students choose different courses according to their preferences. These preferences are mostly influenced by family or friends, although some may not have the opportunity to study their desired subjects because of poor grades. As a result, the investigation into the innovation intention of university students is not only concerned with students on public administration or related courses but also with all university students, irrespective of the course of study.

Universities can play a significant role in promoting public administration education in many ways. The higher management can arrange seminars to invite various public servants in order to inspire and motivate students: they can demonstrate that education is not only about getting degrees and jobs but also innovation creation. Universities can also arrange different training programs for both existing and aspiring public servants.

This particular research is aimed at investigating the abilities and intention of public administration students towards innovation, based on the theory of planned behavior. The sample size for this study was enough to test the proposed model: however, for generalization to a large area (regional, continental, global), a larger sample size will be needed in future studies.

Further studies should investigate factors which hinder students' intention and desire to become future public administrations and innovators. Furthermore, future studies should also investigate the factors behind why students do not see innovation as a desirable career choice. Some of these factors are financial, political, and legal, and vary from country to country: they also depended on the connection of the youth with career selection.

This study concluded that the university environment has a significant influence or impact on students' intentions towards innovation. Consequently, future studies should focus on testing models of involvement on students' knowledge, skills, attitude, values, beliefs, and behaviors. This model can be a source of instruments for evaluating innovative skills and ability acquisition of students from their university programs or disciplines. This model further explains the ability and profile of individuals before and after interacting with a particular environment, as well as how the environment influences their innovative knowledge, skills, attitude, and behavior. Conducting an empirical check through the application of this theory may create a gateway to revealing the connection between innovative skills and the university environment, as proposed earlier in this research.



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