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MASTER'S THESIS

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INNOVATION IN PUBLIC SECTOR INSTITUTIONS IN THE FEDERATION OF BOSNIA AND HERZEGOVINA

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LIST OF ABBREVIATIONS

AVE – Average Variance Extracted
BiH – Bosnia and Herzegovina
CFA – Confirmatory Factor Analysis
CFI – Comparative Fit Index
CR – Composite Reliability
EU – European Union
FBiH – Federation of Bosnia and Herzegovina
FDI – Foreign Direct Investment
FZZPR – Federal Institute for Development Programming
GDP – Gross Domestic Product
IT – Information technology

KM – Convertible marks
MVA – Missing Value Analysis
NFI – Normed Fit Index
NPM – New Public Management
OECD – Organization for Economic Cooperation and Development
PPP – Public-private partnerships
PS – Public sector
PSI – Public sector innovation
R&D – Research and Development
RMSEA – Root Mean Square Error of Approximation
SDGs – Sustainable Development Goals
SEM – Structural Equation Modeling
SRMR – Standardized Root Mean Residual
UN – United Nations
UNDP – United Nations Development Program
VIF – Variance Inflation Factor

INTRODUCTION

Worldwide, public sector institutions have started actively working on the development of good governance and the improvement of their services. Numerous benefits of innovating the public sector (hereinafter: PS) have been recognised, and appropriate measures have been taken. The concept of public sector innovation is new for Bosnia and Herzegovina (hereinafter: BiH) and still, no specific research was made on this topic. Nevertheless, it is certain that the future of any efficient public sector will depend on innovation. According to Karo and Kattel (2019), innovation has become a necessity in order to overcome some challenging times in one country. This research aims to fill the existing gaps on public sector innovation (hereinafter: PSI) in the current literature and to investigate the activities, challenges, and possibilities for the innovative public sector environment in the entity of Federation of Bosnia and Herzegovina (hereinafter: FBiH). This review will indicate where the literature in FBiH is lacking the most and make some research factors more apparent. Special attention will be paid to the issue of innovative perception by PS leaders and their employees. The insights of this research may be even more relevant, due to the fact that BiH, and the entities, are currently going through the process of European Union (hereinafter: EU) integrations and are actively working on the issues of the sustainable development. Moreover, all the aspects of the United Nations (hereinafter: UN) Agenda 2030 and the priorities of the upcoming Development Strategy of the FBiH will be taken into account.

Traditionally, innovation was perceived as part of the private sector, while it was considered inhospitable in the PS that is steadily dealing with the risk aversion of the governments and public scrutiny. As Andersen and Jakobsen (2018) mention, the literature regarding innovation in the public sector has a long-standing history, which has just recently gained momentum. Still, the emphasis on the PS transformative role or the strengthening capabilities is not sufficient. The authors indicate that innovation is a fundamental aspect of PS development as it entails the termination of past, inadequate practices.

Innovation as a concept is subject to many research, and still today, there are many forms of its definition. Damanpour (1991) explains the variety of forms that innovation can take, as a novel product, service, process, program, or even a system, which is a dynamic process of generating or implementing some new idea or behaviour. Moreover, PS innovation aims to create public value and improve the public good.

Mulgan and Albury (2003) describe innovation as the core activity in any public sector, where it is able to respond to all citizen expectations and adapt to their needs. Innovation in the public sector is defined as generating new ideas, introducing new approaches with the aim of providing quality public services, creating value and better response to the needs of the society. Moreover, innovation improves the performance of public services, increases

their efficiency and value and decreases costs. There is a number of obstacles that may hinder such an organisational development and which should be overcome, but the first of them, in the opinion of Mulgan and Albury (2003), is the culture of risk aversion or better said the resistance to change.

Many people, especially in the developing countries as BiH, have a defensive attitude toward innovation as to something just technologically based, hardly reachable and only available to scientists. The term innovation in the public sector is by some people even considered an oxymoron, contradicting words, as Bommert (2010) explains. Indeed, innovation may not only relate to something novel, but rather as Potts and Kastelle (2010) mention, to a transformational process of the institutions and the economy, under the influence of a new idea. Innovation has significantly increased in its prominence regarding administrative and political discourse. Furthermore, as Salge and Vera (2012) emphasise, innovation is now widely accepted as a favourable improvement driver of public services.

Additionally, innovation in the public sector, is a contemporary name for PS reforms. The ideas for the new policies, service deliveries, public-private partnerships (hereinafter: PPP), and public administration conduct are evidence of innovation. To some extent, every sector or part of an institution can innovate.

The purpose of the thesis is to contribute to the development of public sector innovation in FBiH as an opportunity to improve the performance of public services, increase their efficiency, and decrease the costs. The complex and stratified structure of FBiH and its public sector has been forever standing in the way of any growth and development opportunities. PS reforms have introduced many improvements in the same, but the public sector still operates under many obstacles. In order to progress even more in the future, public institutions are trying to innovate their sector, rather than reform it. Through the proper identification of innovation drivers, some gaps on innovation in the public sector of FBiH and the country will be also filled out. Consequently, the purpose will be realised by addressing the following research questions:

- Which initiatives and incentives are currently supporting the innovation in the PS?
- What are the challenges faced by the PS in developing innovation?
- How do public sector employees and managers perceive their working practices from the perspective of innovation?
- What is the influence of innovation drivers and networking on innovative behaviour of employees in the public sector?
- What is the influence of some organisational factors on innovative behaviour of employees in the public sector?

In this respect, the objectives of this master's thesis are:

- to identify the innovative initiatives and incentives which support current innovation in the public sector;
- to examine the challenges faced by the public sector in developing innovation;
- to analyse how do public sector employees perceive their working practices from the perspective of innovation;
- to analyse how do top-managers understand innovation;
- to determine the influence of innovation drivers and networking on innovative behaviour of employees in the public sector;
- to determine the influence of some organisational factors on innovative behaviour of the employees in the public sector;
- to offer recommendations for improvement of public sector innovation.

Additionally, a review of the literature was conducted in order to identify the hypotheses relevant for the achievement of the objectives of this thesis. Consequently, following Lewis, Ricard and Klijn (2018), two hypotheses are proposed:

H_1: Innovation drivers influence innovative behaviour in public sector institutions.

H_2: Networking influences innovative behaviour in public sector institutions.

Besides, following Fernandez and Moldogaziev (2012), the below stated hypotheses are also proposed:

H_3: Encouragement influences innovative behaviour in public sector institutions.

H_4: Empowerment influences innovative behaviour in public sector institutions.

H_5: Employee information influences innovative behaviour in public sector institutions.

H_6: Rewarding influences innovative behaviour in public sector institutions.

In order to perform this research, in the beginning, secondary data is obtained through an extensive literature review on public sector innovation in the country, region, and the world, within the available academic journals, publications, newspapers, books, and the internet. Afterward, the research uses a mixed-method approach, which requires both qualitative and quantitative analysis in order to explore the concept of innovation in the PS. The primary data is collected through semi-structured interviews with the management of several mapped PS institutions, and the survey with close-ended questions is completed by the employees of the FBiH PS institutions. This structure enables easier access toward the perceptions and knowledge of the staff and management. The primary research enables a better understanding of the incentives and the challenges faced by the public sector in developing innovation. Descriptive methods and the comparative analysis will be used to explore the environment and initiatives regarding innovation in the Entity, BiH, the EU, and Oceania. Reports on public sector innovation from several leading countries in this

field, as Australia and New Zealand, will be used to provide relevant information on measures and policies used to foster innovation in their PS. In order to provide recommendations on the improvement of public sector innovation in the FBiH, annual report materials and the answers based on the survey from the relevant institutions will be collected.

This master's thesis consists of five main chapters. The first chapter defines innovation and the public sector and emphasises their separate and common importance. The second chapter explains the impact of public sector innovation and elaborates on several internal and external factors and barriers on innovation. This chapter introduces the possible direction in which the research may develop and offers a complete overview of global innovation drivers and challenges. The key barriers as bureaucracy, competition, regulation, technology, and employee's mind-set are explained in detail. A deeper investigation of this topic is presented in chapter three, which provides a brief overview of the FBiH and explains the relevance of innovation for the Federation of Bosnia and Herzegovina.

Furthermore, this chapter reveals the current and future activities in the FBiH that may affect the development of public sector innovation. Chapter four of this thesis describes the process of the empirical research. The research approach, detailed methodology for both qualitative and quantitative analysis, and the analysed sample are explained in this part. Chapter five presents the most important interview and survey results. Special attention is also given to the findings regarding the characteristics and the obstacles of PS innovation in FBiH. Additionally, this chapter offers several recommendations regarding the analysed issue and explains the main limitations of the research. The master's thesis ends with a conclusion.

1   THE CONCEPT OF INNOVATION AND PUBLIC SECTOR

The concept and importance of the innovation and public sector, separately and together, will be provided in this chapter. In fact, during the past two decades, the concept of innovation has been an element of many researches. Nevertheless, there is still no agreement on its definition. Bland, Bruk, Kim and Lee (2010) explain that this should not be considered a weakness of the existent research, but it surely signals the importance of analysing the innovation within the appropriate circumstances.

People relate the word innovation with something revolutionary and expect that innovation must result in a cure for cancer or going to Mars. Indeed, this is also an innovation but, as Thornton (2012) clarifies, innovation is all around us and it is happening every day at home, in a company or the government. Lewis, Ricard and Klijn (2018) define innovation as some cut-off or as a game-changer. These terms indicate some change that happened compared to the previous state.

Baxter, Schoeman, Goffin and Micheli (2010) claim that innovation is a successful taking of advantage of a new idea. Through this definition, it is also possible to differentiate between two, often mixed, concepts. The creativity is characterized by new idea development, while innovation happens only with successful implementation. Nevertheless, in the context of the public sector, this definition is more specified. Innovation in the public sector is not as much about the good as it is about networking and collaboration. Innovation in this regard is solution-oriented rather than offering simply generic solutions.

1.1 Definition of innovation

According to Bland, Bruk, Kim and Lee (2010) innovation is the generation, acknowledgment and application of a novel idea regarding a social issue, which requires the dominant wisdom as it improves the product or service and fosters value. This definition emphasises the two-folded nature of innovation as a process and the result.

Innovation as a term has been used so many times in a variety of forms that it is in danger of losing its actual meaning unless it is placed in a specific context. Green, Roos, Agarwal and Scott-Kemmis (2014) mention that earlier this term was connected and even confused with research and technology. Actually, most of the prior books and research on innovation were reflecting only on technological innovation, regardless of the fact that most of them were institutional or managerial. The core of innovation is the idea and its implementation, which generates some change and delivers new value. Therefore, innovation may be related to any societal or economic condition. Francesc (2009) underlines that, even though the simplest definition of innovation is that it is an implemented novel idea, there are some opinions that innovation is explicitly a radical, breakthrough change.

Armbruster, Bikfalvi, Kinkel and Lay (2008) explain in more detail how the innovation is in most cases related to research and development (hereinafter: R&D). Many scientific papers found out that enhanced R&D activities result in innovative products and by that enable the achievement of the competitive advantage of a company. Hence, many economies started investing in innovation policies based on research and development, by which some developing countries gained an advantage over the traditional EU countries, Japan, or the United States. This is why these more developed countries have started recently looking for accompanying actions to flank their strategies based on R&D and to go after innovation in some additional areas. This search reviled that not only technical innovation exists. Following this, Armbruster, Bikfalvi, Kinkel and Lay (2008) mention additional defining elements of innovation, which include the new products, production approaches, markets, supply sources, and new organisational forms. In this regard and according to Armbruster, Bikfalvi, Kinkel and Lay (2008), innovation can be classified as of the technical product, non-technical service, technical process, and non-technical process or organisational.

Francesc (2009) recognises four further classifications, the product innovation, the process innovation, marketing innovation, and the organisational innovation. Firstly, product innovation is the introduction of a new or at least highly improved good or service. These improvements may cover the technical, material, software, or other characteristics. Service innovation is primarily reflected in the improvement of speed and efficiency of the provision, the presentation of some new features in the current service or a new service. The process innovation refers to the implementation of some enhanced or novel method. This form of innovation has the goal to lower the unit costs, to increase the quality, or to generate a new or highly improved product. The marketing innovation introduces new marketing methods, as the change of the four P's (package, promotion, placement, and price). With this, new markets are opened and customer needs are met. Lastly, there is the organisational innovation through which new organisational methods are introduced in a company. This form of innovation may have a positive impact on the performance of a company, lower the bureaucracy, supply and transaction costs, and improve the labour productivity.

Francesc (2009) underlines the key innovation characteristics. Firstly, there is the novelty, as every innovation has to contain it at least to some degree. Novelty has three forms, new to the company, to the market or the world. In order for something to be seen as an innovation, it should at least be new to the company and not necessarily to the market nor the world. For example, a wind farm may not be anything innovative for a country already having it or constructing it by itself. Nevertheless, it is an innovation for a country without any wind farms. Secondly, innovation has benefits as it brings social and economic progress. Respectively, innovation differs from invention and research. Invention is most simply defined as the development of a novel idea, but innovation goes beyond that and has commercial and economic prerequisites. On the other side, research is more a search for new knowledge, an experimental work that has no explicit application.

Green, Roos, Agarwal and Scott-Kemmis (2014) explain that uncertainty is an important part of innovation. The larger the change is, and less familiar the person or institution with it is, the greater the uncertainty. Innovation also includes planning, which is, in its essence, a prediction, and it is crucial to be able to adapt and learn from experience when the uncertainty increases.

1.2   Importance of innovation

According to Armbruster, Bikfalvi, Kinkel and Lay (2008), in regard to business performance, the organisational innovativeness is crucial for competitiveness. The organisational innovation simplifies and enables an efficient adoption of the product and process innovation, whose success rests on the extent by which these new technologies are used by the organisation. Moreover, organisational innovations is a direct source of the competitive advantage, especially due to its large enhancement on the productivity, quality,

and flexibility of an organisation. Damanpour and Schneider (2006) explain that in many cases, innovation is considered as the organisational prerequisite in order to be efficient and sometimes even to survive. Particularly, under the circumstances of growing international competition, increasing quality demands, and fast-developing technology and markets, innovation is the mean of achieving economic growth and competitive advantage. Damanpour and Schneider (2008) also confirm that innovation is the origin of organisational development, growth, and efficiency.

Damanpour, Walker and Avellaneda (2009) explain that organisations implement innovation in order to enhance the areas of technological knowledge or competition and to improve their performance. Furthermore, organisational innovation is a mean for achieving the company's performance objectives, particularly in the situation of severe competition, scarce resources, fast developing market, and increasing demand for greater quality.

According to Bland, Bruk, Kim and Lee (2010) only the finalization of three stages, the idea generation, approval, and implementation, results in successful innovation. Nowadays, the focus is in most cases on the factor of novel ideas, but the importance of the other factors may not be underestimated. Andersen and Jakobsen (2018) define innovation adoption as the implementation of a novel idea, which is new in that specific context and during the time of adoption. This is the crucial element of any further development as it symbolises the break with past behaviour and practices.

1.3   Definition of the public sector

There are several ways in which the public sector can be defined, depending on the width of coverage. Koch and Hauknes (2005) explain that primarily the comprehension of the boundary between the public and the private sector enables a complete insight into the public sector. There are some criteria by which the public sector is separated from the private sector. These include the characteristics of a product, the ownership and its control, financing, features of the competition, and the social benefits. These criteria combined result in the public governance concept. Koch and Hauknes (2005) go further in describing the criteria and underline that the goods in the public sector are characterized by their non-excludability and non-rivalry. In this regard, the public sector is a group of institutions involved in the public good production. These institutions need to have collective ownership, the activities have to be primarily financed from the public budget, and the generated benefits need to be of public character.

Keat, Young and Erfle (2013) also mention that the public goods are distinguished by two main characteristics and explain what they mean. These goods are non-rival, which means that there is no additional cost of its supplying to an additional user. Furthermore, they are non-exclusive, meaning that no one can be excluded from using the public good and in this regard it is hardly possible to ask a price for its use. In other words, the utility of these goods is not restricted to individuals and the appearance of new users will not decrease the

utility of other users nor require some additional production. Holcombe (1997) claims that the most proper definition of these goods is that those are the goods which, after they are provided for some consumer, they can be used for zero cost by any additional consumer.

Bailey (2002) defines the public sector as a set of the government activities and its institutions. The PS is often considered as the provider of non-market services that are established solely through collective democratic processes and in regards to the citizen needs. The governement has four interconnected roles. Firstly, it allocates the reseources in order to achieve the maximal efficiency. Secondly, the government impacts the income distribution through the social security system, taxation and PS services distribution. Thirdly, the governement regulates and imposes laws in order to improve the market economy. Finaly, there is the stabilisation role through which the governement uses economic policies in order to address and cope with the main macroeconomic objectives, as unemployment or inflation.

Mongey (2013) defines the public sector as a piece of the economy in charge with the provision of core governmental services, which includes the public transport, healthcare, education, and many more. Public services are entirely or to some extent financed by the taxpayers' money and are not provided for a profit but rather for the public good. The main aspects of the public sector are that it follows the public law, it is funded by the public money, and it provides public services. In this regard, there are three definitions of the PS, the legal, financial, and functional definition.

Borins (2018) emphasises that institutions, which operate for a long time, are more likely to adjust their activities in the way that minimises the costs. However, this also maximises the costs of adapting or changing these activities, which is why novelties are rare. Bloch and Bugge (2013) also claim that regardless the fact that the public sector may have some innovative and new breakthroughs, as for example the digital government, it is too often described as bureaucratic, slow, and conservative. Nowadays, the main objective of almost any country is a smart, sustainable, and inclusive economic growth. In order to achieve this, as Kattel and Mazzucato (2018) explain, it is crucial to reassess the governmental role, the potential of the institutions, and their policies. More precisely, a new explanation for the governmental interventions is needed, and not only that they are correcting the market failures.

Brown and Osborne (2012) think that, during the past two decades, the nature of public institutions has changed immensely all over the world. Earlier were the PS institutions a symbol of stability, but their slow-changing environment is coming out of balance. The primary reason for this is the social and political environmental instability and the fast changing world. Bertucci (2005) explains that the government has defined and crucial regulatory and administrative roles in the society, which may not be disrupted by the market but rather a proper market regulation is required. Nevertheless, as the global

pressure on the PS is increasing, their responsibility has also increased. Many challenges for the public sector have occurred, and a rapid action is needed.

Keeping the promise is not an easy task. For the public sector, as Vigoda-Gadot, Shoham, Schwabsky and Ruvio (2005) mention, it has always been a challenge to realise its ideals. Albury (2005) notices the increasing pressure happening in the public sector, which demands greater efficiency, improved performance, and even more personalized services. The PS should provide services that are appropriated to the society, but also tailored to an individual and not generic anymore. Moreover, Ricard, Klijn, Lewis and Ysa (2017) claim that the public institutions are experiencing severe pressure to deliver more value for the unit of public money. The institutions are challenged to explore some new ways in which they could cope with the financial crisis, inequality, or demographic changes.

Denhardt and Denhardt (2000) emphasise that public management is undergoing a drastic transformation. Many public managers are leaving the service provision and administration on the side and in turn incorporating some private sector principles and by that responding to the claims of being too slow. As a result, many advances have been accomplished in the public sector. Nevertheless, the PS must be primarily dedicated to serving the citizens. This is why a combination of both is necessary, to have the people at the forefront and build responsive and honourable institutions.

1.4 Concept of public sector innovation

The public sector is usually related to bureaucratic silos, followed by inertia and delays. Hence, the main criticisms toward the public sector are regarding its slow dynamics and lack of innovativeness. Sørensen and Torfing (2011) claim that this issue can be solved through privatization, deregulation, and the application private sector planning principles. Regardless of the fact that the PS culture is in some components risk-averse, it cannot be said to be completely hostile to innovation. When we just consider the provision of services, their quality and the content of the policies five decades ago and today, it is clear that due to some incremental innovations, impressive transformation happened in the PS.

Lewis, Ricard and Klijn (2018) describe innovation as a concept whose time has finally come to the PS. Governments across the globe, for already several decades, have been developing their innovation policies and innovation units. In the beginning, this was addressed in a way for the public sector to reinforce the private sector innovation, but the thought of innovating within the public sector developed very soon. Moreover, governmental policies, which should influence the industrial innovation, started to be developed among the first ones. In that time, they were defined and adopted, but their efficiency and effectiveness were still in question. Rothwell (1982) says that the innovation policy is in that regard, actually a synthesis of technology and science, as patents or technical education, and the industrial policy, as a tariff or tax policy.

Palmer and Kaderdina (2017) claim that innovation is no longer only a popular word to use. Moreover it is now considered as a promising solution to many problems in the public sector. The drivers of innovation in the private sector are apparent, for example, the competition or the market share increase, but the situation in the public sector is different, and with it also slower. However, as the government's aim to balance their priorities, it is becoming more evident that some new approaches, innovative methods, are necessary.

Innovation runs opposite to bureaucratic role of institutions. Brown and Osborne (2012) regard public sector innovation as a distinctive model of change, which may come in the form of some novel elements, as knowledge, managerial skills, or even a new institution. Bertucci (2005) also mentions the innovation as a process, which generates small or large structural and functional changes of an institution. Green, Roos, Agarwal and Scott-Kemmis (2014) add that PS innovation includes generating novel ideas, which are transformed into value-enhanced outcomes. Furthermore, the public sector innovation must significantly influence the institutional character and be taken into use by that institution.

The public sector is slowly shifting its provision of tangible services toward the intangible services, which is also demanding more innovation in public services. Moreover, new management methods are required in order to effectively answer the range of public interest questions. Bertucci (2005) emphasises that the lower and middle-level employees initiate most of the innovation in the PS and that innovation in that context is not an answer to crisis nor is it driven by some financial reward, but by recognition. Furthermore, innovation in the PS is carried out all over the world in a similar way, involving a holistic approach, application of new technology, the enhancement of the processes, and empowerment of the public and the employees.

According to Bertucci (2005), there are several types of public sector innovation. Firstly, there is the institutional innovation, which reflects the implementation of a new idea or behaviour to some organisation. Its focus is on the improvement of the existing institution or the creation of a new one. Secondly, the organisational innovation, which suggests one or more new, working practices and techniques. Thirdly, the process innovation that aims to enhance the public service quality and provision through the employment of some new or improved methods. Finally, there is the conceptual innovation whose central focus is to implement some new governance forms, as the interactive policy-creation or the horizontal networking and so on. O'Donnell (2006) also outlines the types of PS innovation in the public sector and arranges them into three categories. There are incremental to radical innovations, depending on the degree of improvement or novelty.

Furthermore, concerning the initiator of innovation, the top-down to bottom-up innovations exist. The final category is the needs-led to efficiency-led innovations, depending on whether the process aims to solve some problem or to make the current service or procedure more efficient. Green, Roos, Agarwal and Scott-Kemmis (2014) explain that there is also the social innovation, as the new strategy or idea that meets the social need.

Furthermore, several categories of PS innovation are recommended, as the service innovation, service provision, administrative and institutional innovation, rhetorical innovation, conceptual innovation, governance innovation, policy innovation, and systemic innovation. As it may be noticed, there are many classifications of PS innovation and neither is officially accepted. These various innovation types are developed accordingly to the structure, context, and selection of the environment.

The PS occupies a distinctive role in the society, which places the public institutions under specific democratic, political, and organisational rules and norms. Hence, many objectives are difficultly defined, and many problems are vague and complex, so it is in most situations hard to find a solution and a genuine driver. Some of the innovation drivers in the public sector, as Langergaard and Scheuer (2012) say, may be to improve the service provision and governance and to increase the public value and efficiency. Additionally, Rivera-León, Simmonds and Roman (2012) mention three ways of exploring the public sector innovation and the ways of stimulating it. These include the personal motivation linked to innovation, the culture of the working environment, and the challenge, which the innovation presents.

Furthermore, Rivera-León, Simmonds and Roman (2012) explain in detail some of the reasons of public sector innovation. There are extrinsic and intrinsic motives to PS innovation. The extrinsic motives consider the governmental role in coping with the issues of the modern world, the sustainable development policies, and the increasing demand for personalized service provision. They are named extrinsic due to the fact that the innovation itself is not the real motive, but moreover the impact that the innovation will have in helping the public sector to cope with a challenge. The intrinsic motives are focused on learning, even if from failure or simply from experience. The rationale for this form of motivation is that even an unsuccessful innovation may be a positive thing and may trigger some further experimentation.

Furthermore, there are factors of the organisational culture. These are traditionally considered to come from the high-level employees and are also called the top-down approach, which is for example, initiated by a minister and then applied through the lower-level management. Two decades ago, new evidence proved the contrary. Namely, that most of the public sector innovation is initiated by the middle and lower-level employees, which is also called the bottom-up approach. Since then, many researches were performed, and the results showed that innovation arises on both sides. Conscious and unconscious innovation are another group of approaches regarding the organisational culture. The conscious innovation is a consequence of an aimed, intended procedure or process to create an innovation. This innovational approach is more related to extrinsic motives, as for example the innovation laboratories. On the other side, unconscious innovation is frequently referred to as accidental innovation or an unexpected finding.

McGann, Lewis and Blomkamp (2018) mention a contemporary trend called innovation laboratories. Still not much is known about these laboratories and their difference to other PS agents and actors. Nevertheless, they are described as associate units, which support the open government programs, and initiatives that encourage transparency and accountability, as well as empower the people with a variety of novel technology.

2 INNOVATION IN PUBLIC SECTOR INSTITUTIONS

The research regarding public sector innovation started a long time ago. Rivera-León, Simmonds, and Roman (2012) claim that the first research began already in the 1970's. Nevertheless, a more serious research approach to innovation has been taken just recently. This is due to the recognition that the public sector development in most cases happens due to some adoptions of institutional innovations. De Vries, Bekkers and Tummers (2016) also explain that the PS innovation is assumed to be a reform movement, as the New Public Management (hereinafter: NPM) or the electronic government.

The innovation process is neither simple nor constant, and it involves a lot of planning and dedication. According to Bertucci (2005), innovation is a way to enhance the functioning of a government, which is supposed to enable and facilitate innovation. The only right manner to achieve this is by creating a favourable environment and providing the basic support to the PS institutions to innovate. This chapter will underline some characteristic and important factors, which affect PSI.

2.1 Scope and effects of public sector innovation

Palmer and Kaderdina (2017) define innovation as an art, which in addition facilitates many things. It is a complex and collaborative process of designing and exploring new opportunities and discovering new approaches to solve demanding problems. Institutions facing societal issues are usually confronted with resource limitations or lack of public or donor tolerance. Moreover, the market forces, which in most cases drive private sector innovation, may have a different effect in the PS. In this regard, depending on the challenge, the scope of PS innovation is defined.

Earlier, the scope of innovation was narrow and in most situations related only to technology, but this is not the case anymore. Green, Roos, Agarwal and Scott-Kemmis (2014) explain that innovation is in most part, incremental and novel to the institution, but usually, it already exists somewhere else. This form of innovation is crucial for improving productivity, safety, or the quality, and it needs a high degree of absorption by the institution. On the other side, there are also innovations, which cause drastic changes and are novel to the world. These radical innovations, like electricity or the internet, have extensive influence that accumulates over many years.

Green, Roos, Agarwal and Scott-Kemmis (2014) describe some important innovational drivers. Among them, there is the drive to lower the public service costs, especially in healthcare. Furthermore, there is the growing complexity of the policies and the increasing challenges, for example in education, in which the quality of the innovation will directly influence the economy, the society, and the environment. In addition, there is a drive to answer the high-quality demands of the public and provide more people-focused services. Finally, there is the wish of highly motivated and educated new employees, who want to change the world and contribute to their institutions.

During recent years, governments have identified that they need a better answer for the environmental and social challenges through the innovational objectives. Schot and Steinmueller (2018) claim that the issues as climate change, poverty or pollution are now governmental and innovational challenges and opportunities. The new technology development will increase the labour productivity and affect the economic growth, while other externalities may be regulated. Innovation policies enhance foremost the R&D that may positively influence the green economy through the investment in clean technologies. The growth and income redistribution can also open new work opportunities and lower the inequality

With this current speed and the scope of change, it is obvious that the PS cannot stay the same. Bertucci (2005) claims that the public sector needs to adjust its scope and innovate in order not to further disappoint the citizens.

Moreover, according to Bartlett and Dibben (2002), the growing fiscal pressure is additionally forcing the government to maximise their service-delivery efficiency and to discover and innovate in order to do less and achieve greater results. Audenaert, Decramer, George, Verschuere and Van Waeyenberg (2019) also argue that the importance of public sector innovation lies in its performance effect. Through innovation, PS institutions can make life quality better for everyone and create stronger and enhanced communities.

Green, Roos, Agarwal and Scott-Kemmis (2014) emphasise that there are two usual reasons for PS innovation and by that the extent of their scope differs. Either the innovation may be required as an answer to a crisis, or a group or an individual generates a specific innovation. Whatever the case is, these innovational benefits are in most circumstances temporary, as the crisis passes or the certain person who initiated the innovation moves on.

According to Palmer and Kaderdina (2017), there are five areas to which public sector innovation contributes. One of them is the optimal allocation of resources by which the government can satisfy the public requirements and use each unit of money prudently. Furthermore, the public sector can through smart regulation achieve a competitive advantage and have a vital role in real economy innovation and attraction of Foreign Direct Investments (hereinafter: FDI). In addition, as the knowledge is so rapidly created and

shared, the innovation helps the PS to stay up-to-date and keep the credibility. The innovation creates a completely unique working environment and engaging duties which are very attractive for new employees and act as talent retention much better compared to simple compensation. Finally, the governmental regulations are enabling the private sector, by directing the industry to be responsive, to innovate, and meet their objectives.

Innovation in the public sector is by its new methods delivering public value. As Francesc (2009) underlines, PSI is altering the way in which the public sector works in order to generate better outcomes. For example, some socially excluded citizens my use digital health-proofing software to receive a free medical examination from any location. Public sector innovation is also enabling effective cooperation with a variety of actors in targeting the resources as required. For example, in some countries, citizens from the rural area may receive the public service and their social transfers at the closest store or gas station without the need for long travel. Furthermore, it is contributing to a more open and inclusive society which trusts one another. For instance, many families are opening their housing facilities and helping the elderly without any family. These things are the true meaning of PSI, new approaches to achieve public goals, and more inclusive public policies.

Sun and Cao (2018) say that an innovation policy helps in solving market failure, building innovative networks, and establishes a fertile environment. More precisely, such a policy is created to stimulate competitiveness and increases the overall social welfare of a country. Mongey (2013) claims that innovation also induces an interim monopoly. Moreover, innovative institutions enhance employee morale and motivation, as well as organisational profitability and growth. Nevertheless, Bloch and Bugge (2013) explain that innovation may generate both positive and negative outcomes. For instance, public surveillance cameras can lower the crime rate, but it may also weaken the legality and trust in the PS.

Borins (2001) claims that the consequences of ineffective innovation are grave. The opposition and the media are always looking for some situation, which would expose the PS failures. Rigid controls are implemented by the government to decrease corruption, but they also, in many circumstances, constrain the innovativeness of the employees. Hence, with such asymmetric incentives, the PS is far less innovative compared to the private sector and may cause adverse selection in which the innovative persons reject a position in the public sector.

Another way of innovating that may impact the public sector is the public-private partnership. Nederhand and Klijn (2018) describe the PPPs as a popular method in which the government enhances their strategy, and by that improves the service provision and completes large infrastructural projects. This cooperation enables more innovative and better outputs for a lower cost, and represent an all-encompassing and lasting approach.

Importantly, the Organization for Economic Cooperation and Development (hereinafter: OECD) (2019) recognises three crucial trends in PSI. The first one is regarding the public sector visibility by which there are many innovative approaches to make the questionable invisible factors more visible. More precisely, many governments have, in the recent period, defined transparency as the main objective of their services and policies. However, still, many actions struggle with this openness, and a lot of insights are invisible for the citizens. The second trend is focused on opening-up the PS. The government was in the past very closed to any kind of public participation. With the development of new technologies, business models, and open data, the public sector had the opportunity to open their doors to the citizens. Thirdly, there is a trend of machines and algorithms. The public sector is innovating the approach to policy and regulation creation by preparing them to be machine-readable. Additionally, human attributes, senses, and the environment are being digitalised in order to generate innovative interventions and services.

2.2 Factors of innovation

There is no general classification of factors, which influence innovation, as these are more context-related. Sørensen and Torfing (2011) explain that regardless of the current interest in PSI, the comprehension of the public innovation sources is still inadequate.

Nevertheless, factors that may influence an environmental development in which PS innovation takes place, as underlined by Taylor (2018), include excellent project management and leadership skills, partnerships and especially the engagement of the citizens and the politicians. As noted by Borins (2001), innovation in the PS is commonly viewed as appearing at the top and only later being implemented by the public servants. However, findings state that innovation can come from all levels in an organisation and that also employees have to be financially stimulated for their innovative ideas.

Andersen and Jakobsen (2018) claim that in order to understand the lower level development in the public sector, it is also important to consider the external factors. These include several influences coming from the top, as the political pressure from the decision makers, horizontal factors as compliance pressures or the practice of other institutions, which facilitates learning.

2.2.1 Internal factors

Most studies emphasise that internal institutional factors influence the amount of innovation in an institution. Mongey (2013) claims that every successful institution requires an overall understanding of the situation inside of the institution, of the internal conditions affecting innovation. Bland, Bruk, Kim and Lee (2010) also emphasise that only creativity and an idea are not enough for innovation. Moreover talent and managerial skills are necessary in order to place these ideas into practice.

According to Mongey (2013), it is up to the management to support innovation initiatives and develop a common, entrepreneurial vision all over the institution. The management has many duties, and one of the most important should be to enable the successful development of an innovative culture in the institution. The management must also show their leadership skills and be able to motivate the employees to behave and think differently. Furthermore, it has to know how to make results through the employees and in the whole institution. Good management and excellent leaders can be created by removing administrative obstacles and through the improvement of their skills. The support and willingness of the whole management is a key for a successful implementation of the innovative institutional activities. The management also has to assure that all actors involved in the process have exceptional communication, which will, in turn, encourage the information flow and innovation. Borins (2018) claims that the PS institutions eventually answer to their political leaders and that this top management may act in a manner, which encourages or discourages innovation.

Mongey (2013) goes even more in detail and explains that it is actually the role of the senior management to be solution-oriented in an effective and uncomplicated manner, particularly when concerning innovation. The top and senior management are the ones who establish the entrepreneurial environment. The senior management in the PS institutions should be less risk-averse, able to motivate, consult innovative employees, and reward good performance and innovative ideas. Mongey (2013) also claims that middle management has a crucial role in stimulating innovation at the lower levels. Their main duty is to create an innovation-supporting environment.

Bertucci (2005) also emphasises the importance of the leadership factor. The managers have an active duty to lead the institutions towards innovation and successful project completion. A good leader is able to inspire a feeling of common responsibility and motivate its employees to accept the challenge. According to Head (2013), improvement of leadership should be an immediate objective for every institution. The only specific obstacle in this regard is that managers have issues with a commitment to innovation and tend to concentrate on a probable failure or risk. Many managers spend their energy and time while trying to cope with restrictive regulations, whereas they should work on enhancing service provision and public policy outcomes.

Rivera-León, Simmonds and Roman (2012) notice that innovation has horizontal and vertical dimensions, and therefore, leadership should ease the learning process at all levels. In order to improve the innovation dynamics, the planning should be aligned all over the institution, employees should be empowered to take initiatives, cooperation inside the institution should be present, and knowledge should be spread and shared. Additionally, the extent of innovativeness within the PS leaders depends on the country, the period, and even the context of that particular day. For example, in an environment, which is chaotic, and with limited resource, there is a much greater risk for the leaders.

According to the Organization for Economic Cooperation and Development (2017), people are the core of the PSI, and it is their dedication, which drives the innovation process. The research has suggested that innovative idea can come from the employee at an institutional level. Hence, PS institutions should aim to motivate, provide opportunities, and encourage their employees in innovating. Motivation is, in most cases, intrinsic, but it is also highly dependent on the working environment, whereas opportunity refers mostly on the provision of autonomy and resources.

Mongey (2013) suggests that one way to stimulate innovation is through rewards. Hence, it is the task of the management to provide motivational rewards to their employees. Unfortunately, in many public sector institutions, innovation is not rewarded, but rather are the failed attempts punished. However, the institutions are starting to change, and it is very important in this regard to choose an adequate reward system, which matches the institutional innovativeness.

Many internal factors of innovation are related to an individual, but the teamwork, collaboration, and support are also of vital importance. Scott and Bruce (1994) claim that all the institutional employees should be orientated toward creativity, open for change, and with a certain degree of tolerance regarding the diversity of the team. Furthermore, Rhee, Park and Lee (2010) explain that the team that innovates is not risk-averse and acts pro-actively will create a sort of entrepreneurial orientation inside the institution, which is perfect for innovation.

Mongey (2013) identifies that one of the reasons for innovation, in an institution, is to lower the costs, which is primarily achieved by improving efficiency and simplifying the hierarchical structure of the institution and the bureaucracy. The traditional system is not flexible nor able to adapt quickly, and this may hinder innovation. Moreover, the higher the bureaucratisation is, the less motivated are the employees.

The above-mentioned factors are altogether part of institutional culture. Rivera-León, Simmonds and Roman (2012) explain that the top management is crucial in setting the right strategic objectives and in planning the appropriate resources for the innovative activities. Moreover, it is probable that innovation will occur in institutional cultures, which stimulate and reward new ideas, as the award and recognition schemes are very strong innovation mechanisms. In addition, the importance lies in the culture of trust, accompanied by good communication learning from mistakes rather than blaming others. Finally, the institutional strategy should have a special focus on the recruitment, development, and retention of the employees on every level as this improves the innovational capacity. Likewise, Mongey (2013) underlines that the institutional culture is the key determinant of innovation, which provides the institution with a sense of identity.

The main institutional goals in the public sector are defined through regulations and governmental policies. Rivera-León, Simmonds and Roman (2012) explain that the PS

institutions need to be more flexible in order to respond to the changing environment. Furthermore, it is important to understand and research the environment in order to be innovative. Therefore, it is crucial to have a culture, which is proactive and forward-looking.

2.2.2 External factors

Besides the internal factors, there are also a few external factors that have to be taken into consideration when talking about innovation. Even though there are much more internal factors of innovation, these external factors may not be neglected as they often have a much larger impact on innovation. Never before was the public sector so much influenced by its external environment. Mongey (2013) explains that the public sector requires a system which is far more open and pursues open innovation in a way also to gather external knowledge and not only depend on internal ideas. Almost every public institution is confronted with heavy political regulations in its environment. Due to this, policies are regularly changed so that the public sector institutions must be able to adapt and react quickly. There are many stakeholders in the public sector, and each one of them can easily doubt or question any decision of the PS, which may influence them. Moreover, the public sector institutions are also influenced by some external events, as foreign trade or strikes.

According to Baxter, Schoeman, Goffin and Micheli (2010) the economic situation all around the world is exerting a large pressure on PS resources. This is one of the reasons why many regard innovation as a focal mechanism for keeping the required quality of the services and at the same time decreasing the costs. The financial recession is affecting the PS service provision. Hence, in order to maintain the necessary level of service quality, new innovative approaches have to be implemented.

Bertucci (2005) also thinks that all the democratic countries must innovate in their public sector in order to cope with the pressures of an opening economy and those of the demanding public. Furthermore, the responsibility of the PS to bring back everything in order is even greater in those countries who were in the war or had some ethnic conflicts. In such circumstances, public sector reform is the only right way of development, and innovation is the key to it.

Nowadays, there are more than ever before different opportunities for the PS to cooperate with external partners, especially in those areas where the public sector institution is not experienced but wants to innovate in. Lee, Hwang and Choi (2012) explain that this popular paradigm is called open innovation. Furthermore, many private sector companies have already taken use of the external innovation opportunities by which the initiatives are transferred from the internal resources to the external ones. This factor has also influenced the public sector innovation, which is moving to open innovation. The PS uses the benefits of an increasing number of new online intermediaries and citizen networks to increase the public value.

Among the discussed external environmental factors, Andersen and Jakobsen (2018) mention the political pressure as a factor of normative authority. This factor forces the institution either to implement or abandon the innovation by relating such a decision to institutional reliance on the resources from the political leader, as foremost the financial resources and those as a democratic authority and legal power. On the other side, Edler and Georghiou (2007) emphasise the importance of public procurement for innovation. Demand has the potential to be the key factor of innovation, but the role of demand is still not recognised in PS policies. Nevertheless, public demand, which is focused on innovative solutions, has enough potential to enhance the provision of public services and policies, innovative motion and favour from a range of related spillovers.

2.3   Barriers to innovation

The incentives for innovation in the private sector, as profit or the increase of the market share, are obvious. Green, Roos, Agarwal and Scott-Kemmis (2014) claim that the innovational context in the PS and its unique barriers and opportunities differ from those in the private sector. The barriers to PSI are in most circumstances result from the difference in the nature of innovation and the nature of the public sector. Bertucci (2005) emphasises that the extent of these challenges also varies, depending on who initiated the innovation process, the top management, or the employees. Tate, Bongiovanni, Kowalkiewicz and Townson (2018) explain that there are many barriers to effective PSI, especially in those situations where the need is known, but still, the crucial resources have not been dedicated to this cause.

Cinar, Trott and Simms (2019) explain that the identification of the innovation obstacles is a critical factor of success in the process. It was indicated that a common form of organisational barrier is associated with administration activities. In addition, the resistance or the absence of support, which in most cases happens due to the incertitude of the new organisational circumstances, is an important internal barrier. Additionally, the lack of crucial resources as money, the IT infrastructure, time, or even the inconsistency with the current values can influence the results of PSI.

The innovational barriers are, in most cases, internal. Sørensen and Torfing (2011) outline some general barriers to PSI. As the most influential challenges are the robust bureaucratic and legal regulations, absence of competition, and monetary incentives. There is also the barrier of complex public services, which are hardly modified and improved. Finally, the leaders of the PS and in many circumstances, the public sector in general, are considered risk-averse as their moves and especially failures are carefully followed by the media. Baxter, Schoeman, Goffin and Micheli (2010) also mention several PSI barriers. The resistance to change is recognised as the major obstacle to innovation in the public sector. Furthermore, the characteristics of the leaders, lack of competitive pressure, and the culture of risk aversion.

2.3.1 Bureaucracy

As the institution gets larger, so does the bureaucracy. According to Mongey (2013), bureaucratic processes may prevent innovation primarily because they include so many procedures that an innovation has to go through in order to be approved by the management. Even after that, it would take some time to review the proposals. Bureaucracy is not only the main barrier to innovation; moreover it is for many the main reason why employees may not suggest or continue with innovative ideas. Vigoda-Gadot, Shoham, Schwabsky and Ruvio (2008) consider the innovation and the bureaucracy, as a very odd couple as their basic characteristic are opposite. The bureaucracy is related to old, traditional, and controlled institutional models whereas the innovation is connected to creativity, autonomy, and commitment. Hence, innovation can hardly reach its full potential and succeed in a classic bureaucratic system.

Head (2013) claims that public institutional structures consist of layers of bureaucracy. As Bommert (2010) notices, the current closed bureaucratic procedures of innovating are not capable of providing the required quality nor the quantity of innovations required to combat the emergent policy challenges, as the financial crisis, climate change, obesity and many more. Other authors, Bland, Bruk, Kim and Lee (2010) also identify several problems around the countries for which the actions of the traditional government are not adequate. The public sector has to increase its innovating capacities. In order to do so, it is crucial that the PS establishes networks and partnerships with the private and civil sector. It is for sure not enough to only improve the existing solutions. Government has to transform the system, and as Thompson (1965) says, practice innovation as its core activity and focus on citizens.

OECD (2017) emphasises the importance of understanding the bureaucratic environment. The bureaucracy consists of internal rules and procedures. Hence, it exerts certain behaviour and governmental values. When the relationship of bureaucracy and innovation is taken into consideration, it is important to analyse the change in the behaviour regarding the rules and procedures. The public sector is obliged to be reliable and work consistently in order to generate a feeling of stability and control. The bureaucracy has different duties depending on the institutional level, sanctions, and available resources. The bureaucratic principles of regulated continuity can function as a barrier to innovation as it creates a risk-averse environment.

Bureaucracies are a structure of values and rules. OECD (2017) underlines that most innovators feel withheld by the bureaucracy and the risk-averse environment, which it creates. Bureaucracy, in fact, represents the essential public values as the stability, efficiency, transparency or accountability and neither of these is in its core, hostile to innovation. Nevertheless, some institutional structures have incorporated their characteristics of risk-aversion or complex hierarchy in their regulations, which prevents innovation. The hierarchical system within every bureaucracy primarily assigns tasks to

lower-level employees and by that increases the control and obedience toward the management that in turn may, in a great extent prevent and discourage the bottom-up innovation. Hierarchy can inhibit the skills from the institutional bottom to travel upwards. Nevertheless, there have been some efforts all around the world to conquer these barriers with some programs to prevent excessive bureaucracy or target some rule exemptions and rewrite them.

According to Francesc (2009), innovation is constrained by the manner in which bureaucracies are organised. It is the bureaucratic combination of regulation and hierarchy, which prevents any change. The institutional hierarchy lowers the possibility of new idea implementation by the top management and in turn, prevents the employees from suggesting and innovation. Moreover, the institutional regulations are used by the employees as a shelter so that even when something goes wrong, they cannot be sanctioned as the rules and procedures were respected and followed.

Francesc (2009) explains that public sector institutions tend to be bureaucratic, as they are excellent in standard operating processes. Bertucci (2005) underlines that the public administration has the potential to become a development instrument for a country. In this regard, the public employees need adequate training, the right skills, tools, and foremost a stimulating environment for the upcoming challenges. In order to attract the FDIs, a public sector needs especially efficient bureaucracy structures and an effective rule of law. The foreign investors take the factor of bureaucracy very serious when analysing an economy and usually require the bureaucracies to be revitalized.

2.3.2   Regulation

According to Bertucci (2005) long-term planning and dedication are the main contributors to innovation. Nevertheless, most governments cannot completely commit to an innovative cause due to large political pressures regarding their performance and certain political agendas. Green, Roos, Agarwal and Scott-Kemmis (2014) think that the legislative constraints are primarily restricting the improvement and innovation capacities. Mongey (2013) also underlines that the regulations and the abundance of rules are the main obstacles of public sector innovation. The main issue is that the managers and the employees are not criticized for being non-innovative but rather for trying to make a change, particularly if that innovative change fails. In the case of any procedural discrepancies, it is the top management, which has to face other regulatory bodies and the scrutiny of the citizens.

OECD (2019) claims that the public sector employees often think that the internal rules and regulations are preventing them from innovating. Still, there is no evidence that rules and procedures are actually blocking innovation. Very few countries have initiated some actions regarding this question, to simplify the governmental procedures and enhance economic activity. These countries discovered that the regulations on its own are not

necessarily preventing innovation; moreover their poor comprehension by the employees is what makes them think they are forbidden to innovate. Hence, it can be seen that there is a connection between the PS regulations, the employees' perceptions and interpretation and innovation. Unfortunately, the overall perception is that the only goal of regulations is to keep the status quo.

Moreover, the OECD (2019) explains that the PS rules usually define the means as what an employee is allowed to do or not, instead to be defining the ends as what the institution wants to achieve or to avoid. Therefore, the improvement opportunities are very often prevented by inadequate and old administration barriers. This rigid use of outmoded regulations and the absence of a will to contribute or make a change are restraining PSI. On a positive side, a program or initiative to reducing the regulations in order to promote innovation would enable the public sector managers and employees to dedicate more time to their basic duties and less to administration and robust procedures that obstruct innovation.

2.3.3   Competition

Competition is something that is not often related to the public sector, and that is with a reason. However, the absence of competition in the PS can largely hinder the development of innovation in the public sector. Mongey (2013) explains that the private sector companies are under constant pressure of competing with other rivals, whereas this is very rare in the public sector. Every actor in the private sector has some competition, and due to that, they have the obligation but also the desire to innovate. For the PS, this lack of competition may be the reason why the top management and other employees are resistant to change. Regardless of the fact are they or not innovative, public sector institutions will exist and serve the people. Hence, it is even to some extent understandable why they do not feel the need to innovate, as there is no challenge or pressure from the competition nor is there some need for development in order to survive. Still, in order to move forward, the innovativeness has to be considered as the expected behaviour of every single employee and not as only an exception.

During the past few years, the public sector has been making new partnerships with the private sector and non-profit organisations, more than ever before. Nevertheless, Bertucci (2005) claims that countries whose public sector was not ready and trained enough to go into this process had no actual benefit from the privatization. Budgetary pressures, which force the governments to lower the number of the employees, to outsource, and go into PPPs are mostly present. Still, there is not enough positive pressure that would foster innovation, but rather a pressure on cutting down current processes. The public sector must adjust to the new and developing environment, foremost redefine, and innovate its manner of operating.

2.3.4 Technology

The implementation and development of technologies have facilitated an absolute redesign of several service industries, by that increased the productivity growth, and created new and value-enhanced services. Green, Roos, Agarwal and Scott-Kemmis (2014) explain that this revolution has also increased the expectations of the citizens in regard to the efficiency, flexibility, and personalization of public services.

Tate, Bongiovanni, Kowalkiewicz and Townson (2018) claim that digital innovation is not something novel for the public sector, but until recently, it was confronted with several challenges. It was noticed in many countries all around the world that an increasing disconnection between the government and the people was arising and this presented a barrier to the well-functioning of the public sector and the provision of public services. In the beginning, the government simply initiated the digitization of its processes without adjusting the design of the information. Hence, the citizens had still to navigating through several PS institutions to receive the required service. An even greater barrier to digital PSI came from the environment when the public sector started outsourcing the technology. However, the result from this was not as expected as the information technology (hereinafter: IT) skills were undermined in the public sector and had several failures. This is why some PS institutions have recognised all the opportunities, which the IT can offer when used in the right and innovative way.

The public sector institutions may relay in a great extent on technology when initiating some innovation, but they simultaneously have to keep up with the technology in order to meet the needs of the citizens and be innovative at the same time. According to Head (2013), the innovational capacity in the PS is being prevented by challenges as the low access and use of digital communication tools, old and not updated systems, and by employees with insufficient experience and knowledge regarding the new technologies. Mongey (2013) emphasises that with this rapidly developing technology, PS institutions must be evolving all the time and following the recent trends. Nevertheless, the management must not implement every kind of new technology but only those which can be useful and which suite the institution.

2.3.5 Public sector employees

According to Audenaert, Decramer, George, Verschuere and Van Waeyenberg (2019) the current global challenges and the rising need for institutional innovativeness are making the job of public sector employees more demanding where personal innovation is required. By the conventional theory, the public sector innovation comes only from the top, but Borins (2002) believes that innovation also comes from the bottom of an institution, from the employees.

Mongey (2013) emphasises that employees may represent a barrier to innovation. The main reason for this is the fact that only a few employees can remain innovative during their whole career, which is a large obstacle for the institution in the long run. The role of the management is critical in this regard, especially in making sure that the right employees will continue working and being innovative. Unfortunately, the general attitude of most PS employees is that if something is not broken, there is no need to repair it. The more stable an employee's position on the work is, the less probable is that she or he will acknowledge innovative ideas or feel the need for change.

Furthermore, the role and influence of an individual during the process of PSI is not well understood, but as Meijer (2014) says, it is very important. The author emphasises that not everyone can become an innovator, but people can surely be motivated and taught to become more entrepreneurial. An entrepreneur is identified through the characteristics of pro-activeness, risk taking, competitiveness, and most importantly, innovativeness. Personal innovation in an organisation is, in most cases, connected to executive positions in which the leader creates a favourable development environment and drives the innovation. Nevertheless, as Meijer (2014) explains, the concept of an individual leader and innovator is gradually being replaced with a number of employees at different organisational levels who contribute to the innovation process.

Bertucci (2005) tries to justify the employee behaviour and explains that initiating some change in the system that has not been done earlier, which is the core of innovation, is a risk to some extent. This is why, the public sector employees can be reluctant to take a chance and try that risky action. The PS employees are often working under pressure, and in those circumstances they have not enough time nor desire to think about or apply some innovative strategies. Furthermore, public sector employees are almost never incentivised to think or act outside their given job duties, the regulations, or as it is said outside the box. They are also not motivated nor rewarded for their innovative ideas. Green, Roos, Agarwal and Scott-Kemmis (2014) argue that the crucial factors for innovation, as the employee empowerment and encouragement or the tolerance, are in the shade of a risk-averse and conservative institutional culture.

According to the OECD (2017) even if the regulation leaves some space for innovation, the public sector employees will probably not use it. This may, in general, be due to the absence of imagination or due to the discouragement for taking the initiative. The issue is that the award for an innovative idea in the public sector is in most situations smaller than the punishment for taking an attempt and failing, which shows how unconducive the institutions are to innovation. In general, this environment is rigid, rule-driven, and deeply procedural. Mulgan and Albury (2003) also claim that the public sector has traditionally provided higher sanctions for unsuccessful innovation than awards for outstanding ones. Moreover, even when the managers and employees would be encouraged and would have a chance to innovate, a scarcity of basic skills could immensely prevent the innovation process.

Head (2013) identifies several dimensions of barriers to innovation when taking into consideration the employees. The most important of them are the inadequacy of the recruitment procedure and the employee capabilities, insufficient empowerment, and lack of rewarding and of time for creative thinking. Francesc (2009) adds one other barrier, that people, in general, do not like change. Every change requires a lot of energy from the employee but also the whole institution. This does not only include the change of routines but moreover the mentality.

3 INNOVATION IN FEDERATION OF BOSNIA AND HERZEGOVINA

Efendic, Pugh and Adnett (2011) describe Bosnia and Herzegovina as a developing country with a very specific internal set-up. It is administratively divided into two entities, the Federation of Bosnia and Herzegovina and Republika Srpska, and into one autonomous region called Brcko District. The Federation of Bosnia and Herzegovina consists of 10 cantons, which are further divided into 79 municipalities and cities. Innovation is especially important for the public sector of BiH and its entities as it is a mean to address the growing budgetary pressure, with an improved service provision or a more efficient administration. PSI applies to all public sector areas and is driven by the need to introduce something new or make the existing situation better. This chapter will describe the environmental context of the Federation of Bosnia and Herzegovina and its current activities, which are of importance for the innovation.

3.1 Brief overview of FBiH

The complexity of the administration arrangement of the country is mostly reflected in the FBiH, due to the fact that it consists of four different levels. There are several overlapping jurisdictions between the government levels. In many cases, as Efendic, Pugh and Adnett (2011) underline, there is a present lack of communication and cooperation between these levels which ultimately provides inefficient results and lot of the same work being done twice. The institutions in FBiH still do not consider innovation as a national requirement or the mean of a constant improvement in public services, which is also seen in its previous strategic orientation.

According to the Federal Institute for Development Programming (hereinafter: FZZPR) (2018), the strategic goals on the development of the FBiH include the increase of the employment and labour productivity, enhancement of the competitive position and decrease of the operating costs. Successful implementation of these goals is a precondition for moving to the group of middle and higher income countries.

In order to have a complete picture of the FBiH and its areas of possible improvement, it is important to underline some crucial economic indicators which were emphasised by FZZPR (2018). According to the latest available data, in 2017, growth in Gross Domestic

Product (hereinafter: GDP) was recorded in FBiH. The nominal GDP in FBiH for 2017 equals to 20,502 million Convertible marks (hereinafter: KM). The nominal rate of growth is 4.9%, while the real rate of growth equals 3.1%. The composite structure of the GDP in 2017 was alike the 2016. The trade and processing industries participate with the largest share in GDP, by 14.8% and 14.1% respectively. Furthermore, the public administration, real estate business and the defense also significantly occupy a share of the GDP, while participation of the administrative activities amounts to only 1.1%.

FZZPR (2018) underlines that the total public revenue of FBiH increased for 757 million KM in 2017 and amounted to 8,778 million KM. Nevertheless, the total public expenditures have also increased and amounted to 7,694 million KM. The revenue surplus for 2017 was 1,084 million KM. Furthermore, the portion of public expenditures in the GDP has decreased compared to the 2016 and is 37.5%. The volume of trade in the Federation of Bosnia and Herzegovina has increased on both sides, but still, a significant trade deficit is present. The export was 16% higher than in the previous year and the import 14.4%.

In 2017, according to FZZPR (2018)there was an increase in consumer prices by 1.7%, whereas since 2012 until 2017 there was a constant downward trend for almost the entire period. When it comes to the salaries, on average the net salary per employee increased for almost 3% and amounts to 860 KM. In 2017, there were on average 505,201 employees in FBiH, which is also an increase of 9.35%, compared to the year before. On the other side, there was a decrease of 5.26% in the number of unemployed, which in 2017 equals 357,971. In this regard, the unemployment rate also decreased in 2017 from 45.2% to 41.5%.

3.2 Relevance of innovation in FBiH

According to FZZPR (2018), Bosnia and Herzegovina is experiencing a constant trend in GDP growth during the last five years. Still, this is not enough for a satisfactory living standard that would match the EU average. In this regard, the country must enhance its competitive position in international markets and the domestic living standard.

The Ministry of Foreign Affairs (2019) claims that there are a very low public sector and private sector innovation in BiH and the entities. The BiH industrial sector is one of the examples which support this statement. Namely, the energy, food production, and mining make almost 50% of the entire industrial sector in BiH, and their share of export in GDP is only 30%, whereas the imports make 60% of the GDP. This trade deficit is, besides others, a consequence of an insufficient investment in R&D and the low innovation capacity. Moreover, Bosnia and Herzegovina has almost no R&D centers, and the share of researchers across the organisations is under 2% whereas this portion is almost 60% in developed countries.

Figure 1 Participation in science and research allocations 2012–2017 from the FBiH budget (GDP %)
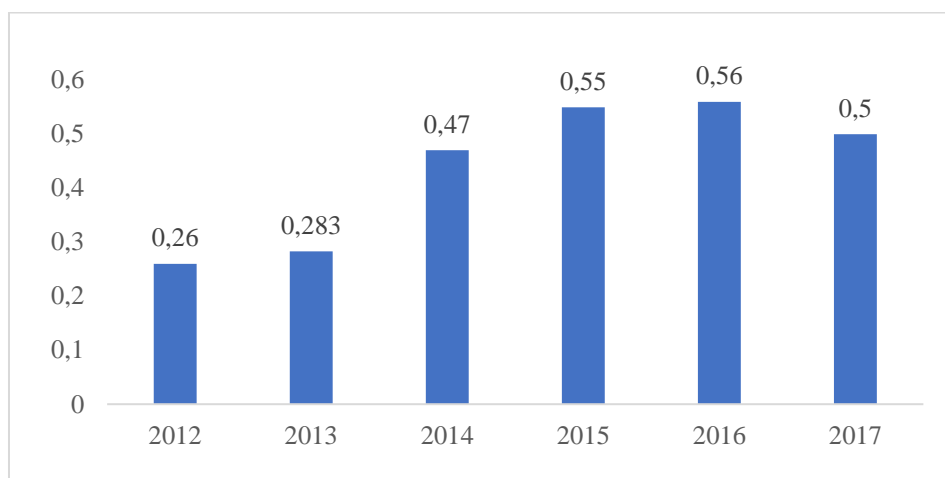
Source: Federal Institute for Development Programming (2018).

This non-innovative mindset is said to be present all over the public sector. According to FZZPR (2018), the country invests only 0.2% of the GDP in research and development, whereas the EU invests on average 2.4%. The government budget for R&D is mostly structured of own and funds from abroad. As Figure 1 on the previous page shows, the Federation of Bosnia and Herzegovina allocated in 2017, 0.5% of GDP for research and development. In the FBiH, about 10.5 million KM was allocated from the budget to R&D activities in 2017, which is an even slightly lower amount than in 2016. The structure of people employed in research and development primarily encompasses the researchers from the sector of education in 81.4% and then the private and the public sector with shares of 10.8% and 7.8%, respectively.

According to the findings of Schwab (2017), the final rank of BiH in regard to the XII pillars of competitiveness is 103 of 137 countries. When it comes to Innovation pillar, Bosnia and Herzegovina is overall on the 123rd place and the 123rd place in the category of public sector procurement of high technology. Furthermore, Schwab (2017) notices that there is no significant increase in the number of patents in the country. In 2017, Bosnia and Herzegovina did not grant any patent. The country is significantly falling behind the countries from the region, particularly Slovenia that has 92 patents, whereas Croatia has six patents and Serbia one. Compared to other countries, Germany is on the very first place with 18,813 patents, after which there is Switzerland with 3,929 licensed patents and Austria with 1,465.

3.3   Development strategy 2021–2027 in FBiH

The Federal Institute for Development Programming (2019) underlines that most public sector institutions in FBiH lack a specific innovation strategy and objectives that are

specifically related to innovation. Furthermore, there is no interest in innovation, nor in the improvement of the training and recruitment process.

The Government of FBiH has recently initiated a planning process of great importance for the whole Entity. Namely, the Development Strategy of the Federation of Bosnia and Herzegovina 2021–2027 will be created. The Federal Institute for Development Programming (2019) emphasises that this will be the first strategy for the FBiH ever, as a similar process was started 10 years ago (for the period 2010–2020) but that strategy was never completed nor adopted. This document will represent the foundation for the creation and harmonization of lower-level development strategies and other strategic documents. It will serve as the focal socio-economic platform for development. Importantly, the Development Strategy of Federation of Bosnia and Herzegovina will reflect on the national priorities related to the EU integration process and the Sustainable Development Goals (hereinafter: SDGs) from the Agenda 2030.

Additionally, the Development Strategy of the Federation of Bosnia and Herzegovina will define the overall vision and goals of the development in FBiH and introduce a strategic framework for domestic and foreign financial resources. There concept of public sector innovation in FBiH will be incorporated in this document in almost every thematic subgroup and through a focus on Sustainable Development Goals and the smart specialization principles. Moreover, the strategic priorities defined by this document will enable an easier inclusion of innovation in the daily activities of the PS institutions in FBiH.

3.4 Agenda 2030 and innovation in FBiH

In September 2015, the UN member countries had come together and adopted the Agenda 2030. The Ministry of Foreign Affairs (2019) describes this as a first step toward the future of sustainable development. The Agenda 2030 was created in order to respond to almost all current global challenges. For this very first time, all the world leaders have committed themselves to a sustainable future, which leaves no one behind. The Agenda 2030 or the Agenda of Hope, places the human being in the center of the development process. It invites the PS to create and adopt regulations that are inclusive, respect the human rights, and meet the citizen needs.

Even though Bosnia and Herzegovina has committed to the SDGs in 2015, according to the Ministry of Foreign Affairs (2019), a more comprehensive and all-encompassing preparations for the Agenda 2030 have started two years ago with the aim to involve all governmental levels in this process. The complex administrative system of the country is influencing the progress. Nevertheless, the advancement is considerable, given the fact that BiH has over 160 ministries only on the national level and more hundreds of on the lower levels. A lot of work will still be dedicated to the SDGs in the upcoming period, and this

alignment will be even more demanding in the Federation of Bosnia and Herzegovina due to the three levels of government.

FZZPR (2019) underlines that the main thematic groups of the Development Strategy of Federation of Bosnia and Herzegovina, the economic development, sustainable infrastructure, social development, good governance, and spatial development, corresponding to the SDG thematic areas. As already mentioned, the importance of innovation will be highly recognised in this document. There are two very important sub-groups, which focus on smart specialization and public services. These two are primarily combining the principles of good governance and IT with public sector innovation. Additionally, sustainable development goal nine, which aims to foster innovation, is incorporated in these two groups. This is considered very important for Federation of Bosnia and Herzegovina, especially as the promotion of sustainable industries and the investment in research and innovation, are the crucial ways of facilitating sustainable development.

4 EMPIRICAL RESEARCH

The innovation in the public sector cannot happen on its own. It is crucial to identify the issues in the public sector, work on their solutions, and implement specific ideas. The public sector institutions have to focus on the processes which may support innovation. The innovative practices are becoming increasingly popular in the public sector of the Federation of Bosnia and Herzegovina; nevertheless it is little known of what public policies and procedures may be used in order to combat the innovation barriers and to increase the institutional innovation capacity. This chapter will explain how the research was conducted in order to obtain a complete picture of innovation in the public sector in the FBiH, with a special focus on the barriers and factors which impact the innovation in FBiH.

4.1 Research approach and the content

This research is in basic exploratory, and through its mixed approach, it uses both qualitative and quantitative research methods in order to analyse the innovation in the public sector in the FBiH. In order to perform this research, in the beginning, secondary data was obtained through an extensive literature review on public sector innovation in the country, region and the world, within the available academic journals, publications, newspapers, books, and the internet. The primary data was obtained through semi-structured interviews with the management of several identified PS institutions and a survey with close-ended questions was completed by the employees of the FBiH PS institutions.

The Table 1 in Appendix 2 shows which research methods were used to answer every single research question. The research used a mixed approach (qualitative and quantitative

methods) because different research questions required different research methods in order to be answered appropriately. Hence the reliability and validity of the research were enhanced and the conclusions have been provided in more detail. Additionally, this approach provided more understandable answers to each research question. In order to obtain an overall understanding of the institutions in the PS of the Federation of Bosnia and Herzegovina, personal and collective innovational perceptions were collected.

Additionally, a review of the literature will be conducted in order to identify the hypotheses relevant to the achievement of the objectives of this thesis. Consequently, following Lewis, Ricard and Klijn (2018), two hypotheses are proposed:

H_1: Innovation drivers influence innovative behaviour in public sector institutions.

H_2: Networking influences innovative behaviour in public sector institutions.

The measurement of indicators for innovation drivers and networking will be adopted from Lewis, Ricard and Klijn (2018), as well as a method for summation of the score. Besides, following Fernandez and Moldogaziev (2012), the below stated hypotheses are proposed:

H_3: Encouragement influences innovative behaviour in public sector institutions.

H_4: Empowerment influences innovative behaviour in public sector institutions.

H_5: Employee information influences innovative behaviour in public sector institutions.

H_6: Rewarding influences innovative behaviour in public sector institutions.

The measurement of indicators for encouragement will be adopted from Coveney (2008), for the empowerment from Abukhait, Bani-Melhem and Zeffane (2019), for the employee information and innovative behaviour from Singh and Sarkar (2019) and for rewarding from Fernandez and Moldogaziev (2012). The control variables will be age, education and job position.

According to Kurz, Hüsig and Dowling (2018), innovation is usually arising from some group of experts or higher-level employees in the public sector, while neglecting the potential of other ordinary employees. In this regard, the research examined the innovative behaviour of lower-level public sector employees and compared that data with the answers of the top management.

Six indicators, innovation drivers, networking, encouragement, empowerment, employee information, and rewarding were used to analyse the innovative behaviour. The definition of innovative behaviour was adopted from Kurz, Hüsig and Dowling (2018), as a deliberate creation, introduction, and implementation of helpful novel ideas or processes at work by an employee. In the beginning, the employee identifies a problem or opportunity and offers a resolution or a novel idea. After that, the employee introduces that idea to the

supervisor in order to induce some interest and receive support and approval. Finally, in ideal cases, the employee implements the idea on the level of the department, institution or even beyond. As the innovative behaviour includes several processes, the employees have to express different behavioral forms at different stages.

4.2 Methodology

As already mentioned, the research was completed through a mixed-method approach, which required both qualitative and quantitative analysis in order to explore the concept of innovation in the PS. The sample consisted of all PS institutions in FBiH, including 16 ministries, 2 agencies, and 11 institutes. The questions for the qualitative and quantitative research were adopted from previous internationally recognised researches and were appropriated to the context of the public sector in the FBiH. These questions were trying to answer the research questions and gather some recommendations from the public sector regarding innovation.

4.2.1 Qualitative research

The interview, a qualitative method, was used as a primary source of this research and a way to enhance the quantitative findings. The qualitative research provided more insight into the opinions and everyday reality of the public sector managers. The interviews enhanced to some extent, the comprehension of the quantitative data and facilitated their interpretation. The interview was conducted in Sarajevo in the period from the 10th of July until the 25th July, 2019. During that period, all the interviews with public sector managers were completed in their respective institution. In the majority of cases, the interviewees were the top managers, but when they were unavailable, the interview was held with an employee recommended by the top manager, usually with the middle managers. It was crucial to gather detailed insights from the high-level employees in the public sector as they should know for the best the overall situation in their institution.

Furthermore, beside the collective view of the management, personal attitudes on innovation were collected, and additional questions could be asked regarding the specific innovative initiatives in their institution. As one institution in FBiH is responsible for development planning and management, with a focus on innovation, more than one interview was held with the management. Additional insight, during the same period, was attained through an interview with a member of academia, an employee within the United Nations Development Program (hereinafter: UNDP), and a leader of the City Innovation Lab. In total, 11 high-level employees were interviewed.

Several steps preceded the organisation of the interviews. By using the federal database of public sector employees, according to their position, managers from every PS institution were selected. These were later on contacted via the telephone, in order to receive an immediate answer and explain the importance of the research in more detail. The meetings (the time, date, and location) were arranged with the managers who were available and

ready to talk about innovations. Additionally, the interview was arranged with the managers from three other institutions, from the University, an international organisation, and the local level public sector institution, based on their publicity regarding the involvement in innovation and public sector reforms.

During the interview, a voice recorder was used, and simultaneously notes were made. The interviewees were at the beginning asked for their consent regarding the voice recorder and a definition of public sector institution was explained to them. All the interviews were held in the respective institutions of the managers, which resulted in a relaxed atmosphere and an overall impression to speak more freely. Moreover, the formulation of close-ended questions enhanced the feeling of a conversational, unreserved tone.

The interview questions were formed with a lot of attention and prior analysis of similar qualitative researches on innovation. Special attention was given to an objective phrasing of the respective questions. In order to test the questions, a sample interview was conducted with one manager from the Federal Institute for Development Programming in order to verify if there are any redundant questions, and if everything is understandable. In this regard, it was only suggested to offer some examples when asking the questions, as for instance, about the innovational barriers.

Furthermore, every institution and their web pages were analysed before the interview in order to get an overall picture of their current activities and duties and to appropriate the questions more closely. The research included two forms of questions. One form was for the managers in the public sector, and these questions are presented in Appendix 3. The other form was appropriated to the leading employees of other public sector institutions within the local governments in FBiH, and UNDP. Additionally, the questions for this group are outlined in Appendix 4.

The interviews were conducted up to the saturation point or the point at which the answers from different interviewees are being repeated and nothing new is found out. The saturation point for this qualitative research was 11 interviews. After the interviews were carried out every audio recording was transcribed. More precisely, this included a word by word typing of everything from the interview. Once this was completed, the data was inputted into the NVivo 12 software, and the information was analysed and interpreted.

4.2.2 Quantitative research

The quantitative research aimed to obtain the opinion of the public sector employees on the research questions. Moreover, in order to explain in detail, the process of quantitative research, it is important to define the dependent and independent variables. The survey consisted of five parts with separate question that were reflecting the research variables. The control variables of this research are the age, education, and job position of the public sector employees.

When it comes to the innovative behaviour of the public sector employees as the dependent variable, it is important to underline that many studies have related this variable as a key for enhancement of the efficiency and service quality. Nevertheless, Miao, Newman, Schwarz and Cooper (2018) claim that this variable has received finite attention, especially when considering the fact that innovative behaviour may impact the public sector effectiveness and efficiency. According to Abukhait, Bani-Melhem and Zeffane (2019), the innovative behaviour is characterised by the creation, development, and adoption of a new idea which further results in improved goods, services, and processes. Additionally, Singh and Sarkar (2019) emphasise that innovative behavior affects sustainable institutional development.

This study used six measurement models for the innovation drivers, networking, encouragement, empowerment, employee information, and rewarding. The indicators were adopted from other valid empirical researches. In order to assure that the indicators are relevant for this research, their content and length were carefully analysed. Some indicators were simply translated in the local language, but others had to be adjusted in order to be comprehensible.

Innovation drivers are the first independent variable of this research. Lewis, Ricard and Klijn (2018) define them as different factors which support or hinder the public sector innovation. These factors can be of contextual nature, procedural ,or structural. Some of the examples include the institutional culture, the quality of the manager's proposal, or the impact of some external factors, as the economic crisis.

The second independent variable is networking. According to Lewis, Ricard and Klijn (2018) this is the frequency of collaboration and communication outside of the institution. Networking has been recognised, a long time ago, in the private sector as an innovation facilitator, but recently, it has been gaining increasing attention and relevance also in the PS. Furthermore, Booyens and Rogerson (2017) explain that networking has a vital role in obtaining knowledge, simplifying the learning experience, and improving the technological capacities of an institutional innovation process. Through the collaboration and communication in the public sector, as Godenhjelm and Johanson (2016) say, many challenges and issues can be resolved, and ideas can be improved, which are not possible through the traditional system. Some governments have even gone a step further and have formed innovation networks which aim to bypass the barriers through public sector communication. Francesc (2009) mentions that these networks primarily aim to enhance learning, which is in return focal to innovation.

Lewis, Ricard and Klijn (2018) notice that leadership, the values and capabilities of the managers, can immensely impact change and innovation. Daglio, Gerson and Kitchen (2014) describe leadership as a key factor of the institutional culture, in which a leader serves as a role model and which behaviour and actions directly influence the ethical behaviour of the employees. As Nusair, Ababneh, and Kyung Bae (2012) explain,

governments all across the world are having many challenges when it comes to satisfying the public demands. In this regard, the PS institutions are forced to adopt a new form of leadership which motivates and encourages its employee's participation and their innovative behaviour through the appropriate institutional environment. This encouragement is the third independent variable and Kurz, Hüsig and Dowling (2018) claim that encouragement influences the design of the job and by that also the employee motivation. A challenging and supportive working environment offers the employee a sense of autonomy, freedom, and control, which increases their intrinsic motivation and their innovative behaviour.

Employee empowerment is the fourth independent variable which has many definitions, but in general, it is defined as giving the autonomy, responsibility, access to resources, and the required information to the employees in order for them to perform some duties. Fernandez and Moldogaziev (2012) mention that the employee empowerment in the PS can enhance the institutional performance by looking for new methods of altering some process errors. Moreover, there are two perspectives on empowerment, the managerial in which the manager shares the power with the employees and the psychological in which the empowerment an internal state of mind is, with increased intrinsic motivation. Nevertheless, Abukhait, Bani-Melhem and Zeffane (2019) explain that the results from the studies on the relationship among empowerment and innovative behaviour differ. Some findings indicate a positive relationship in which a delegation of authority creates motivation, innovation, and trust in the employees. Other findings show an insignificant, negative relationship in which the employees are confused in front of an issue.

The fifth independent variable, employee information which also refers to the complete process of data, knowledge, and learning, is for Daglio, Gerson and Kitchen (2014) the essential element for the improvement of innovation. The Organization for Economic Cooperation and Development (2019) defines knowledge as the timely availability of information which enhances the innovative institutional capacity. Furthermore, Abukhait, Bani-Melhem and Zeffane (2019) explain that knowledge sharing includes a mutual exchange of task information and working expertise in which it enhances innovative employee behaviour and fosters critical thinking.

The final independent variable is closely related to recognition and motivation on the work. According to Francesc (2009), rewarding is a way to express recognition, to enhance PSI, to raise awareness, increase the sense of belonging together, and to enhance the citizen's perception of the PS. Kurz, Hüsig and Dowling (2018) underline that in regard to rewards, the extrinsic motivation is often taken with reserves, as in most cases, the intrinsic motivation shows a positive relationship with innovative behaviour. Furthermore, Kim (2006) claims that the public sector employees, contrary to the private sector employees, are in general, driven by the sense of service and their concern for the citizens. People willing to serve the interest of the larger public, usually prefer intrinsic over the extrinsic rewards. Mulgan and Albury (2003) regard the monetary rewarding as a weak innovational

motivator in the PS, whereas recognition, accompanied by pride and the sense of contribution, is considered much more effective.

All the survey questions were adopted from the existing validated studies and were formulated with special care in order to prevent double meanings. The questions reflecting innovation drivers and networking were made following Lewis, Ricard and Klijn (2018). Encouragement was measured by using questions recommended by Coveney (2008). The questions for employee information were adopted from Hoof, Ridder and Aukema (2004). Moreover, empowerment and rewarding were measured following the example of Fernandez and Moldogaziev (2012). The dependent variable, innovative behaviour, was measured with the questions adopted from Singh and Sarkar (2019).

The introduction to the survey contained the purpose of the survey and a short definition of PSI in order to avoid any confusions. The complete survey is outlined in the local language in Appendix 5, while the questions in English are analysed as part of the survey findings. It is important to underline that the survey was completely anonymous.

A sample survey was piloted two days before it was officially sent to all public sector employees in the Federation of Bosnia and Herzegovina. Its validity and the comprehension of every variable was tested by consulting four Expert Associates from the public sector in the Federation of Bosnia and Herzegovina. The survey was sent as a link through the email so that these persons could directly send their comments and opinions. According to the feedback, a few corrections were made where some questions were rephrased. The survey was sent on the 17th of July 2019 to 1,799 available and valid email addresses from the Address Book, through the Lime Survey Software which is available at the School of Economics and Business in Sarajevo. The survey was open for two weeks until the analysis was conducted. On the 24th of July, a reminder was sent to the addresses which have not seen the email.

In order to perform the quantitative analysis and measure the staff perception on different innovation factors in the PS, a five-level Likert scale was used in the range from 1 (absolutely do not agree) to 5 (absolutely agree), as well as in the range from 1 (absolutely hinder) to 5 (absolutely support). Additionally, for the frequency in internal and external communication of PS institutions, a range from 1 (never) to 5 (daily) was used. The data from the Lime Survey was imported in Excel, and the answers were coded, for example, for female the code 1 was given and for male code 2.

The database was for further analysis exported to SPSS 22. Descriptive methods and the comparative analysis were used to explore the environment and initiatives regarding innovation in the Entity and the country. Confirmatory factor analysis (hereinafter: CFA) and structural equation modeling (hereinafter: SEM) were used for the analysis of quantitative data using the SPSS 22 and Lisrel 8.8. The relevant data and important results were presented on graphs and in tables.

4.3   Sample

The objectives of quantitative and qualitative research differ. According to Mongey (2013) the probability sampling is in most cases used in quantitative research, and in the case of qualitative research, the non-probability sampling can be used. Furthermore, many studies regarding the implementation of public sector innovation consider an institution as a homogeneous entity and believe that all the attitudes toward innovation are the same over the institution. Nevertheless, De Vries, Tummers and Bekkers (2018) underline that the institutions consist of different groups and units with distinct goals and values. This is why it is important to take into consideration various PS domains and actors. Consequently, this research aimed to have a sample representing as many as possible public sector areas and employees.

Surveys which are conducted through, as Fricker (2008) explains, a mailing list-based sampling structure may be considered in the same manner as the traditional survey structures. In this case, random sampling is used, and only the e-mail address from each sample unit is required. This approach is in most cases used and appropriate for broad homogeneous groups with publically available e-mail addresses, as the PS institutions.

The main criteria for the population in this research is that the person is a public sector employee in the FBiH. The minimal size of the sample was set at 200 participants, which is as Hair, Black, Babin, and Anderson (2010) emphasise, enough for the multivariate analysis. The contacts of all public sector institutions and almost all their employees in the FBiH were collected through the available mailing address book. The survey was available and open until the 3rd August 2019. During that time 291 surveys were completed and submitted, while the interesting fact was that 501 employees opened the survey but have not submitted it. The response rate from the survey was 16.18%.

Figure 2 Representation of gender in the survey

Source: Own work.

36
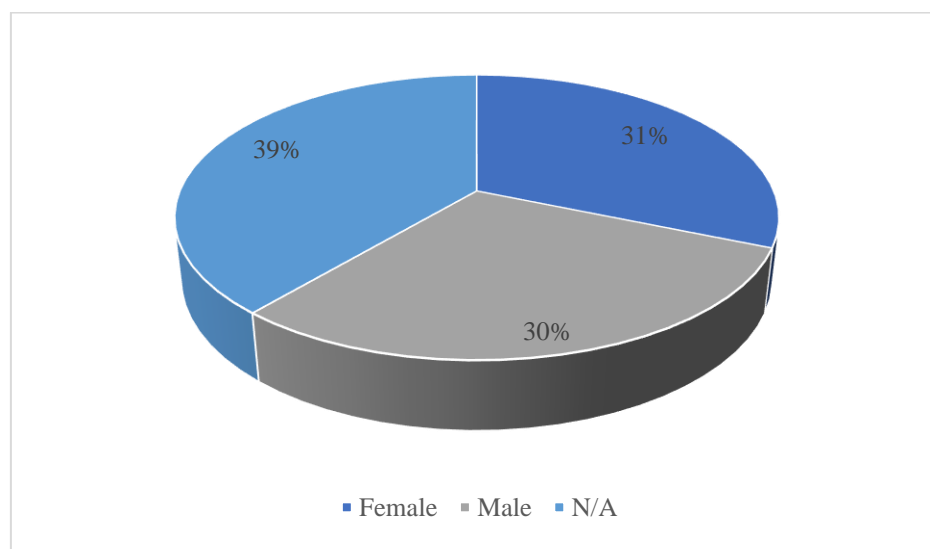
Besides the questions regarding the analysed variables, the survey consisted of also some demographic questions in regard to gender, age, years of experience, education, and job position. These questions provided some additional information on the general profile of the respondents, which can be used for further comparison.

When it comes to the survey demographics, it can be noticed in Figure 2 on the previous page that both genders are almost equally represented. There are 31% female responses and 30% male responses. The interesting thing is that the largest portion of respondents, 39%, did not want to answer the question of gender while they have answered the other demographic questions. According to the Civil Service Agency (2019), the largest share of employees in the Federation of Bosnia and Herzegovina, around 20%, is between 56 and 60 years old, while the lowest portion, 0.2% of employees, are those with age below 25.

Figure 3 Age of the participants in the survey, by percentage
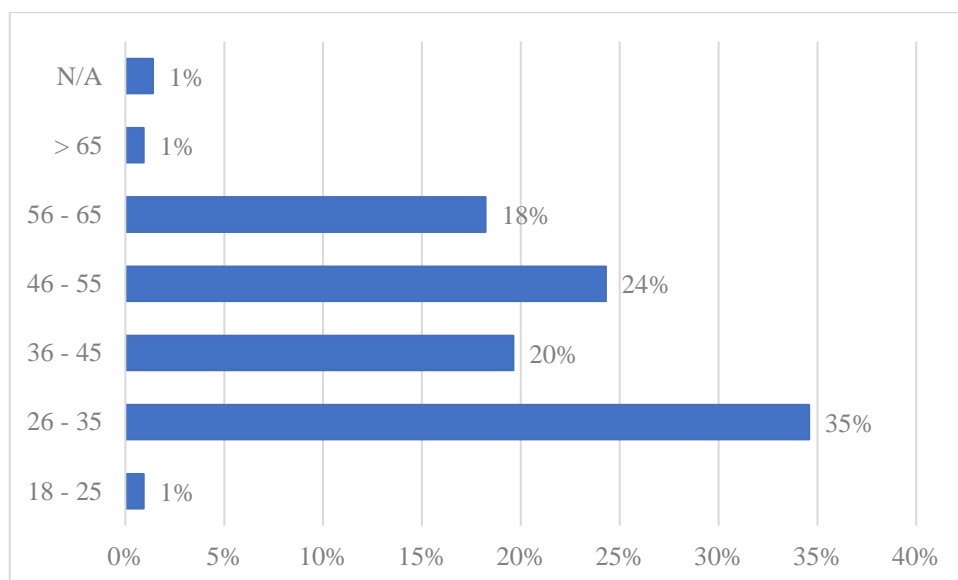
Source: Own work.

Most surveys, as the Figure 3 shows, were answered by the employees with age from 26 to 35 years, this age group is among the least represented in the total age structure of public sector employees in the Federation of Bosnia and Herzegovina. Accordingly, it may be noticed that especially the younger generations, and to some extent the middle generation, are either more willing to help others to conduct research or are interested in innovation and the improvement of the public sector.

Figure 4 Working experience of the participants in the survey, by percentage
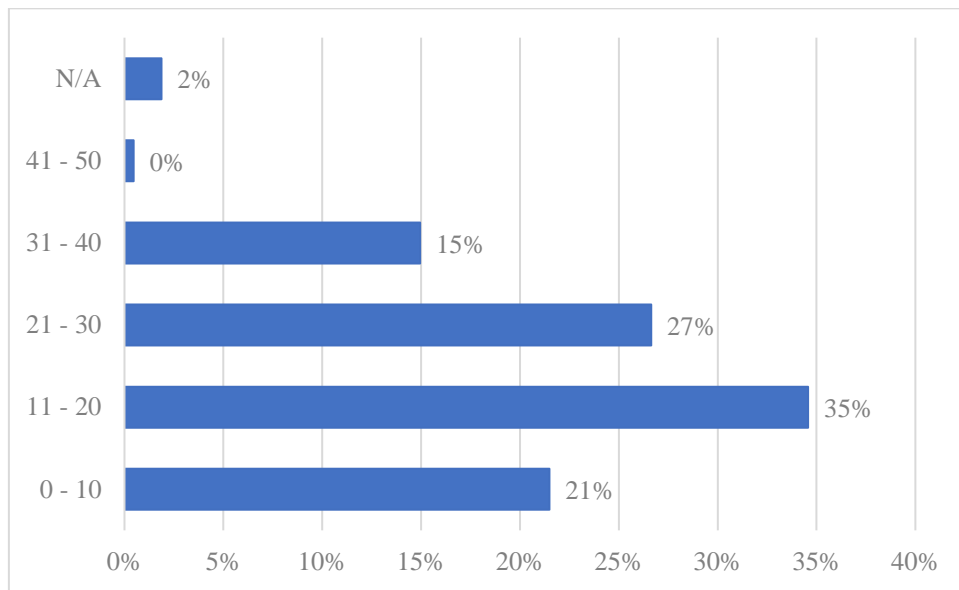
Source: Own work.

The working experience may influence the desire to change and the working energy. Figure 4, shows that most of the respondents, 35%, have 11 to 20 years of the working experience. No one with experience of more than 41 years has answered the survey, which can be justified by the fact that people with working experience above 40 years usually go to retirement.

Figure 5 Education of the participants in the survey, by percentage
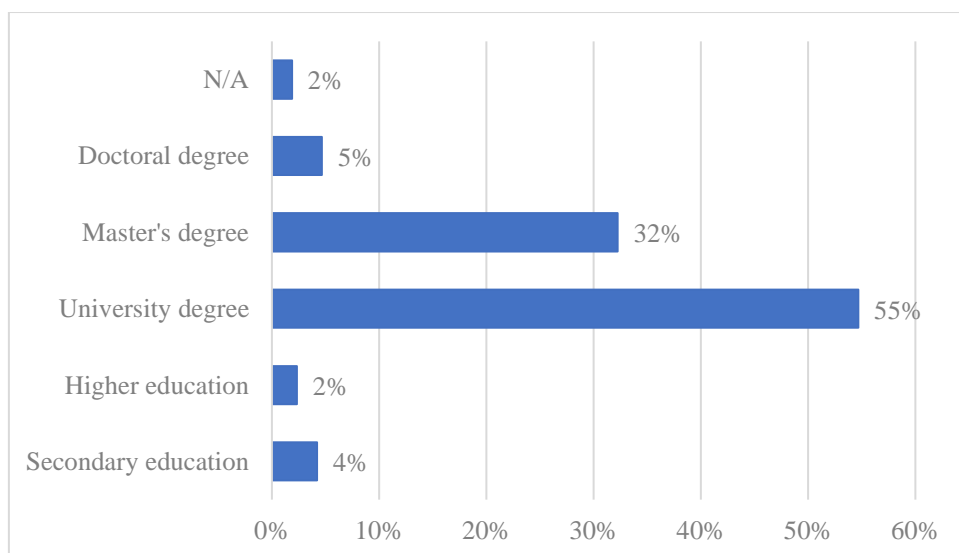
Source: Own work.

As it was previously mentioned, education may be one of the factors influencing innovation. Most of the respondents, as Figure 5 shows, have a University degree.

Figure 6 Job position of the participants in the survey, by percentage
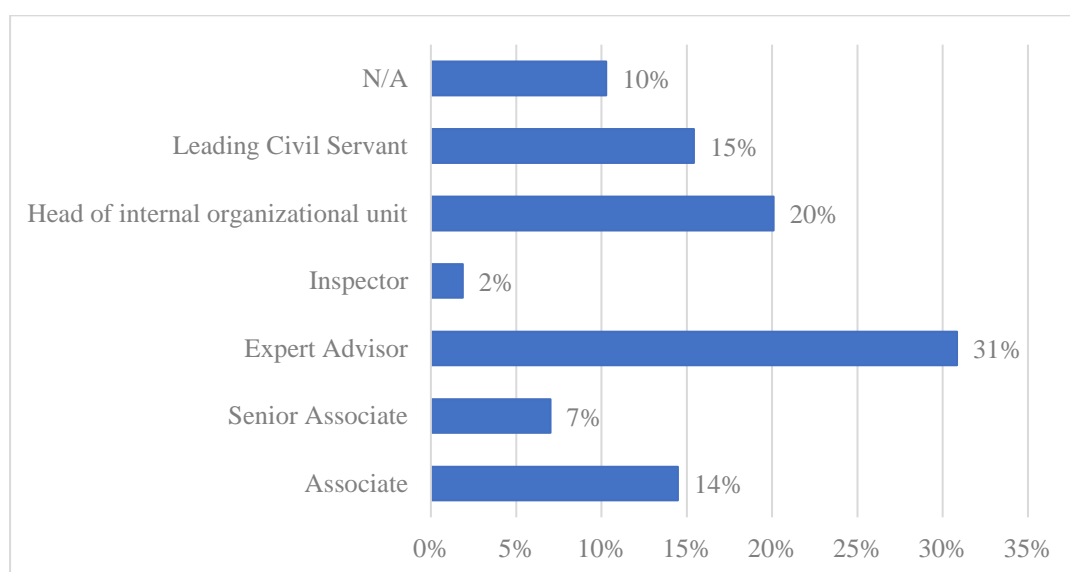
Source: Own work.

Kurz, Hüsig and Dowling (2018) explain that the potential to the innovation of those employees who are at the lower and middle-level is in many cases overlooked. As Figure 6 shows, most responses were collected from the Expert Advisors from the public sector institutions in the FBiH. This position in the PS requires at least 3 years of working experience. In overall, 15% of the answers came from the managers, and 74% came from the employees in the public sector, while 10% did not want to specify their position.

Table 1 Interviewees positions and institutions

Institution	Interviewees
Federal Institute for Development Programming	Assistant Director for development planning
	Assistant Director for economic, regional and social development analysis
Federal Ministry of Justice	Secretary of the Ministry
Ministry of Agriculture, Water Management and Forestry of the FBiH	Secretary of the Ministry
Federal Civil Service Agency	Head of the HR department (recommended as the replacement of the top management)
Federal Institute for Public Administration	Director
Public Administration Reform Coordinator's Office (FBiH)	Head of the department (recommended as the replacement of the top management)
Gender Center FBiH	Assistant Director
City of Sarajevo – Innovation Lab	Head of the Innovation Lab
School of Economics and Business in Sarajevo	Professor
UNDP	Policy Specialist

Source: Own work.

The sample of the qualitative research included the leading public sector employees, which were mapped from the address book. The sample consisted of 11 managers with which the interview was conducted. As some managers were not available for the interview, their opinion was collected through the survey.

Table 1 on the previous page, represents the positions of the managers and their respective institutions. On average, the interviews with the managers from the public sector lasted about 30 minutes, while the interviews with the additional three leaders lasted for about 20 minutes.

Figure 7 Interviewees working experience, in percentage
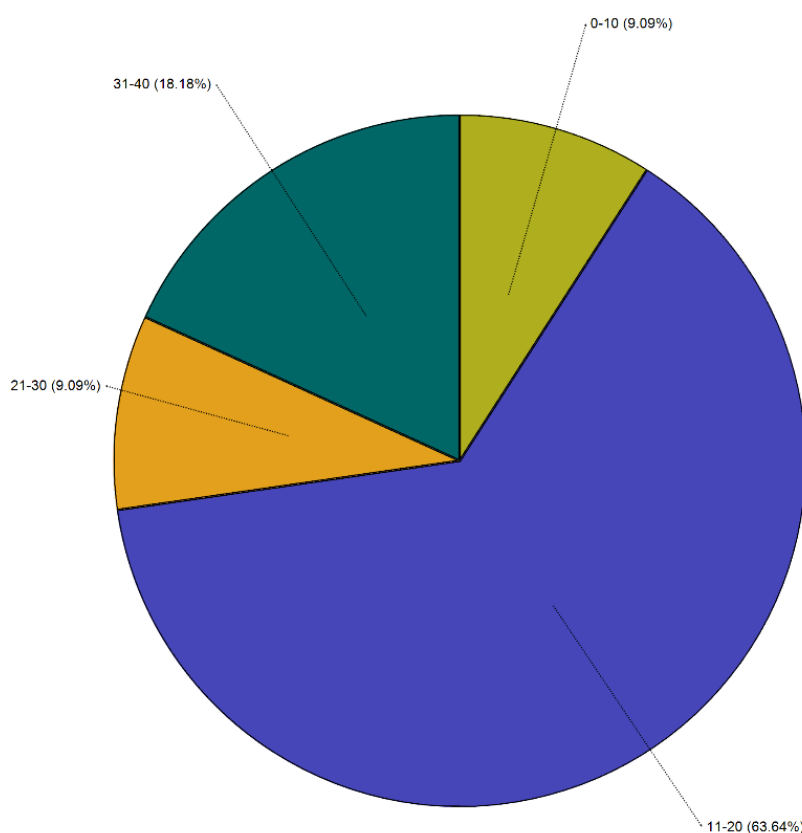
Source: Own work.

The age of the interviewees was between 32 and 60 years, and the average age was 43 years. The duration of working in the public sector was between eight and 38 years, on average, the working experience in the PS was 20 years.

In Figure 7 it can be noticed that most of the interviewees, 63.64%, have a working experience between 11 and 20 years which is enough to create an overall picture of the public sector and to be familiar with the current situation in the Federation of Bosnia and Herzegovina and the country.

Furthermore, the main reason for choosing the additional three interviewees, beside the curiosity of the external expert opinion on the public sector innovation, was due to the fact that their background regarding innovation was very interesting for this research. The head of a department in the City of Sarajevo initiated the major innovations in Sarajevo, which included a variety of new projects for the city, the Innovation Lab and the "Smart City" initiative which consists of all local, cantonal and federal level representatives, the private sector and the civil sector.

The Professor from the University in Sarajevo is a participant of the Swedish Innovation Leaders Program for the improvement of PSI, one of the organisers of the Sarajevo Innovation Summit and many other Conferences which aim to enhance entrepreneurship and development. Finally, the Policy Specialist is a person who worked for almost 25 years in the Federal Ministry of Justice and is now working within the United Nations Development Program on the improvement of the strategic planning system in the Federation of Bosnia and Herzegovina.

5   DATA ANALYSIS AND DISCUSSION OF RESULTS

The analysis of the collected data and its results will be presented in this chapter. The data analysis will consist of several steps, and different statistical methods will be used, which will be explained in detail. Based on the obtained results, some recommendations to public sector innovation will be provided and the general characteristics of the PS in regard to innovation will be outlined.

5.1   Interview findings

The results of the interview went much beyond the regular answers on the questions, they offered direct insight into the daily operations of public sector institutions, and a genuine perception of PS employees could be recognised. The qualitative data which was obtained through the interviews was coded and analysed through NVivo 12 in nine categories or codes which were directly linked to the research questions and were further coded into five to ten nodes. These categories include the barriers to innovation, barriers to personal innovation, drivers of innovation, best methods of rewarding, motivational factors, innovational initiatives, institutional structure, manager's opinion on innovation, and recommendations.

In order to identify the innovative initiatives and drivers which support innovation in the public sector, two categories were formed. Namely, the category for the drivers of innovation and for the innovational initiatives. The drivers of innovation were coded by the most frequent sources recognised during the qualitative analysis. These include the leader, employees, pressure from above and international obligations, middle management,

projects and partnerships, and the intrinsic energy, respectively by the extent of every driver.

Figure 8 The drivers of innovation
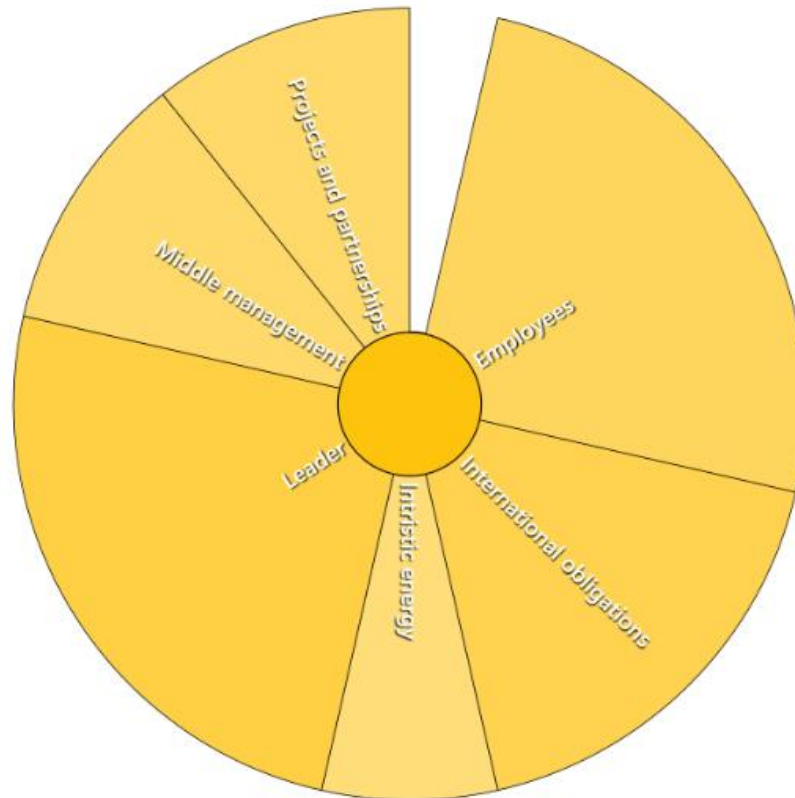
Source: Own work with results retrieved from Nvivo 12.

It can be seen in Figure 8 that the dark-coloured segments as the leader and employees are considered as the largest drivers of innovation. It is interesting how both the top and low-level employees are said to be the ones initiating innovation. This may be explained from two angles. From one side the employees are those who are coming with new ideas and have operational duties, while from the other side the leader or the manager is the one who approves it, decides on innovation and brings it forward.

The interviewees think that the lower-level employees are those who are thinking outside of the institutional box. There are always a few individuals who are looking for new methods and ways in order to improve the current situation. In the past, public sector employees were not so proactive, but with the new employee empowerment and rapidly changing world, they have become more educated, competent, and willing to progress. These individuals can also motivate those around them and form groups which easily implement innovations.

Most interviewees agree that innovation in the public sector is foremost a bottom-up approach but only with the approval of the top management. This is a specific and important moment for public sector innovation when the energetic and moderately experienced employees meet a manager who is simply open to change and does not feel threatened by it. It is not necessary for the manager to innovate or do anything except to give approval.

There are many institutions in the PS of Federation of Bosnia and Herzegovina who have completed extraordinary projects only because their employees have voluntarily formed a team and engaged in project management. Besides their willingness and the positive attitude to make a change, they have only needed the approval from their manager. The main aim of these teams is to attract additional foreign funds which will help the institution and the citizens. This innovative approach of a few individuals, with the support of the management, is also a way of networking, nationally and internationally, and learning from good practices.

When it comes to current and former innovational initiatives in the PS of FBiH, the analysis showed that these are mostly connected to new documents, regulations, and laws which are suggested, improved, or created. Besides these, there is also an increasing number of digital initiatives which aim to enhance the public service provision and lower the bureaucracy. Additionally, there are also initiatives regarding the improvement of strategic planning and horizontal and vertical harmonisation all across the Federation of Bosnia and Herzegovina. Fact is that there are many present initiatives, but only a few of them are indeed successfully implemented.

In order to examine the challenges and barriers faced by the public sector in developing innovation, three categories were formed, the barriers to innovation, institutional structure, and the manager's opinion on innovation. The barriers to innovation were coded into ten most frequently mentioned barriers.

Every interviewee recognised the institutional system and the regulations, as the largest challenges for public sector innovation in Federation of Bosnia and Herzegovina. Besides these, the fact that politicians are opposed to innovation and that the bureaucracy is so complex and includes a lot of overlapping in the jurisdiction, is making public sector innovation almost impossible. The managers and the overall resistance to change were also underlined as a challenge for new ideas. Additionally, an important aspect of evaluation and rewarding was considered as a constant barrier for employees to conduct public sector innovation.

Figure 9 Horizontal dendrogam on clustered barriers
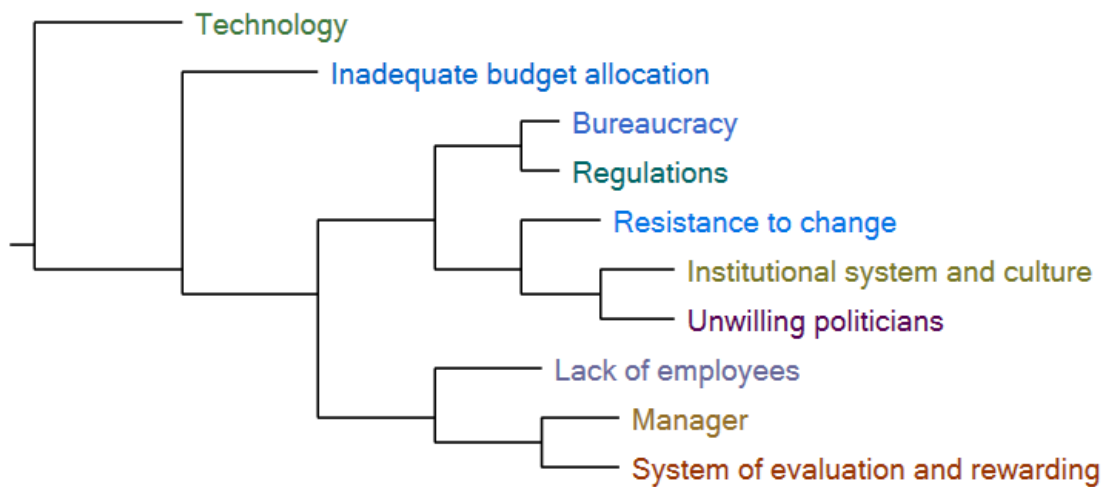
Source: Own work.

It is interesting to analyse which barriers are, in most cases mentioned together. Figure 9 shows, for example, how regulations and bureaucracy were in most situations elaborated together. This is a circle in which the regulations are complicating the bureaucracy in most circumstances and the bureaucracy is slowing down the regulations. The divided jurisdictions and the legal heritage in FBiH are representing large barriers to public sector innovation.

The public sector employees in FBiH are on average 49 years old, according to the Civil Service Agency (2019), due to which most of the employees cannot follow the digitalisation processes and advancements nor have the required energy for it. All of this makes the employees to surrender to this closed system, to be fine with all the regulations, do only as they say, and not change until the regulations change which usually needs 20 to 30 years.

The managers are usually mentioned together with the system of evaluation and rewarding, and both of these aspects hinder innovation. Without the manager's consent, no innovation can occur in the PS. Innovation is usually considered as additional work from the side of the manager, and if no one is asking nor paying for it, there is no reason or motive to innovate. This is especially the case in the public sector where the salary system is immune to rewarding or punishing. There are no indicators of what has an institution or an employee done at the beginning of the year in order to see, compare it, with the end of the year.

The analysis showed that the managers are opposed to innovation and are simply continuing to be a part of a non-innovative PS system, while only three interviewees emphasised that their managers are open to innovation. It may be seen in Figure 9 that the

institutional system and unwilling politicians are clustered together in most cases and are both connected with resistance to change.

This also gives an overall picture of the institutional structure in FBiH. The interviewees described the institutional structure as primarily closed to innovation, static, outdated, and demotivating, respectively to the frequency of answers. Every respondent said that the public sector in FBiH is not innovative. Nevertheless, this structure always has some individuals who are proactive and are opposing the stereotypes that the PS employees and institutions have to be old, slow, and inefficient.

In order to analyse how do public sector employees perceive their working practices from the perspective of innovation, three categories were formed, the barriers to personal innovation, motivation, and the best rewarding methods. These categories offer an overview of the internal and external factor which foster or prevent personal innovation.

Figure 10 Barriers to personal innovation
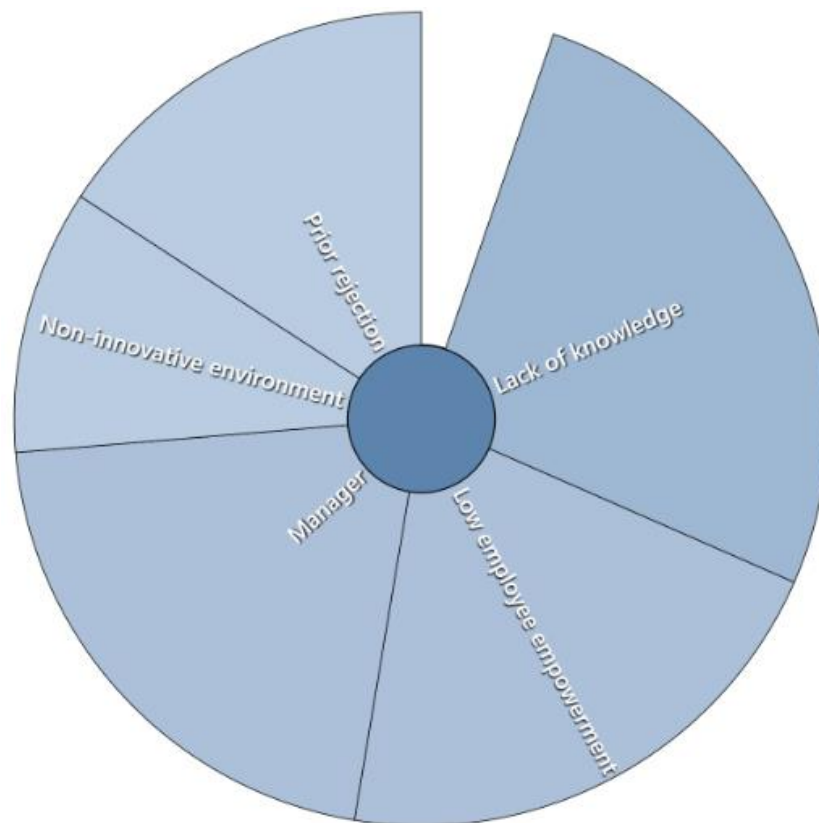
* the size and the darker colour indicate more references coded

Source: Own work with results retrieved from Nvivo 12.

It can be seen in Figure 10, that the employees are primarily non-innovative due to their lack of knowledge. This can be related to the closed system, which is not stimulating any personal learning and skills development and in which progress of some employees is considered as a threat.

Furthermore, the fact that the employees have low or no decision-making power is decreasing their options to make a change. The behaviour of the manager and the working environment can also prevent an employee from innovating. It is interesting that every interviewee, even though most of them, only after the interview, mentioned the prior rejection as a reason for the employees not to innovate. This is obviously a common situation in the PS, especially during the first few years in the public sector, where the employees come with new ideas and try over and over to innovate but are constantly rejected by different barriers until they give up completely.

The interviewees claim that individual motivation is crucial for PSI and work in general, but it is very hard to stay motivated in a system which is made to demotivate its employees. This motivation can be created and increased in many ways, but in most cases, it depends on the proper rewarding system of an institution.

Figure 11 Motivational factors
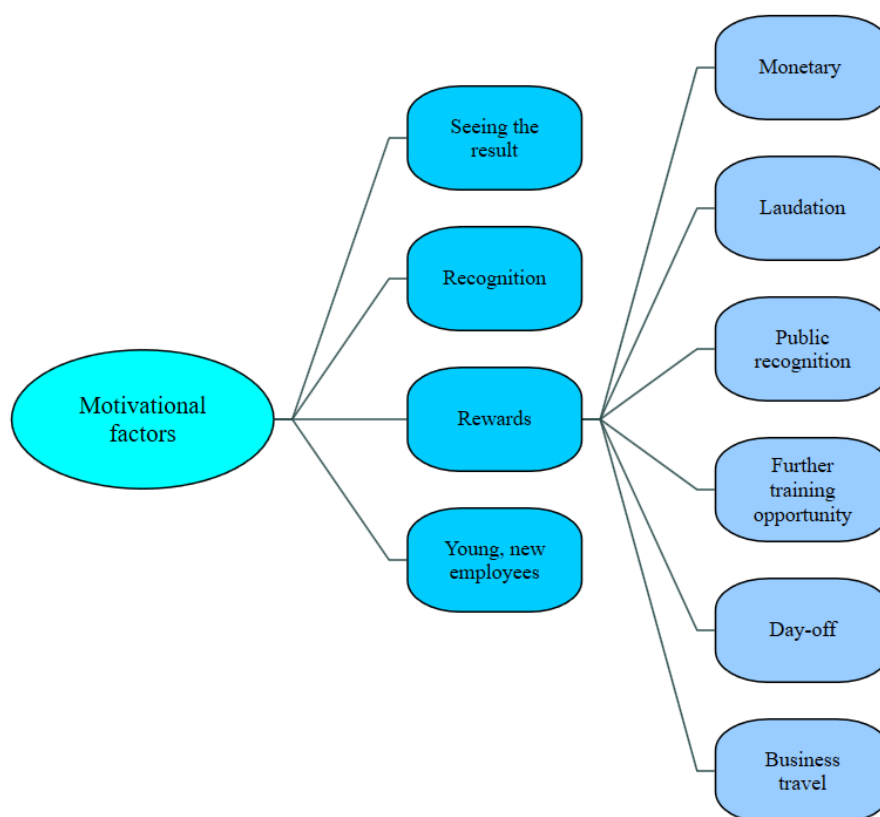
Source: Own work.

Different people are motivated by different things, but there are several common motivational factors in the public sector, which were identified through the qualitative analysis, in Figure 11. It is interesting that intrinsic and personal satisfaction, as seeing the result has the greatest motivational factor. Nevertheless, it is very hard to see any results as most ideas are prevented in the beginning or are slowed down for many years. Besides this,

recognition is also said to be a large motivator, which has an intrinsic element but is again not often part of the PS practices. Additionally, one interviewee noticed that it would be a great motivation if it would be easier to progress in the public sector to higher positions. This is a very difficult and slow process in the public sector but if a person would know that there is an option of further advancement for sure that the motivation would be higher.

Even though rewards are in the third place when it comes to the extent of created motivation, they are most frequently used in the public sector. Rewards may have many forms; among others, they can also include a form of recognition, which is a separate motivational factor. Most interviewees said that for them personally a combination of money, laudation, and a day-off is the best method of rewarding, but in general that money is the most wanted and sometimes the perfect reward.

The interviewees were free to make any suggestions and recommendations for the improvement of PSI. Almost 50% of the recommendations were related to the introduction of a proper rewarding system. Meaning that an employee should know that if the work is done properly, a salary will be accordingly paid out, but if the job is not done than a sanction will be undertaken. Also that some additional monetary reward will be paid with the salary if some innovation is successfully introduced or a new project is developed. The current situation in the PS in FBiH is that regardless that an employee is working or not, the payment and benefits remain the same. The qualitative analysis also showed that the recruitment process has to be improved and that the public sector and its culture have to become open to innovation and change the pessimistic mindset toward PSI. Additionally, it is suggested to take smaller steps and some short-term projects with immediate results, develop the leadership skills, and work on coordination and networking, which is lacking on all levels.

5.2   Survey findings

In order to analyse the quantitative data which was collected through the survey, several steps will be undertaken. Firstly the data will be preliminary analysed and verified in regards to any existing outliers, missing data and the data assumptions of the multivariate statistical analysis. The second step, as Hair, Black, Babin, and Anderson (2010) suggest, will be the confirmatory factor analysis in order to prove the reliability, discriminant validity and the convergence of the measurement models. Finally, the structural model and the hypotheses will be tested with the method of structural equation modeling, which is a combination of the factor analysis and the multiple regression. Furthermore, the data will be analysed through SPSS 22.

5.2.1   Data examination

The missing value analysis (hereinafter: MVA) aims to identify the sample which is missing the collected data. According to Hair, Black, Babin, and Anderson (2010), a single observation can have under 15% of missing data, except if there is a visible pattern. The data can be missing entirely at random, only be missing at random, or not missing. More precisely, the data from this research is missing due to the fact that some employees have not responded to some questions, and this is not negligible. In this regard, an MVA was conducted. There were 291 responses to the survey, and according to Hair, Black, Babin, and Anderson (2010), those observations with more than 15% of missing data in the sample were eliminated. After that, 214 responses were available for the analysis, which was still an adequate sample size. In order to analyse the data randomness, a Little MCAR test was conducted. The test (Chi-Square = 7118.787, df = 7082, Sig. = .377) showed a significant difference among the missing data, the sample, and the randomness sample. Accordingly, it can be concluded that the missing data is missing entirely at random, meaning that the variables are not related to other variables which are being measured.

The method in which the missing data can be replaced depends on the mentioned results. As the data is missing entirely at random, as Hair, Black, Babin, and Anderson (2010) explain, a method called regression imputation can be used to input the missing values. This technique uses the regression analysis and the relationships with other variables in order to predict the data which is missing and keep the overall results unaffected. The regression imputation was used to replace the missing values, which are graphically presented in Appendix 7.

Hair, Black, Babin, and Anderson (2010) explain that extremely high or low sample values, the outliers, from the collected data have to be identified. In this regard, the Mahalanobis (D^2) method is used in order to indentify any multivatiate outliers. The obtained result was of 0.0000056–1.0000000, whereas the threshold is 3.5 according to Hair, Black, Babin, and Anderson (2010). Therefore, the analysis showed that there are no outliers and that all the observations can be used for further analysis. Additionally, as Hair, Black, Babin, and Anderson (2010) claim, a successful multivariate data analysis method has to satisfy the assumptions of normality, homoscedasticity, and linearity. In order to fulfill the same, a Breusch-Pagan test for homoscedasticity was conducted. The linearity was tested and confirmed through the Variance Inflation Factor (hereinafter: VIF) for which the results are presented in Appendix 6. When it comes to the results of skewness and kurtosis, it was noticed that the normality was slightly disturbed, but as Hair, Black, Babin, and Anderson (2010) emphasise, the used estimation method or the maximum likelihood method is robust to these deviations.

5.2.2   Measurement models testing

In order to test the measurement models, it is necessary to analyse the validity of the model, its reliability and validity and then to present the obtained results. The Confirmatory Factor Analysis will be used in order to test the models. Only in the case of the innovation drivers and networking variables, a summated aggregate scale will be used as this approach is suggested by Lewis, Ricard and Klijn (2018).

The measurement model for innovation drivers was adopted from Lewis, Ricard and Klijn (2018). This variable is analysed from the respondent's viewpoint. The public sector employees were asked to choose the procedural and structural factors which either support or prevent PSI on a scale from 1 if mostly hinders to 5 if it mostly helps. There were 12 items or indicators which were used to measure this variable and which are presented, below, in Table 2.

Table 2 Indicators for innovation drivers

Variable	Code	Indicator
Innovation drivers	DRIV1	Annual budget
	DRIV2	Salary and promotion system
	DRIV3	Values and culture of the executive management
	DRIV4	Institutional structure
	DRIV5	Quality of ideas coming from the employees
	DRIV6	Values and culture of the politicians
	DRIV7	Quality of the policy proposals
	DRIV8	National government pressure on the FBiH
	DRIV9	EU directives
	DRIV10	Economic crisis
	DRIV11	Media attention
	DRIV12	Citizen involvement

Source: Own work.

The possible individual results on innovation drivers could range from 12, in the case that every item hinders innovation, to 60 in the case that every item is supporting innovation from the point of view of the respondent. This summation of all 12 items gives the overall result of how supporting are the institutional procedures and structures in the public sector when it comes to innovation. The mid-point of the maximum score is 30, and as on the average, the total score per respondent or the sum of all means was 36.06 it can be concluded that in general, PS employees see these factors as slightly supporting innovation and not hindering it.

Table 3 Descriptive statistics on innovation drivers

DRIV		1	2	3	4	5	6	7	8	9	10	11	12
N	Valid	214	214	214	214	214	214	214	214	214	214	214	214
	Missing	0	0	0	0	0	0	0	0	0	0	0	0
Mean		3.03	2.88	3.24	2.95	3.39	2.48	2.50	3.11	3.56	2.59	3.03	3.30
Median		3.00	3.00	3.00	3.00	3.00	2.89	3.00	3.00	4.00	2.80	3.00	3.00
Mode		3	3	3	3	3	3	3	3	4	2	3	3
Sum		648	616	693	631	726	532	535	666	762	554	647	706

Source: Own work.

It is also useful to consider the measures of central tendency and the mean responses per each item. Table 3 shows interesting results when it comes to the most frequently chosen intensity of some indicator, the mode, and in concern of the average answer. The respondents were most frequently neutral to the suggested structural and procedural factors. The results for the mean and median are also around the neutral point of view, but still, it may be seen that items 6, 7 and 10 are hindering innovation while item 9 is supporting public sector innovation. This neutrality may also, to some extent, reflect on the lack of interest of public sector employees, their disappointment in the PS, disbelief in innovation, and the way in which they are prevented to be proactive and suggested to stay neutral and closed.

Table 4 Indicators for networking

Variable	Code	Indicator
Networking	NETW1	An officer from another federal institution
	NETW2	A politician
	NETW3	An officer from the region
	NETW4	An EU officer
	NETW5	A representative of a business association
	NETW6	A leader of a medium or large private company
	NETW7	A representative of a citizens' group
	NETW8	A union representative
	NETW9	A media representative

Source: Own work.

The measurement model for networking was adopted from Lewis, Ricard and Klijn (2018). This variable is analysed from the respondent's viewpoint. The public sector employees were asked to mark how often and with whom they are communicating. This was including all the forms of communication except the circulating emails and could range from 1 if never to 5 if on a daily basis. There were 9 items which were used to measure this variable and which are presented in Table 4.

The possible individual scores on networking could range from 9, in the case that there is no communication at all, to 45 in the case that respondents daily communicate with all the items from the list. This summation of all 9 items gives the overall picture on the extent of communication and networking in the public sector of the Federation of Bosnia and Herzegovina. The mid-point of the maximum score is 30, and as the average total score per respondent or the sum of all means was 22.5 it can be concluded that in general, PS employees rarely or even never communicate with each other.

The results of central tendency measures for this variable show a clear stance of the respondents when it comes to the frequency of communication. The public sector employees rarely communicate with items 3, 5, 6, 7, 8, and 9, there is almost no communication with items 2 and 4, and a more often and sometimes weekly communication is present with item 1, from the list in Table 4 on the previous page.

Table 5 Descriptive statistics on networking

NETW		1	2	3	4	5	6	7	8	9
N	Valid	214	214	214	214	214	214	214	214	214
	Missing	0	0	0	0	0	0	0	0	0
Mean		3.57	1.71	2.44	1.88	2.47	2.39	2.35	2.32	2.14
Median		4.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Mode		5	1	2	1	2	2	2	2	2
Sum		765	367	521	402	530	511	503	497	457

Source: Own work.

The data from Table 5 shows that there is almost no communication with politicians or some EU representatives, but there is a frequent, monthly, weekly or daily communication with other federal institutions. It may be concluded that the level of networking is very low and that the communication based on needs and daily requirements among the federal institutions is not enough in order to stimulate new ideas and change.

The CFA was used with the aim to test the eligibility of other remaining measurement models. The Chi-Square ($\chi2$) is used in order to test these models, but in the case of a larger sample, Hair, Black, Babin, and Anderson (2010) also suggest the use of other additional indices. For some variables, the primarily tested model, with all indicators, showed an insufficient fit so that the proposed indices were analysed and through that, some indicators were excluded from the model. An eligible measurement model is the one with a ratio of $\chi2/df$ lower than five. The index of Standardized Root Mean Residual (hereinafter: SRMR) is recommended to be lower than 0.08, the Root Mean Square Error of Approximation (hereinafter: RMSEA) under 0.1, and the incremental indices as the Normed Fit Index (hereinafter: NFI) and Comparative Fit Index (hereinafter: CFI) should be higher than 0.90.

Table 6 CFA for encouragement

Variable	Code	Indicator	St. loadings	t -value
Encouragement	ENCO1	Employees in my institution are encouraged to develop new ideas	0.813	-
	ENCO2	Creative work is appreciated and recognised in my institution	0.923	16.684
	ENCO3	People get fair and constructive feedback in regard to their new ideas	0.932	16.871
	ENCO4	We, the employees know what goals our institution wants to achieve	0.758	12.547
Chi-Square=4.017; df=2; RMSEA=0.0688; SRMR=0.0102; NFI=0.994; CFI=0.997				

Source: Own work.

The measurement model for encouragement was adopted from Coveney (2008). The Confirmatory factor analysis was conducted for four indicators. For this measurement model, the $\chi2/df$ equals 2.0085, the RMSEA is 0.0688, SRMR equals 0.0102 and the NFI and CFI are higher than 0.9. The results, which are presented for encouragement in Table 6 show a good fit.

Table 7 CFA for empowerment

Variable	Code	Indicator	St. loadings	t -value
Empowerment	EMP2	I am satisfied with my involvement in the decisions which influence my work	0.677	-
	EMP10	I am authorised to make the required decisions in order to do my job well	0.802	10.202
	EMP11	My manager allows and trusts me to make the right decisions on work.	0.855	10.693
	EMP12	I have the opportunities for freedom and independence in doing my job.	0.853	10.674
Chi-Square=3.096; df=2; RMSEA=0.0507; SRMR=0.0143; NFI=0.994; CFI=0.998				

Source: Own work.

The measurement model for empowerment was adopted from Abukhait, Bani-Melhem and Zeffane (2019). The Confirmatory factor analysis was conducted for four indicators. For this measurement model the $\chi2/df$ equals 1.548, the RMSEA is 0.0507, SRMR equals 0.0143 and the NFI and CFI are higher than 0.9. The results in Table 7 show a good fit for the empowerment model.

Table 8 CFA for employee information

Variable	Code	Indicator	St. loadings	t -value
Employee information/ Knowledge sharing	KNOW1	I prefer to be completely informed about what my colleagues know	0.609	-
	KNOW3	I regularly inform my colleagues about what I am working on	0.763	8.841
	KNOW4	When I learn something I make sure my colleagues find out about it	0.852	9.495
	KNOW5	I share new information with my colleagues	0.866	9.578
	KNOW6	I ask my colleagues about their skills when I want to learn them	0.696	8.281
	KNOW7	It is important that my colleagues know what I am working on	0.700	8.316
Chi-Square=19.615; df=9; RMSEA=0.0774; SRMR=0.0290; NFI=0.980; CFI=0.989				

Source: Own work.

For this measurement model, the χ2/df equals 2.179, the RMSEA is 0.0774, SRMR equals 0.0290 and the NFI and CFI are higher than 0.9. The results, which are presented in Table 8 show a good fit for the model of employee information or in other words, for knowledge sharing.

Table 9 CFA for rewarding

Variable	Code	Indicator	St. loadings	t -value
Rewarding	REW1	Promotions are in my institution merit-based	0.907	-
	REW2	Employees are rewarded for the provision of high quality services	0.918	21.964
	REW3	Promotion in a position depends on how well the employees do their job	0.898	20.719
	REW5	Creativity and innovation are being rewarded	0.898	20.740
	REW7	My efforts are rewarded as they should be	0.811	16.460
Chi-Square=8.503; df=5; RMSEA=0.0573; SRMR=0.0102; NFI=0.993; CFI=0.997				

Source: Own work.

The measurement model for rewarding was adopted from Fernandez and Moldogaziev (2012). The CFA was conducted for five indicators. For this measurement model the χ2/df

equals 1.701, the RMSEA is 0.0573, SRMR equals 0.0102, and the NFI and CFI are higher than 0.9. The results, which are presented in Table 9 on the previous page, show a good fit.

Table 10 CFA for innovative behaviour

Variable	Code	Indicator	St. loadings	t -value
Innovative behaviour	INNO1	At work, I constantly search for new processes and ideas for performing my job duties	0.725	-
	INNO2	At work, I promote and share the ideas to other colleagues	0.816	11.441
	INNO3	At work, I try to implement novel ideas	0.912	12.369
	INNO4	At work, I develop appropriate plans to implement novel ideas	0.753	10.566
Chi-Square=5.061; df=2; RMSEA=0.0848; SRMR=0.0177; NFI=0.990; CFI=0.994				

Source: Own work.

The measurement model for the dependent variable innovative behaviour was adopted from Singh and Sarkar (2019). The CFA was conducted for four indicators. For this measurement model, the $\chi2/df$ equals 2.531, the RMSEA is 0.0848, SRMR equals 0.0177 and the NFI and CFI are higher than 0.9. The results, which are presented in Table 10, show a good fit.

5.2.3 Reliability and validity testing

After which the eligibility of the model is proofed it is necessary to verify the reliability and validity of those models. The testing of the model reliability aims primarily to satisfy some theoretical assumptions and is measured by the factor of Composite Reliability (hereinafter: CR), which has to be above 0.6. Hair, Black, Babin, and Anderson (2010) claim that the CR values above 0.7 are the ones which properly measure reliability.

When it comes to the validity of the measurement models, it is important to verify the convergent and divergent validity. Hair, Black, Babin, and Anderson (2010) explain that the convergent validity may be proofed through the factor loadings and the Average Variance Extracted (hereinafter: AVE) in which an appropriate convergence is achieved if these two have values above 0.5. Divergent validity will be tested by comparing the square root of AVE (which should be higher) with the correlations of all variables. The reliability and validity will not be tested for innovation drivers and networking as the summated aggregated scale was used in their case.

Table 11 Reliability and validity testing

	Item	Absolute indicators			Incremental indicators		CR	AVE	SQRT AVE
		χ2/df	RMSEA	SRMR	NFI	CFI			
Innovation drivers	12	-	-	-	-	-	-	-	-
Networking	9	-	-	-	-	-	-	-	-
Encouragement	4	2.009	0.0688	0.0102	0.994	0.997	0.918	0.739	0.860
Empowerment	4	1.548	0.0507	0.0143	0.994	0.998	0.876	0.640	0.800
Employee information	6	2.179	0.0774	0.0290	0.980	0.989	0.886	0.567	0.753
Rewarding	5	1.701	0.0573	0.0102	0.993	0.997	0.949	0.787	0.887
Innovative behaviour	4	2.531	0.0848	0.0177	0.990	0.994	0.879	0.648	0.805

Source: Own work.

The aggregate results of the CFA can be seen in Table 12, and as it was previously emphasised, all the measurement models satisfy the assumptions of the goodness of fit. The validity of the models is confirmed as all of them have the CR above 0.7. During the testing of the measurement models, in the previous subchapter, it could be seen that the factor loadings were in the range from 0.677 to 0.932 and the Table 11 shows that the values of AVE are above 0.5. Therefore, the assumptions of convergent validity are satisfied by all measurement models.

Table 12 Divergent validity

	ENCO	EMP	KNOW	REW	INNO
ENCO	**0.860**				
EMP	0.535	**0.800**			
KNOW	0.200	0.344	**0.753**		
REW	0.853	0.525	0.166	**0.877**	
INNO	0.263	0.447	0.580	0.206	**0.805**

Source: Own work.

The discriminant validity is also confirmed for all the measurement models. As can be seen in Table 12 on the previous page, the square root of AVE values (on the diagonal) are greater than correlations with other constructs presented below.

5.2.4   Hypotheses testing

The testing of the hypotheses is conducted in two models. Due to the fact that summated scales were used for DRIV and NETW, these two hypotheses are tested in the first model, while the hypotheses of INNO, REW, EMP, ENCO are tested in the second model.

The hypotheses in the first model are the following:

H_1: Innovation drivers influence innovative behaviour in public sector institutions.

H_2: Networking influences innovative behaviour in public sector institutions.

This model was tested in Lisrel 8.8 through the structural equation modeling, which combines the Confirmatory factor analysis and the multiple regression, as Hair, Black, Babin, and Anderson (2010) underline. The eligibility also has to be tested for this structural model.

Table 13 Hypotheses testing for Model 1

	Dependent variable	**Independent variable**	**Standardized rating parameter**	**t – value one-tailed**
H1	Innovative behaviour	← Innovation drivers	0.144	2.003**
H2	Innovative behaviour	← Networking	0.208	2.864**
Chi-Square=18.147; df=8; RMSEA=0.0771; SRMR=0.0354; NFI=0.966; CFI=0.978				

***p<0.01; **p<0.05; *p<0.1

Source: Own work.

All the indicators of the goodness of fit, including the χ2/df ratio of 2.268, which can be seen on the bottom of Table 13, confirm a very good fit of this model. When it comes to the testing of the hypotheses it is important to analyse the standardized rating parameter (β) which indicates how the dependent variable changes depending on the change of the standard deviation of the independent variable.

Additionally, the t-value has to be considered in order to decide on the significance of some parameter. Based on the results presented in Table 13, both hypotheses hold, and there is a significant and positive relationship between the independent variables and the dependent variable. Innovation drivers significantly increases innovative behaviour in public sector institutions (β=0.144; t=2.003; p<0.05) and also networking significantly increases innovative behaviour in public sector institutions (β=0.208; t=2.864; p<0.05).

The hypotheses in the second model are the following:

H₃: Encouragement influences innovative behaviour in public sector institutions.

H₄: Empowerment influences innovative behaviour in public sector institutions.

H₅: Employee information influences innovative behaviour in public sector institutions.

H₆: Rewarding influences innovative behaviour in public sector institutions.

This model was also tested in Lisrel 8.8 through the SEM, and its eligibility has also been tested. Furthermore, all the indicators of the goodness of fit, including the χ2/df ratio, confirm a very good fit of this model.

Table 14 Hypotheses testing for Model 2

	Dependent variable	Independent variable	Standardized rating parameter	t – value one-tailed
H3	Innovative behaviour	← Encouragement	0.003	0.0228
H4	Innovative behaviour	← Empowerment	0.391	2.994***
H5	Innovative behaviour	← Employee information	0.485	5,651***
H6	Innovative behaviour	← Rewarding	-0.156	-1.148
Chi-Square=354.792; df=242; RMSEA=0.0468; SRMR=0.0572; NFI=0.960; CFI=0.985				

***p<0.01; **p<0.05; *p<0.1

Source: Own work.

Based on the results from Table 14, two hypotheses hold as there is a significant and positive relationship between empowerment and innovative behaviour, and between employee information and innovative behaviour. Empowerment significantly increases innovative behaviour in public sector institutions (β=0.391; t=2.994; p<0.01). In other words, when the employees are satisfied with their involvement at work, when they are authorised and trusted to make the required decisions, and when they have the opportunities for freedom and independence, they will constantly search for new processes and ideas, and develop appropriate plans to implement these novel ideas. Moreover, employee information significantly increases innovative behaviour in public sector institutions (β=0.485; t=5.651; p<0.01). This means that when the employees are completely informed about what their colleagues know, share new information with their colleagues and ask their colleagues about their skills when they want to learn them, then they will constantly search for new processes and ideas, and develop appropriate plans to implement these novel ideas.

The testing of the fourth hypothesis showed that rewarding negatively influences innovative behaviour in public sector institutions, but this relationship has no statistically significant influence. Moreover, this negative relationship could be a revolt of the

employees due to the fact that there is no rewarding system in the PS in FBiH at all. Encouragement does positively influence innovative behaviour in public sector institutions, but this influence is not statistically significant. Nevertheless, people often confuse encouragement with a situation in which someone is forced and pressured to deliver. In these circumstances, reverse psychology occurs, and with the absence of the right leadership skills, the creative process completely stops. There are many examples in which some logical relationship of two variables, ends to be not-significant. In this regard, Jung, Chow and Wu (2003) who also discovered the negative relationship between encouragement and institutional innovation, recommend the identification of a variable that would mediate this relationship, for instance rewarding.

5.2.5   Control variables

The control variables which are included in both models are age, education, and job position. It is assumed that with the increase of age, innovation decreases, while for the other two control variables a positive relationship to innovation is assumed.

Table 15 Analysis of the control variables in Model 1

	Dependent variable	Independent variable	Standardized rating parameter	t – value one-tailed
H1	Innovative behaviour	← Innovation drivers	0.165	2.294**
H2	Innovative behaviour	← Networking	0.175	2.420**
	Innovative behaviour	← Age	-0.022	-0.303
	Innovative behaviour	← Education	0.049	0.708
	Innovative behaviour	← Job position	0.213	2.945***
Chi-Square=29.869; df=17; RMSEA=0.0596; SRMR=0.0314; NFI=0.949; CFI=0.973				

***p<0.01; **p<0.05; *p<0.1

Source: Own work.

When it comes to the first model, it can be noticed in Table 15 that age has a negative relationship to innovation, which means that as the employees become older, they behave in a less innovative way. This change is especially seen in the way they communicate and how easy they get hindered by many structural and procedural factors. Even though the direction of this relationship is as it was assumed, it is not significant. Education has a positive relationship to innovative behaviour, meaning that as an employee becomes more educated, so does the level of innovative behaviour increase. Nevertheless, this relationship is not significant. The job position has a positive and significant relationship to innovative behaviour in this model. This would mean that the higher the job position is, the more innovative an employee is. A justification for this relationship was provided through the qualitative analysis. In fact, the manager and the top-level employees in the public sector in FBiH are the ones who make decisions and are free to approve new ideas. Every

innovation is implemented with their consent, is easily processed, and often they are the ones who take credit also for the ideas coming from the lower-level employees.

Table 16 Analysis of the control variables in Model 2

	Dependent variable	**Independent variable**	**Standardized rating parameter**	**t – value one-tailed**
H3	Innovative behaviour	← Encouragement	0.100	0.700
H4	Innovative behaviour	← Empowerment	0.303	3.462***
H5	Innovative behaviour	← Employee information	0.454	5.335***
H6	Innovative behaviour	← Rewarding	-0.120	-0.853
	Innovative behaviour	← Age	-0.065	-1.068
	Innovative behaviour	← Education	-0.019	-0.310
	Innovative behaviour	← Job position	0.099	1.512*
Chi-Square=363.420; df=274; RMSEA=0.0391; SRMR=0.0484; NFI=0.957; CFI=0.987				

***p<0.01; **p<0.05; *p<0.1

Source: Own work.

When it comes to the second model, it can also be noticed, in Table 16, that age has a negative and insignificant relationship to innovation. It is interesting to see that education has a negative relationship to innovative behaviour in this model, but it is not significant. The job position has a positive and significant relationship to innovative behaviour in this model, but on a lower level of significance than in the previous model.

5.3   Some characteristics and obstacles of public sector innovation in FBiH

During the recent period, many public sector reforms have taken place in the Federation of Bosnia and Herzegovina and the country with the goal to enhance the efficiency and overall performance. Especially, as the overall perception and situation of the public sector of FBiH was undesirable, and it was straggling with innovation and any new enhancements. The qualitative research gave an insight into the characteristics and the overall picture of the public sector in the Federation of Bosnia and Herzegovina.

The public sector in FBiH is described as a system in which innovations are not adequately validated and are unwanted. The institutional culture is immutable, does not motivate and operates as a status quo. Public sector regulations and procedures are said to limit the progress and are slowly created and implemented, inflexible, and out of date. These rules are even to a greater extent, prevented by politics. In general, the PS in FBiH is based on a continental legal heritage, with a lot of bureaucracy and overlapping jurisdictions.

The public sector institutions in FBiH have a lack of vision and the right leadership. Moreover, the leaders in the PS institutions do not require any innovations and are unwilling to lead and motivate any change. This system lacks on internal and external communication and an overall institutional approach. Furthermore, the PS employees in

the Federation of Bosnia and Herzegovina are described as being inert, indolent, and resistant to change. This is mostly because of the lack of competent employees and an adequate evaluation system. Moreover, there is also a collective and pessimistic attitude when it comes to the future of the public sector in FBiH and the country. This pessimistic mindset also refers to the innovation in the public sector.

This general perception always has some exceptions. Many interviewees have underlined that every institution has some individuals who are ready to make a change and innovate. These individuals are already designing and implementing great projects which are enhancing the quality of public services and the efficiency of the public sector in FBiH.

Based on the previously studied literature, 12 obstacles to public sector innovation were identified. The quantitative analysis confirmed, in general, the overall description of the characteristics of the PS provided by the qualitative analysis. As it may be noticed in Figure 5 from the Appendix 9, 46% of PS sector employees in the FBiH think that the culture and values of the politicians are the largest obstacles to innovation. This can be also confirmed by several inputs from the qualitative analysis. Here it was noticed that the constant political change coming from different mandates is bringing in different people with different goals and is leaving many things unfinished. Additionally, the politicians are closed to innovation and have different values which are more valuable to them. Besides this, 44% and 43% of employees see the economic crisis and the quality of policies coming from the politicians, respectively, as a barrier to innovation. On the other side, a very low percentage of employees considers the EU directives, the involvement of the citizens, or the quality of ideas coming from the employees as an obstacle. This can be more seen as a factor which stimulates PSI in many cases.

5.4 Recommendations and limitations to the research

The public sector innovation in FBiH is restricted by many constraints which were identified through this research. Based on the mentioned barriers of public sector institutions, of the overall system and the FBiH, several recommendations to overcome the same are introduced.

The institutional culture in the Federation of Bosnia and Herzegovina has to become open to novel ideas, to empower its employees and promote learning. This enhanced culture should be proactive, creative, and in some cases risk-taking. This last part may not be easy for the governments, especially when the risk of pursuing an innovation seems much larger compared to the risk of keeping the status quo. Moreover, people matter and are the core of the public sector innovation. The employees have to move away from that innovational pessimism in which innovation is not seen as a necessity. In this regard, governments have to enhance the capacities of civil servants. This may be done through the improved culture, some incentives, or procedures which enable new methods of working. As the public has very low or no trust in the government, so are also the public sector employees labelled as

inefficient and corrupt. This is why the public sector innovation is such an important and urgent factor through which the image of the public sector would be improved and the PS employees would be more motivated and challenged to enhance their performance.

It would be good for the public sector employees in FBiH to be recognisable in a positive way and to have a common goal. The public sector values should be familiar to everyone. One of them would be the support to the employees, as they have to feel encouraged in order to act and innovate. Additionally, the recruitment process has to be improved and isolated from any subjective or illegal actions in order to bring the most adequate and quality employees to the PS. This may be done through a complete digitalisation of the process, from the job application to the random selection of recruitment questions.

Nowadays, networking and working together is one of the most frequently used way to solve problems. The public sector in FBiH has to cooperate more with the private and civil sector. These partnerships can be created through a new institutional structure, which would enable the sharing of risk and the inflow of additional resources for innovation. There are also many innovational incentives in the private sector which may serve as a role model for the PS, as the share option. In the case of the public sector, this can be translated as sharing with the employee or the team the gains or success of their innovations. This is then closely related to the innovational rewarding system, which also lacks in the public sector of FBiH.

It is necessary to introduce responsibility for work, which means that everyone, from the bottom to the top, has to answer for their own actions. Everything should be assessed on a performance base, both in case of sanctions and rewards. To increase motivation, a just system of rewarding the good results should be improved or established if missing, but also some bad results or behaviour should be punished. As it was found out during the qualitative analysis, in the past, it was possible to reward some innovative employee's solutions with a lump sum. The only issue was that there were no regulations which would define the criteria or the form of innovation regarding the range of the financial reward.

The government in the Federation of Bosnia and Herzegovina requires a strategic approach with a clear orientation. Furthermore, it is crucial to change the overall conscience and to make a definite statement that the public sector must be innovation-oriented. It is for the best to have a bottom to top approach but with the approval from the top, and in order to achieve this the attitudes of the top management have to be adjusted.

As there is no pressure from the competition and the market as in the private sector, the public sector needs authority pressure. The leaders have to demand innovation. Excellent leadership and management skills are a necessity in the public sector in the FBiH. This primarily includes setting a common vision, strong incentives, and a proper task delegation. Additionally, it is crucial to establish all over the PS a practice of knowledge

sharing and clear communication through which it would be easier to identify new opportunities and cope with challenges.

The regulations and procedures should support public sector innovation and not hinder. The government and the institutions in FBiH have to appropriate their internal rules in a way which would enable innovation. Digitalisation, as a facilitator, plays a great role at this point. There are many attempts to digitalise the public sector operations in FBiH, but still, this has not reached its full capacity. In most cases, digitalisation has not lowered the bureaucracy nor accelerated the processes, but rather complicated them as the institutions have digitalised its administration and at the same time have kept the traditional paper-based method.

The qualitative analysis suggested that one of the main problems in the PS of FBiH is the bureaucracy and the overlapping of jurisdictions. One of the solutions to this issue would be to regroup the ministries according to more similar areas of work or the principles of the EU. Additionally, the Federation of Bosnia and Herzegovina needs an institution for e-governance or innovation in order to know exactly who is responsible for the improvement of the public sector. Due to the complexity of the overall system, a department could be also formed within an existing institution which would be in charge of all innovational initiatives, R&D, and the enhancement of the public sector in FBiH. The Federal Institute for Development Programming would be one of the examples where this could be formed as it is already one of the centers for innovation, research, and strategic planning in the FBiH.

As this is the first of this kind research on public sector innovation in FBIH, the main challenge was to include all crucial factors in the analysis of public sector innovation but also not to go too much into detail. What should also be taken into regard while interpreting the results are the several limitations which were present during the qualitative and quantitative analysis.

When it comes to the interviews, it was difficult to reach out to some managers and explain to them the real meaning of PSI. The managers of the Federal Ministry of Finance were on holiday and after several attempts, no replacement for the interview could be found. This Ministry is very important to innovation in the public sector, and many interviewees mentioned an inadequate allocation of resources as an obstacle to innovation, so that this interview would have been a valuable insight to the research. Moreover, some managers refused on the very beginning to participate as they were of an opinion that innovation is something revolutionary, unnecessary, and that their institution and the public sector, in general, do not have anything to say about it.

The advantage of the interviews was that it was possible to find out much more information on the situation in several PS institutions in FBiH. Nevertheless, as the voice recorder was used, there were some things that the managers kept for themselves and did

not want to share. This was, especially, noticeable when the interview was over and the voice recorder was turned off. At that moment, managers would add some comments, examples from practice and would name concrete things that prevent their institution in pursuing innovation.

In regard to the quantitative analysis, the major restraint was the fact that it was the period of summer holidays when the research was conducted. Namely, between July and August, the public sector employees are taking their days off and at no point during this period are the sectors or the institutions operating in full capacity, with all or the majority of the employees present. Besides, those employees who have had a pessimistic attitude to innovation and change and who did not want to participate from the beginning, have also contributed to a smaller research sample. The response rate of 16.18% was small compared to the number of issued questionnaries, but still enough for the analysis. This limitation may on one side be justified by the fact that there was a large absence of employees in the institutions, which was also noticed during the qualitative analysis. On the other side, it may also refer to the wrong attitude of the employees regarding the PSI. In order to avoid this in future studies, it would be better to ask the managers after the interviews to distribute the surveys to their employees as in that case, they would feel required to participate.

CONCLUSION

There is a constantly growing need to research and understand public sector innovation. Innovation is not simply a good or new idea, but moreover, it is the implementation of that idea. This is where the public sector in the Federation of Bosnia and Herzegovina struggles. There are many ideas and place for improvement, but the politics, regulations, and the overall institutional structure hinder their implementation. The PSI aims to adopt new methods in order to achieve public needs and is a very challenging task for the governments. As innovation cannot occur by itself, it is crucial that governments develop an innovative environment, which is promoting and supporting innovative behaviour.

The purpose of this thesis was to contribute to the development of public sector innovation in FBiH as an opportunity to improve the performance of public services, increase their efficiency, and decrease the costs. Several independent variables, which may influence innovative behaviour in the PS, were identified and six hypotheses were suggested. Namely that, Innovation drivers influence innovative behaviour in public sector institutions, and respectively that networking, encouragement, empowerment, employee information, and rewarding influence innovative behaviour in public sector institutions. This structure was throughout a mixed-method approach further researched.

Throughout the qualitative and quantitative analysis and their findings, all research objectives were attained. When it comes to current and former innovation initiatives in the

PS of FBiH, both analysis methods showed that these are mostly connected to new documents and laws which are suggested or improved. Besides these, there is also a large number of digital initiatives which aim to enhance the public service provision, but unfortunately only a few of them are indeed successfully implemented. There is a lack of initiatives which support current innovation in the public sector and even those who exist are mostly coming from the international actors and not from the PS institutions.

The research showed that the main challenge to PSI is the institutional system and the regulations in the FBiH. Furthermore, the fact that politicians are opposed to innovation, and that the bureaucracy is so complex with overlapping jurisdictions, is hindering PSI in many aspects. The managers perceive innovation as some additional work and unnecessary in the PS and have an overall resistance to change. Whereas, the perception of the public sector employees differs depending on the age structure and previous experience. The age structure of the PS employees in FBiH is very old, but those employees who are young and new to the PS are trying to make a change. The middle-age structure has some individuals who are coming with new ideas but a majority gave up on innovation in the moment when their new suggestions were constantly rejected by the leader. Most employees have a lack of knowledge and have become one with the closed system and are not motivated to incur any change as this will not have an effect on their salary nor position.

This research has provided a general picture of the public sector in FBiH when it comes to innovation and innovative behaviour. The major findings imply that the leader and employees are the largest drivers of public sector innovation in FBiH. In fact, people are the key factor of PSI and this is why it is crucial that they are managed properly. These employees are primarily motivated through a personal satisfaction of seeing the result and delivering good work. This research showed that the process of innovation includes the bottom-up as well as the top-down approach. Moreover, in some circumstances, it also includes the sideways-in approach. The management has to enable a work environment that fosters innovation and supports the employees.

When it comes to the determination of the influence of innovation drivers, networking, and some organisational factors on innovative behaviour it is found that there is a significant and positive influence of innovation drivers, networking, empowerment and employee information on innovative behaviour in the public sector. On the other side, no significant relationships were found regarding the influence of encouragement and rewarding on innovative behaviour in the public sector in FBiH.

Several recommendations on the improvement of public sector innovation were offered and elaborated in detail. In this regard, the government in the Federation of Bosnia and Herzegovina requires a strategic approach with a clear orientation and vision. It is necessary to introduce responsibility for work. This means that the salary scale should be sensitive to performance, where good work is rewarded, bad sanctioned and extraordinary work is additionally rewarded. Moreover, it is crucial to establish all over the PS a practice

of knowledge sharing and clear communication, as this was shown missing throughout the whole research. The regulations and procedures are recognised as the main barriers to PSI in FBiH. This is why the government in FBiH should make small steps and each institution should appropriate their internal rules in a way which would enable innovation. Finally, it is important to establish an institution responsible solely for innovation or a department within an existing institution in FBiH which would work on the improvement of innovation in the Entity.

The main findings of this research showed to be in accordance with the theoretical framework which was suggested by several references. The prior researches also affirmed that the PS managers are risk-averse and have a defensive attitude to innovation as something hardly reachable and excessive. It was also suggested that innovation is a bottom-up approach but it requires the willingness of the whole management. Most factors which influence innovation were said to be intrinsic and the research also showed that the internal factors are motivating an innovational change in the PS. Researchers discovered that the main challenges of PSI are the robust bureaucracy and the legal regulations which was also proved by this research. An interesting theoretical background was also found in regards to the two hypotheses which were not significant in this research. Some previous analysis on innovation also found a negative relationship between encouragement and institutional innovation, and emphasised that an additional variable, as rewarding, is needed in order to mediate this relationship.

Finally, it may be concluded that the public sector in FBiH is not innovative enough and there is a lack of interest in this regard. It is important to underline that the public sector institutions in FBiH are defined by a continental legal heritage which limits the innovation in so many aspects. This is why it is crucial to introduce an innovative institutional structure, a proper rewarding system, and allow the employees to think outside of this regulated box. It would be recommendable that more research on this topic happens on the institutional level in FBiH or even the country. This approach could introduce new findings on the satisfaction, desires, and motivation of the public sector employees, which would be a stronghold in suggesting new policies in FBiH.

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APPENDICES

Appendix 1: Povzetek (Summary in Slovene language)

Institucije javnega sektorja so po vsem svetu dejavno delale na razvoju dobrega upravljanja in izboljšanju njihovih storitev. Prepoznane so bile številne prednosti inovacij javnega sektorja in sprejeti ustrezni ukrepi. Koncept inovacij v javnem sektorju je za Bosno in Hercegovino nov, še vedno pa na tem področju še ni bilo opravljenih posebnih raziskav. Kljub temu je gotovo, da bo prihodnost vsakega učinkovitega javnega sektorja odvisna od inovacij. Inovacije so postale nuja, da bi premagali nekatere zahtevne čase v eni državi. Namen te raziskave je zapolniti obstoječe vrzeli v inovacijah javnega sektorja v obstoječi literaturi in raziskati dejavnosti, izzive in možnosti za inovativno okolje javnega sektorja v entiteti Federacije Bosne in Hercegovine.

Namen magistrskega dela je prispevati k razvoju inovacij v javnem sektorju v FBiH kot priložnost za izboljšanje učinkovitosti javnih storitev, povečanje njihove učinkovitosti in zmanjšanje stroškov. Kompleksna in razslojena struktura FBiH in njenega javnega sektorja je bila vedno na poti kakršne koli priložnosti za rast in razvoj. Reforme javnega sektorja so uvedle številne izboljšave iste, vendar javni sektor še vedno deluje pod številnimi ovirami.

Za izvedbo te raziskave so na začetku sekundarni podatki pridobljeni z obsežnim pregledom literature o inovacijah v javnem sektorju v državi, regiji in svetu, v okviru razpoložljivih akademskih revij, publikacij, časopisov, knjig in interneta. Nato se v raziskavi uporablja pristop mešane metode, ki zahteva tako kvalitativno kot kvantitativno analizo, da bi raziskali koncept inovativnosti v javnem sektorju. Primarni podatki se zbirajo s polstrukturiranimi intervjuji z vodstvom več kartiranih institucij javnega sektorja in anketo z odprtimi vprašanji izpolnijo zaposleni v institucijah javnega sektorja FBiH. Ta študija je uporabila šest modelov meritev za gonilnike inovacij, mreženje, spodbujanje, opolnomočenje, obveščanje zaposlenih in nagrajevanje.

Glavne ugotovitve pomenijo, da sta vodja in zaposleni največja gonila inovacij javnega sektorja v FBiH. Pravzaprav so ljudje ključni dejavnik PSI, zato je ključno, da se z njimi pravilno upravlja. Ti zaposleni so v prvi vrsti motivirani z osebnim zadovoljstvom glede rezultata in dobrega dela. Ta raziskava je pokazala, da proces inovacij vključuje pristop od spodaj navzgor in pristop od zgoraj navzdol. Poleg tega v nekaterih okoliščinah vključuje tudi stranski pristop. Vodstvo mora omogočiti delovno okolje, ki spodbuja inovacije in podpira zaposlene. Z raziskavo smo odkrili pomemben in pozitiven vpliv inovatorjev, mreženje, opolnomočenje in informiranje zaposlenih o inovativnem vedenju zaposlenih v PS. Po drugi strani ni bilo najdenih pomembnih odnosov v zvezi z vplivom spodbujanja in nagrajevanja na inovativno vedenje v javnem sektorju v FBiH.

Nazadnje je treba poudariti, da institucije javnega sektorja v FBiH opredeljujejo celinsko pravno dediščino, ki omejuje inovacije na toliko vidikov. Zato je ključno uvesti inovativno institucionalno strukturo, ustrezen sistem nagrajevanja in omogočiti zaposlenim, da razmišljajo zunaj tega reguliranega okvira.

Appendix 2: Research methods used for every research question

Table 1 Research methods used for every research question

No.	Research Question	Research Method
1	Which initiatives and incentives are currently supporting the innovation in the PS?	Interviews (qualitative research)
2	What are the challenges faced by the PS in developing innovation?	Interviews (qualitative research) Survey (quantitative research) Literature Review
3	How do public sector employees and managers perceive their working practices from the perspective of innovation?	Interviews (qualitative research) Survey (quantitative research) Literature Review
4	What is the influence of innovation drivers and networking on innovative behaviour of employees in the public sector?	Survey (quantitative research) Literature Review
5	What is the influence of some organisational factors on innovative behaviour of employees in the public sector?	Survey (quantitative research) Literature Review

Appendix 3: Interview questions public sector

Innovation in the public sector is defined as generating new ideas, introducing new approaches with the aim of providing quality public services, creating value and better response to the needs of the society.

1) How innovative is your institution/ the level of innovativeness? Are there currently some innovative initiatives in your institution?
   i) What are your senior management's attitudes to initiatives?
   ii) What are your manager's perceptions of staff's attitudes to initiatives?
   iii) What do you think staff's perceptions of these initiatives are?
2) What is or would prevent your institution following/adopting an initiative?
3) What are by your opinion the major barriers to innovation in the PS of FBiH?
4) How do you perceive your working practices from the perspective of innovation?
5) Is your institutional structure supporting the innovation practices?
6) How much is the personal innovation important for the innovativeness of your institution? Are staff motivated by initiatives? Examples?
7) Is there a procedure in place for employees that have innovative ideas for the improvement of your organisation? If not, why do you believe there is no procedure?
   i) How do staff submit new ideas for consideration?
   ii) Could the procedure be improved?
   iii) How long does it take for an employee's idea come into practice?
   iv) (If long) Does this frustrate and demotivate employees?
   v) What are the steps involved?
8) Do you think the public sector as a whole is innovative? Why? / Why not?
9) Do you feel public sector organisations do enough to encourage innovation?
10) Do you know of a reward system (money, time-off, recognition) in place for innovative efforts in your organisation?
    i) What are these rewards?
    ii) What reward has the biggest (motivating) impact on staff?
    iii) If no rewards system, should there be one?
11) What changes could the public service make to enhance innovation?

Name and position of the interviewee:

Name of the institution:

Place and time:

Appendix 4: Interview questions others

Innovation in the public sector is defined as generating new ideas, introducing new approaches with the aim of providing quality public services, creating value and better response to the needs of the society.

1. How innovative are the PS institutions FBiH by to your experience? Are you familiar with some current innovative initiatives in the PS institution of FBiH?
   i)   What are the senior management's attitudes to innovative initiatives?
   ii)   What do you think staff's perceptions of these initiatives are?
2. What are by your opinion the major barriers to innovation in the PS of FBiH?
3. What are by your opinion the major drivers to innovation in the PS of FBiH?
4. How do you perceive PS working practices from the perspective of innovation?
5. Is the institutional structure in FBiH supporting the innovation practices?
6. How much is the personal innovation important for the innovativeness of a PS institution? Are PS employees motivated by initiatives? Examples?
7. Are you familiar with some procedure in place for PS employees that have innovative ideas for the improvement of their institution? If not, why do you believe there is no procedure?
8. Do you think the public sector as a whole is innovative? Why? / Why not?
9. Do you feel public sector institutions do enough to encourage innovation?
10. Do you know of a reward system (money, time-off, recognition) in place for innovative efforts in PS institutions in FBiH?
    i)   What are these rewards?
    ii) What reward has the biggest (motivating) impact on staff?
    iii) If no rewards system, should there be one?
11. What changes could the public service make to enhance innovation? Some examples of good practice from your experience?

Name and position of the interviewee:

Name of the organisation:

Place and time:

Appendix 5: Survey questions

The survey questions in English are outlined and analysed in survey findings. The questions in local language and the form of the survey are presented below in order to enhance the clarity.

Analiza inovativnosti u javnom sektoru u FBiH

Poštovani,

Ovo istraživanje se provodi za potrebe izrade master teze na Ekonomskom fakultetu u Sarajevu, a bavi se analizom inovativnosti u javnom sektoru u FBiH.

Upitnik je struktuiran u 5 grupa i zahtijevaće otprilike 10 minuta vašeg vremena, te je potpuno anoniman. Zbog metodičkih razloga upitnik sadrži djelimično slična pitanja, te vas molimo za razumijevanje. Od izuzetnog značaja za uspjeh ove studije jeste da pitanja detaljno pročitate, te date vašu subjektivnu procjenu.

ANKETA JE POTPUNO ANONIMNA.

Ukoliko vam bude potrebno dodatnih informacija, budite slobodni kontaktirati nas.

Srdačan pozdrav,
Lamija Bećarević
lamijab@mail.com

There are 14 questions in this survey.

Spol?
Molimo vas da izaberete SAMO JEDAN od ponuđenih odgovora:
- Ženski
- Muški

Koliko imate godina?
Izaberite jedan od ponuđenih odgovora
Molimo vas da izaberete SAMO JEDAN od ponuđenih odgovora:
- manje od 18
- 18 - 25
- 26 - 35
- 36 - 45
- 46 - 55
- 56 - 65
- više od 65

Koliko imate godina radnog iskustva?
Izaberite jedan od ponuđenih odgovora
Molimo vas da izaberete SAMO JEDAN od ponuđenih odgovora:
- 0 - 10
- 11 - 20
- 21 - 30
- 31 - 40
- 41 - 50

Koji je najviši nivo vašeg obrazovanja?
Izaberite jedan od ponuđenih odgovora
Molimo vas da izaberete SAMO JEDAN od ponuđenih odgovora:
- Srednja škola - SSS
- Viša škola - VŠS
- Fakultet - VSS
- Magisterij / Master
- Doktorski studij

Kako biste okarakterisali svoje radno mjesto?
Izaberite jedan od ponuđenih odgovora
Molimo vas da izaberete SAMO JEDAN od ponuđenih odgovora:
- Stručni saradnik
- Viši stručni saradnik
- Stručni savjetnik
- Inspektor
- Šef unutrašnje organizacione jedinice
- Rukovodeći državni službenik (rukovodilac, sekretar, pomoćnik rukovodioca, glavni inspektor)

Osnaživanje radnika

Odaberite odgovarajući odgovor za svaku stavku:

	1 - Apsolutno se ne slažem	2 - Ne slažem se	3 - Neutralan sam - Niti se se slažem niti se ne slažem	4 - Slažem se	5 - Apsolutno se slažem
Imam osjećaj ličnog osnaživanja kroz radne procese i aktivnosti					
Zadovoljan/na sam svojim učešćem u odlukama koje utiču na moj rad					
Imam povjerenje i sigurnost					

(table continues)

6

	1 - Apsolutno se ne slažem	2 - Ne slažem se	3 - Neutralan sam - Niti se se slažem niti se ne slažem	4 - Slažem se	5 - Apsolutno se slažem
u svog nadređenog					
Imam dovoljno resursa (oprema i materijal) da obavim svoj posao					
Imam dovoljno informacija o trenutnim aktivnostima moje institucije					
Imam slobodu da tražim nove tehnologije, procese, tehnike i / ili ideje na radnom mjestu					
Posao koji radim mi je veoma važan					
Osjećam se kompetentnim/om za obavljanje zadatih poslova					
Siguran/na sam u vlastite sposobnosti i vještine potrebne za obavljanje zadatih poslova					
Imam ovlaštenje da donesem neophodne odluke da dobro obavim svoj posao					
Moj nadređeni ima povjerenja i dozvoljava da donosim odgovarajuće odluke u svom poslu					
Imam prilike za nezavisnost i slobodu u tome kako obavljam svoj posao					

Informiranost uposlenika

Odaberite odgovarajući odgovor za svaku stavku:

	1 - Apsolutno se ne slažem	2 - Ne slažem se	3 - Neutralan sam - Niti se se slažem niti se ne slažem	4 - Slažem se	5 - Apsolutno se slažem
Pravodobno/pravovremeno dobijam relevantne informacije za rad od svog nadređenog					
Sve vrijeme dobijam potpune i tačne informacije					
Očekivanja od uposlenika u instituciji su dobro iskomunicirana (znamo šta se očekuje od nas na radnom mjestu)					
Sadašnje stanje institucije je dobro priopćeno od strane nadređenog					
Učestalost komunikacije između nadređenog i mene je odlična, tj. dobijam redovno instrukcije o poslu					
Učestalost komunikacije sa strankama je odlična					

Koji od navedenih faktora ometaju ili pomažu inovacije u vašoj instituciji?

Odaberite odgovarajući odgovor za svaku stavku:

	1 – Apsolutno ometaju	2 – Uglavnom ometaju	3 – Neutralan uticaj	4 – Uglavnom pomažu	5 – Apsolutno pomažu
Godišnji proces budžetiranja					

(table continues)

(continued)

	1 – Apsolutno ometaju	2 – Uglavnom ometaju	3 – Neutralan uticaj	4 – Uglavnom pomažu	5 – Apsolutno pomažu
Sistem naknada i unaprjeđenja					
Vrijednosti i kultura vašeg rukovodstva					
Organizaciona struktura institucije					
Kvalitet prijedloga koji dolaze od ostalih službenika					
Vrijednosti i kultura izabranih političara					
Kvalitet predloženih mjera od strane političara					
Uticaj vlade FBiH					
Direktive od EU					
Trenutno stanje ekonomije					
Medijska pažnja					
Uključenost građana					

Odaberite odgovarajući odgovor za svaku stavku:

	1 - Apsolutno se ne slažem	2 - Ne slažem se	3 - Neutralan sam - Niti se se slažem niti se ne slažem	4 - Slažem se	5 - Apsolutno se slažem
Radnici u mojoj instituciji se ohrabruju da razvijaju nove ideje					

(continued)

	1 - Apsolutno se ne slažem	2 - Ne slažem se	3 - Neutralan sam - Niti se se slažem niti se ne slažem	4 - Slažem se	5 - Apsolutno se slažem
Kreativni rad se cijeni i prepoznaje u mojoj instituciji					
Ljudi dobijaju pravedne i konstruktivne povratne informacije o svojim novim idejama					
Mi radnici znamo šta naša institucija želi da postigne (ciljevi)					

Odaberite odgovarajući odgovor za svaku stavku:

	1 - Apsolutno se ne slažem	2 - Ne slažem se	3 - Neutralan sam - Niti se se slažem niti se ne slažem	4 - Slažem se	5 - Apsolutno se slažem
Moj rukovodilac ili nadređeni služi kao dobar uzor u radu					
Moj rukovodilac pokazuje poverenje u moj rad					
Moj rukovodilac postavlja ciljeve na odgovarajući način					
Mogu slobodno i otvoreno razgovarati sa svojim rukovodiocem					
Moj rukovodilac me					

(table continues)

10

(continued)	1 - Apsolutno se ne slažem	2 - Ne slažem se	3 - Neutralan sam - Niti se se slažem niti se ne slažem	4 - Slažem se	5 - Apsolutno se slažem
ohrabruje da preuzmem rizike i sasvim je u redu pogriješiti u pokušajima					
Moj rukovodilac potiče podređene da rade na najbolji mogući način					
Moj rukovodilac gradi identitet i moral tima					
Moj rukovodilac nadahnjuje povjerenje svojim argumentima					
Moj rukovodilac optimistično razgovara o budućnosti					
Moj rukovodilac navode druge da gledaju na probleme iz više različitih uglova					
Moj rukovodilac vrednuje doprinose zaposlenika					
Moj rukovodilac potiče podređene da ponovno razmisle o svojim idejama					

Molim vas da u skladu sa ličnom ocjenom stanja u vašoj instituciji izrazite nivo slaganja sa dolje navedenim tvrdnjama na skali od 1 - Apsolutno se NE slažem do 5 - Apsolutno se slažem.

Odaberite odgovarajući odgovor za svaku stavku:

	1 - Apsolutno se ne slažem	2 - Ne slažem se	3 - Neutralan sam - Niti se se slažem niti se ne slažem	4 - Slažem se	5 - Apsolutno se slažem
Promocije/unapređenja u mojoj radnoj jedinici zasnivaju se na zaslugama					
Zaposleni su nagrađeni za pružanje visokokvalitetnih usluga					
Napredovanje u poziciji zavisi od toga koliko dobro zaposleni obavljaju svoj posao					
Nagrade u mojoj radnoj jedinici zavise od toga koliko dobro zaposleni obavljaju svoj posao					
Kreativnost i inovacije se nagrađuju					
U mojoj instituciji ljudi su nagrađeni za nove ideje koje dobro rade					
Moji napori su nagrađeni onako kako bi trebalo da bude					
Dobijam blagovremene pohvale za moje ideje/ dobar posao					

Koliko često komunicirate sa nizom različitih organizacija o pitanjima vezanim za instituciju (uključujući komunikaciju putem telefona, e-pošte ili lično, ali isključujući cirkularne poruke e-pošte)?

Odaberite odgovarajući odgovor za svaku stavku:

	1 - Nikada	2 – Rijetko	3 - Mjesečno	4 - Nedjeljno	5 – Dnevno
Službenik u drugoj federalnoj instituciji					
Političar					
Službenik u regionu					
Službenik iz EU					
Predstavnik poslovnog udruženja					
Vođa srednje ili velike privatne firme					
Predstavnik grupe građana					
Predstavnik sindikata					
Predstavnik medija					

Odaberite odgovarajući odgovor za svaku stavku:

	1 - Apsolutno se ne slažem	2 - Ne slažem se	3 - Neutralan sam - Niti se se slažem niti se ne slažem	4 - Slažem se	5 - Apsolutno se slažem
Na radnom mjestu stalno tražim nove procese, tehnike i / ili nove ideje za obavljanje radnih aktivnosti					
Na radnom mjestu stalno imam kreativne ideje					
Na radnom mjestu promovišem i širim ideje drugim kolegama					

(table continues)

(continued)

	1 - Apsolutno se ne slažem	2 - Ne slažem se	3 - Neutralan sam - Niti se se slažem niti se ne slažem	4 - Slažem se	5 - Apsolutno se slažem
Na radnom mjestu pokušavam da implementiram nove ideje					
Na radnom mjestu razvijam adekvatne planove i rasporede za implementaciju novih ideja					
Na radnom mjestu sam u stanju isprobati nove načine rješavanja problema s kojima se susrećem tokom rada					

Dijeljenje znanja

Odaberite odgovarajući odgovor za svaku stavku:

	1 - Apsolutno se ne slažem	2 - Ne slažem se	3 - Neutralan sam - Niti se se slažem niti se ne slažem	4 - Slažem se	5 - Apsolutno se slažem
Volim da budem u potpunosti informisan/a o onome što moje kolege znaju.					
Kada mi treba neko znanje, pitam svoje kolege o tome.					
Redovno					

(table continues)

(continued)

	1 - Apsolutno se ne slažem	2 - Ne slažem se	3 - Neutralan sam - Niti se se slažem niti se ne slažem	4 - Slažem se	5 - Apsolutno se slažem
obavještavam svoje kolege o tome na čemu radim.					
Kada sam naučio/la nešto novo, pobrinuo/la sam se da i moje kolege saznaju za to.					
Dijelim informacije koje sam stekao/la, sa svojim kolegama.					
Pitam svoje kolege o njihovim vještinama kada želim da naučim nešto.					
Smatram da je važno da moje kolege znaju na čemu radim.					
Kada je kolega dobar u nečemu, pitam ga da me nauči.					

Pošaljite vašu anketu.
Hvala za popunavanje ove ankete.

Appendix 6: Qualitative analysis results

Table 2 Output for descriptive statistics

	N	Min.	Max.	Mean	Std. Dev.	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
GEND	131	1	2	1.49	.502	.046	.212	-2.029	.420
AGE	211	2	7	4.27	1.179	.243	.167	-1.221	.333
EXP	210	1	5	2.37	1.005	.229	.168	-.890	.334
EDUC	210	1	5	3.31	.786	-.560	.168	1.723	.334
JOB	192	1	6	3.58	1.692	-.021	.175	-1.213	.349
EMP01	207	1	5	3.61	1.018	-.717	.169	.176	.337
EMP02	213	1	5	3.65	1.024	-.645	.167	-.175	.332
EMP03	213	1	5	3.57	1.178	-.697	.167	-.254	.332
EMP04	209	1	5	3.56	1.091	-.446	.168	-.785	.335
EMP05	211	1	5	3.22	1.171	-.127	.167	-.978	.333
EMP06	213	1	5	3.32	1.117	-.319	.167	-.841	.332
EMP07	212	1	5	4.27	.734	-1.196	.167	2.885	.333
EMP08	214	1	5	4.53	.633	-1.696	.166	5.173	.331
EMP09	211	1	5	4.53	.620	-1.677	.167	5.587	.333
EMP10	210	1	5	3.61	1.076	-.579	.168	-.341	.334
EMP11	210	1	5	3.75	1.000	-.673	.168	-.003	.334
EMP12	210	1	5	3.69	1.020	-.595	.168	-.241	.334
INFO1	214	1	5	3.43	1.080	-.573	.166	-.422	.331
INFO2	214	1	5	3.29	.965	-.146	.166	-.568	.331
INFO3	212	1	5	3.21	1.046	-.124	.167	-.744	.333
INFO4	208	1	5	3.27	1.020	-.213	.169	-.712	.336
INFO5	213	1	5	3.53	1.101	-.473	.167	-.562	.332
INFO6	203	1	5	3.90	.920	-.680	.171	.280	.340
DRIV1	210	1	5	3.04	1.110	.051	.168	-.745	.334
DRIV2	202	1	5	2.86	1.161	.129	.171	-.740	.341
DRIV3	203	1	5	3.24	1.106	-.158	.171	-.643	.340
DRIV4	210	1	5	2.95	1.101	-.014	.168	-.722	.334
DRIV5	208	1	5	3.40	.767	-.174	.169	.557	.336
DRIV6	199	1	5	2.44	1.094	.242	.172	-.649	.343
DRIV7	200	1	5	2.50	1.089	.130	.172	-.757	.342
DRIV8	202	1	5	3.11	1.119	-.174	.171	-.555	.341
DRIV9	200	1	5	3.57	.818	-.545	.172	1.054	.342
DRIV10	193	1	5	2.56	.940	.301	.175	-.139	.348
DRIV11	195	1	5	2.98	.876	.076	.174	.357	.346
DRIV12	195	1	5	3.31	.785	.043	.174	.866	.346
ORGE1	214	1	5	2.71	1.114	.212	.166	-.822	.331
ORGE2	213	1	5	2.62	1.162	.271	.167	-.849	.332
ORGE3	210	1	5	2.68	1.054	.184	.168	-.568	.334
ORGE4	212	1	5	3.14	1.166	-.251	.167	-.818	.333
SUPE1	213	1	5	3.38	1.091	-.493	.167	-.327	.332
SUPE2	212	1	5	3.72	.863	-.715	.167	.766	.333
SUPE3	211	1	5	3.34	1.036	-.411	.167	-.375	.333
SUPE4	211	1	5	3.82	.985	-1.009	.167	.935	.333
SUPE5	209	1	5	3.32	1.091	-.306	.168	-.684	.335
SUPE6	210	1	5	3.43	1.088	-.377	.168	-.476	.334
SUPE7	210	1	5	3.20	1.166	-.224	.168	-.697	.334

(table continues)

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	N	Min.	Max.	Mean	Std. Dev.	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
SUPE8	208	1	5	3.22	1.085	-.221	.169	-.487	.336
SUPE9	208	1	5	3.29	1.043	-.251	.169	-.413	.336
SUPE10	207	1	5	3.33	1.051	-.438	.169	-.407	.337
SUPE11	210	1	5	3.23	1.106	-.324	.168	-.543	.334
SUPE12	208	1	5	3.26	.994	-.343	.169	-.102	.336
REWA1	213	1	5	2.51	1.123	.384	.167	-.652	.332
REWA2	211	1	5	2.43	1.073	.532	.167	-.317	.333
REWA3	213	1	5	2.47	1.208	.483	.167	-.746	.332
REWA4	210	1	5	2.50	1.154	.436	.168	-.634	.334
REWA5	211	1	5	2.39	1.083	.482	.167	-.434	.333
REWA6	210	1	5	2.34	1.083	.618	.168	-.210	.334
REWA7	212	1	5	2.61	1.161	.282	.167	-.704	.333
REWA8	214	1	5	2.89	1.153	.017	.166	-.840	.331
NETW1	210	1	5	3.57	1.217	-.289	.168	-1.248	.334
NETW2	206	1	5	1.72	1.076	1.687	.169	2.187	.337
NETW3	210	1	5	2.43	1.088	.590	.168	-.217	.334
NETW4	208	1	5	1.87	.933	1.137	.169	1.222	.336
NETW5	205	1	5	2.46	1.223	.577	.170	-.640	.338
NETW6	204	1	5	2.40	1.205	.628	.170	-.611	.339
NETW7	210	1	5	2.36	1.206	.653	.168	-.572	.334
NETW8	206	1	5	2.34	1.082	.664	.169	-.168	.337
NETW9	205	1	5	2.15	1.124	.943	.170	.256	.338
INNO1	208	2	5	3.75	.800	-.386	.169	-.170	.336
INNO2	206	2	5	3.64	.789	-.216	.169	-.321	.337
INNO3	206	2	5	3.89	.738	-.490	.169	.296	.337
INNO4	208	2	5	3.94	.709	-.648	.169	.857	.336
INNO5	206	2	5	3.71	.746	-.476	.169	.125	.337
INNO6	206	1	5	3.85	.777	-.687	.169	.796	.337
KNWL1	210	1	5	3.96	.734	-1.105	.168	2.659	.334
KNWL2	210	1	5	4.13	.647	-.984	.168	3.432	.334
KNWL3	209	1	5	3.74	.809	-.541	.168	.260	.335
KNWL4	211	1	5	4.00	.778	-.806	.167	1.411	.333
KNWL5	211	1	5	4.09	.704	-.961	.167	2.357	.333
KNWL6	210	1	5	4.13	.647	-.877	.168	3.008	.334
KNWL7	208	2	5	3.91	.800	-.529	.169	.027	.336
KNWL8	209	1	5	4.17	.690	-.852	.168	2.072	.335
Valid N	61								

Table 3 VIF for latent variables

		Collinearity Statistics	
	(Constant)	Tolerance	VIF
1	DRIVs	.499	2.003
	NETWs	.873	1.146
	ENCOs	.309	3.236
	EMPs	.642	1.557
	KNOWs	.835	1.197
	REWs	.289	3.460
	AGE	.882	1.134
	EDUC	.945	1.058
	JOB	.823	1.216

Appendix 7: Missing data

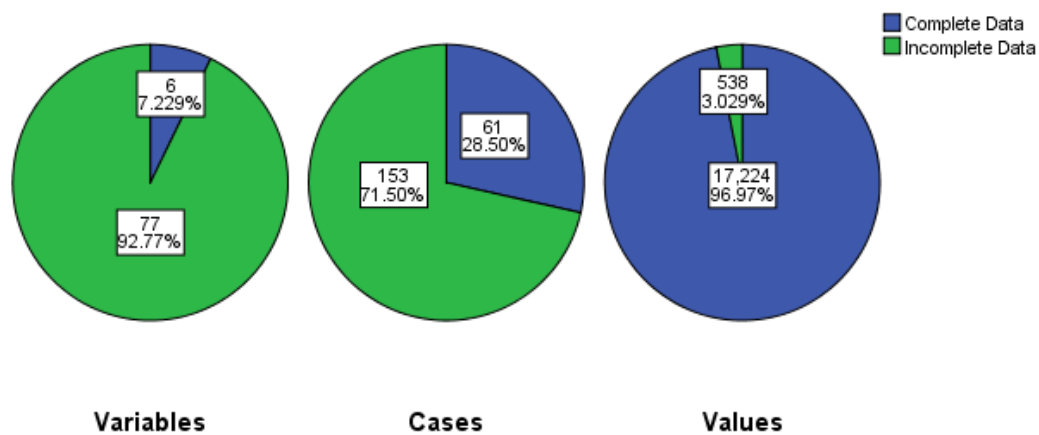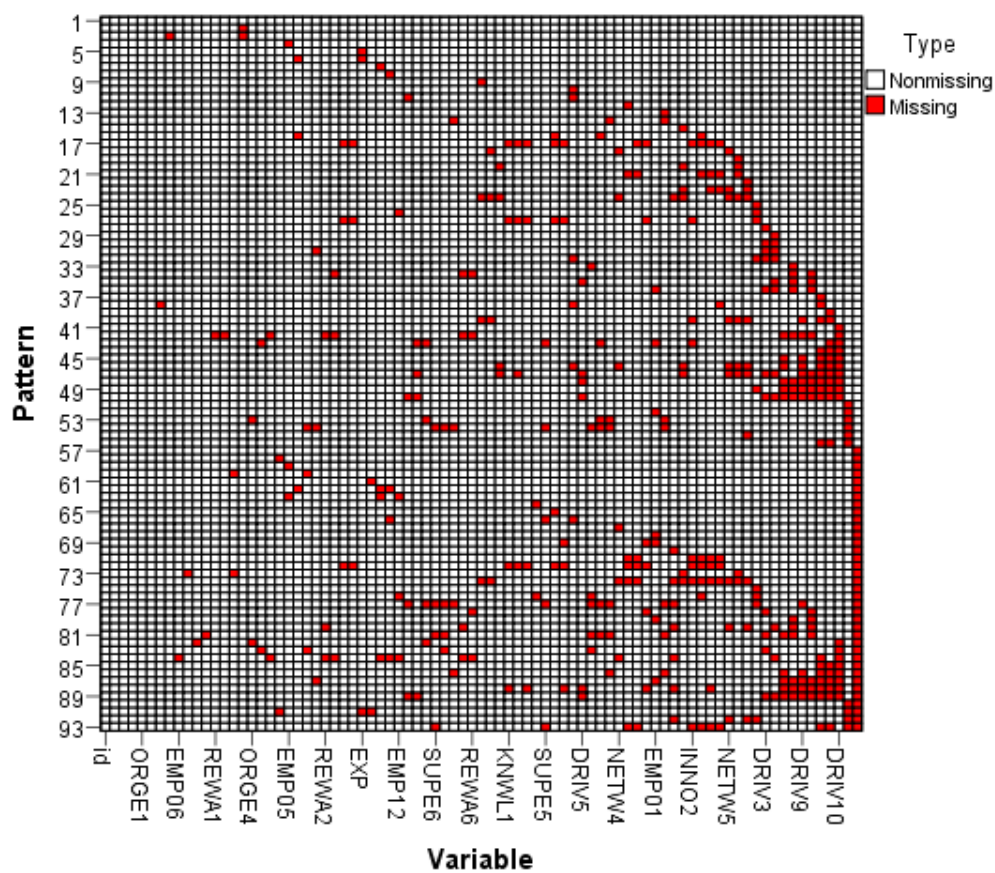*Figure 1 Overall summary of missing data*

Figure 2 Missing value patterns

Appendix 8: Lisrel output on hypotheses testing
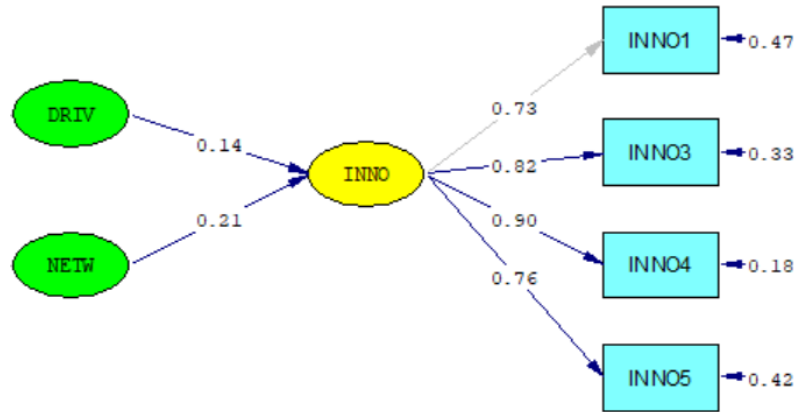
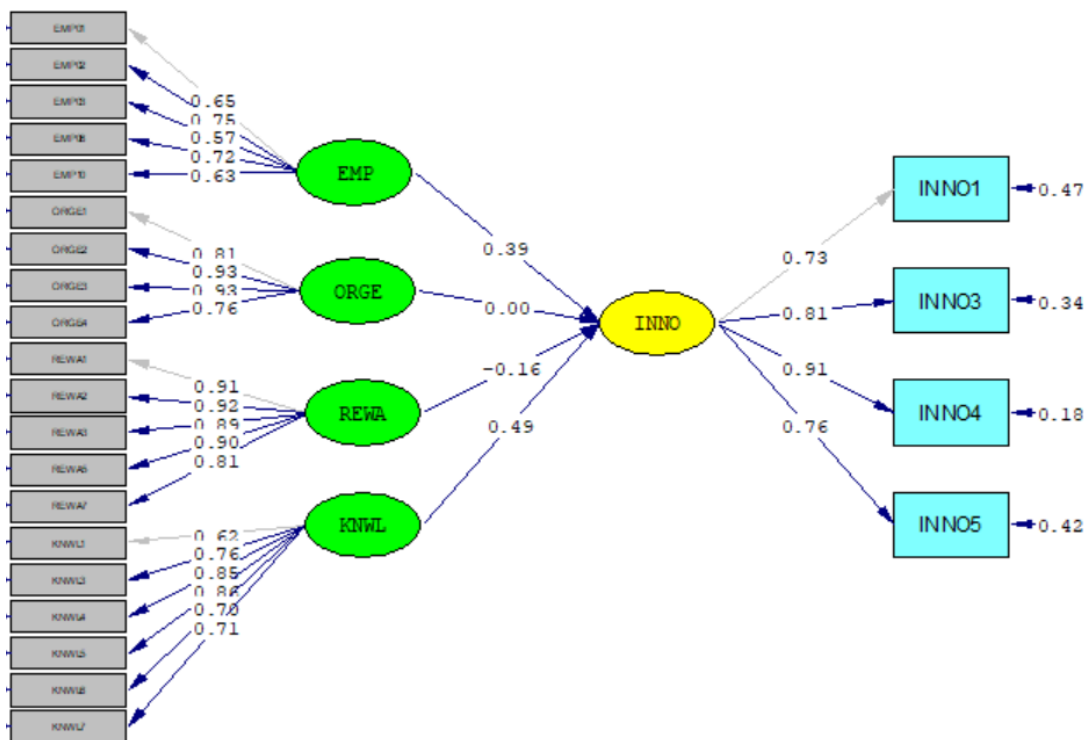*Figure 3 Hypotheses testing for Model 1*

Figure 4 Hypotheses testing for Model 2

*ORGE is the code for organisational encouragement.

Appendix 9: Obstacles to innovation in the PS of FBiH

Figure 5 Obstacles to innovation in the PS of FBiH