Entrepreneurial Behaviour and Organisational Propensity to Innovate in a Public Sector Context

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Abstract

The importance of innovation, in both private and public entrepreneurial fields, is the basis of all companies' strategic choices. This study examines entrepreneurship and innovation, as well as their dynamic interface in value creation, in the public sector. It explores entrepreneurial determinants for public sector innovation, as collected from managers and employees involved in the water supply and sewage industries in Ukraine. The data, related to a sample of firms, were obtained from a twofold self-administered survey. Adopting an ordered logistic regression model to analyse the data obtained from a survey, it is discovered that the entrepreneurial determinants of self-awareness, knowledge-enabling and entrepreneurial orientation positively correlate with fostering innovation process. The findings reveal that entrepreneurial leadership and intrapreneurial self-efficacy are mediating determinants. Finally, the results demonstrate that intrapreneurial self-efficacy has more potential than entrepreneurial leadership to stimulate innovation at the individual level, which has both theoretical and practical implications.

Keywords

Public management, entrepreneurship, creativity & innovation in business, management

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Public sector entrepreneurship is a dynamic research domain, fostering innovation and creativity (Leyden, 2016; Turkel & Turkel, 2016). Studies of public value-added entrepreneurial services stress the importance of overcoming the "non-innovative" stereotype and reinventing "innovativeness". Historically, research employs entrepreneurship as an instrument to guide transformational processes and increase structural efficiency, introducing new ways to interact with citizens that improve the efficiency and performance of service delivery (Considine et al., 2009; Benington & Moore, 2010; Moore, 2013; Alsos et al., 2016). On the one hand, most of these studies credit contemporary corporate entrepreneurial practices like digital innovation and entrepreneurial networking as core performance indicators (Lewis et al., 1980; Kingdon & Stano, 1984). On the other hand, they discredit public sector entrepreneurial and organisational performance (Hood, 1991; Osborne & Gaebler, 1992; Moore, 1995). As a result, there are two related approaches to researching the relationship between public innovation and entrepreneurship.

First, the National System of Entrepreneurship's (NSE) approach holistically focuses on the entrepreneurial conditions of the public sector within the context of sustainability and innovation. It focuses on institutional stakeholders' relations and aligns the entrepreneurial environment with the concept of sustainable development and quality-of-life approaches (Acs et al., 2017; Leyden, 2016; Costanza et al., 2007). Moreover, it stresses the interrelation between public sector innovation activities and entrepreneurial practices with respect to social well-being, while addressing the challenges of sustainability and innovation (Alsos et. al, 2016; Bason, 2018). A systematic review conducted by Windrum et al. (2008) demonstrated the negative impact of the general perception that the public sector is non-entrepreneurial and stagnant. Their review found that the belief that the private sector is more innovative drives the public sector to adopt privatization strategies to ensure innovation, productivity, and employment. They identified the following generic factors to distinguish when innovation is happening within the public sector:

i) incentive structure;

ii) public sector entrepreneur;

iii) bottom-up and top-down innovation;

iv) impact of NPM on innovation; and,

v) implications of consumerism. These five innovation factors should be linked to profit-driven mechanisms determined by internal processes (Alsos et al., 2016).

The second approach requires an understanding of the external and internal organisational antecedents (Walker, 2014) that trigger the transformation of innovation drivers. According to Leyden & Link (2015), a "public sector entrepreneur" is a person who can take innovative decisions under risk, highlighting "innovation and economic growth" as a key motivation for their behaviour. Furthermore, this approach suggests a significant element of modernization in public management practices, in which the role of entrepreneurial thinking is taken seriously

within the process of public value creation. Therefore, this approach differs from the NSE approach, as it is initiated from public organisations' internal conditions and properties require that stimulate innovative activities. Its application generates novel possibilities for exploring the entrepreneurial behaviour patterns and innovation practices of internal organisational stakeholders (e.g., employees and managers) (Mikkelsen et al., 2017).

Both approaches contribute to research regarding public sector entrepreneurship by addressing the challenges of fostering public sector innovation and sustainability. Overall, the first approach focuses on individual stakeholders and institutional frameworks, and the second one focuses on individual stakeholders within an organisation. Although they are complementary theories, there is a gap in the current research regarding their overlapping domains of the conditions and determinants of public entrepreneurship. Consequently, systematic research is required to close these gaps by identifying potential determinants that foster innovative and sustainable public practices.

Even less attention is paid to public entrepreneurship in transition and developing economies, where entrepreneurial culture, particularly in the public sector, is relatively weak and needs reforms to facilitate change. Recent studies suggest that establishing supportive regulative institutional arrangements and government programs in developing economies facilitates informal networks and promotes growth of new entrepreneurial culture. This results in increased orientation toward sustainability and improves the rates of productive entrepreneurship (Audretch, Belitski & Cherkas, 2021). In this context, the case of Ukraine's developmental journey, beginning in 2014, when the EU-Ukraine Association Agreement was signed, and including the Deep and Comprehensive Free Trade Area, may serve as a positive example of reforms in both private and public sectors.

In 2014, the Ukrainian government introduced an ambitious reform agenda that included a major banking system reform accompanied by a flexible exchange rate regime, e-Government for public procurement and value-added tax repayments, and professional governance for several state-owned enterprises. Ukraine has made considerable progress in decentralisation; deregulation; and, justice, customs and tax, and anticorruption reforms. Historically, the country's economic strengths included agriculture, metallurgy, nuclear energy, chemical engineering, and heavy manufacturing. However, more recently, Ukraine has emerged as a home for innovative businesses and entrepreneurs in finance, high-tech and, particularly, the fast-growing IT and digital services sector (Conlon ed al., 2021). Although the private sector changes, particularly in the case of small and medium enterprises (SMEs), may seem more obvious, there are also spill-over effects in the public sector. Still a largely unexplored area, particularly in the context of transition economies, the study of entrepreneurial determinants for public sector innovation is of great social scientific interest. Although entrepreneurial behaviour and innovation are rather universal (Johnson, 2001), the mediating determinants of entrepreneurial leadership and intrapreneurial self-efficacy may strongly depend on the wider economic context and can be influenced by structural changes related to reforms.

Specifically, the aim of this study is to test the assumption that internally and/or externally driven cognitive entrepreneurial behaviours and processes affect the organisational propensity

to innovate. Despite contemporary studies on the entrepreneurial potential of public-sector employees (Rogowska et al., 2017), the influence of organisational stakeholders' roles on innovation and sustainability remains vague. In addition, the internal properties that define and motivate public sector employees' entrepreneurial actions and behaviours must be identified in order to discover the effects of entrepreneurial behaviour on public sector innovation. Thus, it is assumed that internal processes are key to studying entrepreneurial behaviour in a public sector context. Therefore, this paper aims to reveal the correlations between perceived entrepreneurial potential (i.e., displayed entrepreneurial behaviour of public-sector managers and employees) and innovativeness of public-sector organisations.

The study is organised as follows. In the first, part there is an identification process of the entrepreneurship determinants within public organisations. Subsequently a review of current research on entrepreneurial behaviour determinants, attempting to improve the field's current understanding of the prerequisites of entrepreneurial activity, is provided. It is evaluated the influence on public sector organisational innovation by formulating and testing five hypotheses within a country context. Third, it is defined the data collection methods and explained the empirical analysis used to test hypotheses. Finally, a discussion of the findings and results of the analysis is provided. In the next Figure (Figure 1) the main key points of the work are briefly represented.

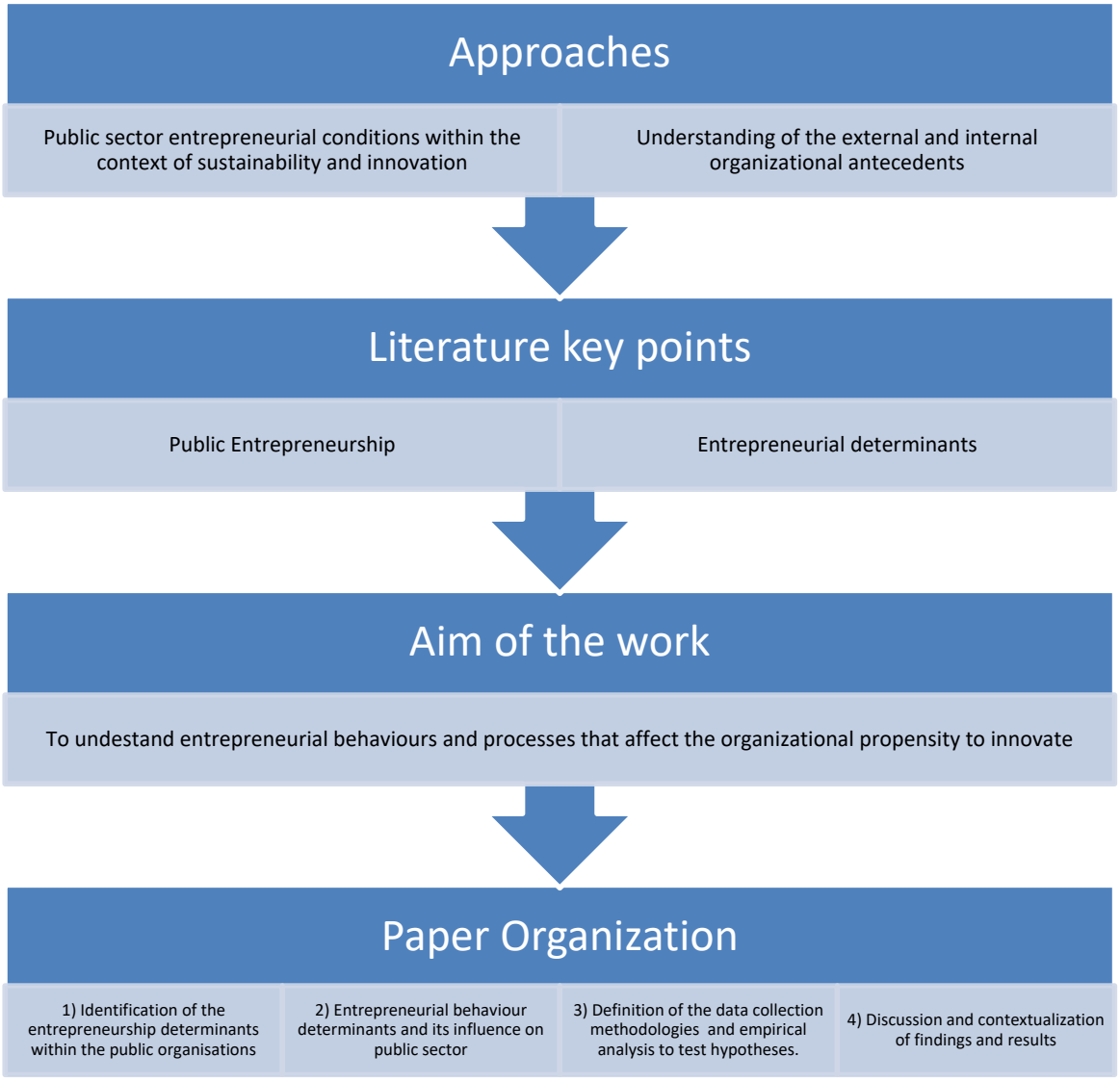

Figure 1: Key points

Research Design and Hypotheses

Determinants of the entrepreneurial behaviour within the public-sector context

According to Mulgan (2007), innovation in the public sector is identified as the process of generating new ideas and applying them to generate public/social value. Specifically, the task "to generate the value for society" moves innovation beyond the usual framework to the categories of the public value management approach (PVM-approach) as a specific tool for tackling problems (Meynhardt & Metelmann, 2009). The more precise specification was suggested by Bloch (2011), who brought it in line with the classical understanding of innovation as new or significant changes to services and goods, operational processes, organisational

methods, or the way your organisation communicates with users. In this study, this definition is relevant to consider the significance of public value in order to provide consistency with the literature based on theoretical and empirical definitions of innovation in the public sector context. In addition, this approach has been adapted to the principles of "European Public Sector Innovation Scoreboard", that is about the public sector innovation which is about new or improved processes (internal focus) and services (external focus) (Hollanders et al., 2013). This statement extends the idea innovation within public-sector organisations, allowing consideration of the public sector as a kind of "Schumpeterian innovator". In fact, it considers the direct and indirect effects of innovations generated in the public sector on the stimulation of innovation processes of other sectors (private or non-governmental).

The innovation process may take place since they may provide regulatory changes within the process of market development (Hollanders et al., 2013). Given this fact, it is reasonable to consider public-sector entrepreneurship with respect to the creation of a sustainable innovative economy under the NSE-framework, which implies the possibility of enhancing the entrepreneurial environment in the public sector (Leyden, 2016). Since thus study explores the interrelation of innovativeness and displays of entrepreneurial behaviour at an individual level, it requires consideration of cognitive processes as a common attribute that reflects the behaviour of public-sector employees and managers. Thus, to provide consistency in measurement, the propensity of public organisations to innovate is considered as perceived innovativeness at an individual level. This implies detailed treatment of the public-sector organisations' innovativeness in terms of the taxonomy of public-sector innovations and an assessment of the managers' and employees' awareness of innovations. According to Windrum (2008), there are six types of innovation in the public sector: service, provision, or delivery, organisational, conceptual, policy and systematic. To reveal the perceived innovativeness of an organisation at an individual level when conducting a self-administrated survey, it is necessary to set a specific question that asks the respondent to consider each type of innovation in the public-sector context. Simultaneously, the managers' and employees' awareness of the significance of public value creation through public-sector innovation must be considered. Cole & Parston (2006) highlighted the following clusters of innovation value in the public-sector context: outcomes, productivity, services and democracy. This study emphasizes the outcomes identified in Cole & Parston's classification and applied in the report on "Powering Public Sector Innovations: Towards a New Architecture" (2013). In this case, outcomes refer to "better achievement of individual and societal outcomes such as increased health, learning, job creation, safety, sustainable environment, etc.", as external as well as internal (productivity-focused) outcomes (Hollanders et al., 2013). Moreover, public-sector organisations are expected to gain "external" and "internal" outcomes in such a way that the first ones provide a guide for achieving the second ones. To address the objectives of the study, it is important to uncover the impact of entrepreneurial behaviour on the propensity to innovate. Due to the non-monetary nature of "entrepreneurial" gain, it is defined as a supportive means for proactively driven innovation in the public-sector context that is aimed at providing higher efficiency of public value generation. In such a way, the study of "supportive means" effects should assess its influence on a set of conductive conditions to ensure innovations at public organisations. Such assessment needs an appropriate determination of conditions aimed to enhance their propensity to innovate.

Assuming that innovation in public contexts responds to peculiar managerial conditions, Sahni (2013) suggested particular sets of these conditions, the common feature of which is a potential to foster innovation processes at public sector organisations. These sets include experimentation, feedback loops, and motivation for improvements (Sahni 2013).

Furthermore, the EU survey conducted among public officials outlined the following classification for innovation antecedents: internal, external and political (Hollanders et al., 2013). Due to the emphasis on internal cognitive processes and behavioural effects, studying internal factors is of major interest. These factors include human resources-related factors (education, training, incentives to innovation, management, and leadership) and bureaucracy, organisational structures and design (also including the internal innovation culture) (Hollanders et al., 2013). To outline the framework of conducive conditions, it is adopted Sahni's system of classification and supplement it with the factors suggested in the EU survey. Moreover, motivation and incentives, knowledge management, leadership and control, experimentation and self-awareness are considered as managerial conditions. This approach enables further exploration of the propensity to innovate via 'entrepreneurial impact' in the public-sector context. Further analysis aims to identify appropriate determinants of when and how entrepreneurial behaviour occurs in public-sector organisations. Based on our empirical research concerning the entrepreneurial potential of public-sector officials, managers and employees, there are five generic determinants of perceived entrepreneurial behaviour: *entrepreneurial orientation, entrepreneurial leadership, self-awareness and self-efficacy, knowledge-sharing*. This allow the introduction of specific proxies motivating the entrepreneurial intentions of public-sector employees and managers that are personal attitudes and perceived behaviours.

According to the assumptions of the theory of planned behaviour, intention is conditioned by cognitive processes (Goethner et al., 2012). As noted earlier, the propensity to innovate (perceived innovativeness) is not directly connected with the intentions of acting entrepreneurially. Instead, this connection is mediated by the influence of displays of entrepreneurial behaviour that enable conducive conditions for public sector organisations to innovate. The particular emphasis, in this case, is on the process of acting entrepreneurially while exploiting opportunities for new knowledge applications to increase the efficiency of public value creation. Since existing academic literature provides a relatively narrow range of the developed theoretical frameworks to examine "which factors and managerial practices in the public sector are conducive to innovative activity" (Demircioglu & Audretsch, 2017), one of the core tasks is an operationalization of the public sector entrepreneurship concept based on available empirical findings (i.e., to set the system flow of "concept - measurement techniques - social indicators"). Hence, consideration of public sector managers' and employees' entrepreneurial potential, based on their propensity to innovate via five generic proxies of displays of entrepreneurial behaviour, is justified by two main reasons. First, the adoption of the most relevant variables for the empirical study of public-sector officials' entrepreneurial behaviour according to public-sector entrepreneurship theory. Second, the evaluation of these variables in terms of their innovativeness, applying the established sets of conducive conditions. To develop a model to analyse cognitive process (in section 4), data was collected via a self-

administered survey (in section 3) that consists of sets of questions that correspond with each of the five generic proxies. The goal was to gain a clear understanding of the features inherent to entrepreneurial leadership, entrepreneurial orientation, self-awareness, self-efficacy and knowledge-sharing.

Hypotheses formulation

Entrepreneurial leadership

The concept of entrepreneurial leadership and (McGrath & Macmillan, 2000; Leitch et al., 2017) its influence on employee behaviour and organisational effectiveness (Mishra & Misra, 2017) remains a complex knowledge domain. Significant research has focused on the link between leadership effects and employee behaviour with respect to innovation, specifically on employees' approaches to entrepreneurial leadership and innovative decision-making within their work routine (Chen et al., 2016). For instance, according to Mishra and Misra (2017), entrepreneurial leadership has a considerable enabling impact on effectiveness regardless of the type of organisation. The core research findings identify leadership attributes that affect the innovative behaviour of employees. Based on the literature, there are several attributes: i) empowering employees to engage in opportunities to explore ways to achieve organisational goals in the most efficient way (Chen, 2007; Renko et al., 2015); ii) taking risks by letting employees work beyond their core responsibilities (Kuratko et al., 2014); iii) maintaining the innovation by developing a process for its adoption (Surie & Ashley, 2008); and, iv) setting and clarifying the goals for value generation according to the core organisational mission (Greenberg et al., 2011). Public entrepreneurial leadership is responsible for transforming public sector organisations from inflexible and bureaucratic (i.e., slow to respond to economic changes and customer needs) to consumer and quality-oriented (i.e., susceptible to such changes) (Newman 2005; Storey 2004; Currie et al., 2008). "Associated with the leadership template of government policy, leaders of public sector organisations are expected to be more business-like, including exhibiting entrepreneurial leadership characteristics" (Currie et al., 2008, p.988). This statement supports Newman's (2005), positive contribution of the business practices exploration to the adjustment of the "dynamic leadership style" and appropriate involvement of entrepreneurial values, within a public context. It reveals a shift in public organisational performance from being passive or reactive to being proactive (Morris & Kuratko, 2002). Moreover, it promotes an innovation-enabling environment that uses incentives to guide employees' entrepreneurial orientation through a motivational system (Sadler, 2000; Zerbinati & Souitaris, 2005; Mair, 2002). Consequently, the following hypothesis is articulated:

Hypothesis 1. The entrepreneurial leadership determinant positively correlates to public organisations' propensity to innovate.

Entrepreneurial orientation

Entrepreneurial orientation is considered to be a core element of analysis to determine public employees' entrepreneurial potential. It represents an assessment of the employee's pro-activeness while performing their regular job functions (Meynhardt & Diefenbach, 2012; Karyotakis & Moustakis, 2016; Kwon & Cho, 2017). Furthermore, the dimension of

entrepreneurial orientation should be explored for public intrapreneurship, rather than a direct performance-measurement, which is more inherent for private-sector employees (Rogowska et al., 2017). Simultaneously, it involves the treatment of the employees' behaviour about past experience, previous contacts with an entrepreneur or personal entrepreneurial actions. In sum, previous public sector studies distinguish the following core features of entrepreneurial orientation: i) a factor that indicates how effectively and promptly one reacts to external changes (Kim, 2010; Kwon & Cho, 2017); ii) a series of key drivers within a bottom-up innovation strategy (Fernandez & Pitts, 2011; Karyotakis & Moustakis, 2016); and, iii) a specific source for increasing the quality and efficiency of public goods provision and public service delivery (Rogowska et al., 2017). In addition, entrepreneurial orientation should be considered a supplementary category with respect to entrepreneurial leadership. The perception of entrepreneurial leadership varies according to one's position. In fact, according to Mishra and Mirsa (2017, p.75) "The executives are feeling motivated, and this motivation gets reflected in a higher degree of creative integration leading to higher involvement of people in organising available resources for the maximum advantage of the organisation." As a result, in contrast to private employees, managers do not have high leadership expectations of their public employees in relation to innovation and creativity.

Innovation in the public sector can improve the quality of delivered services and reduce costs. This could be promoted in case of significant shifts in public policies that grow in importance in transition economies. Particularly noteworthy are improvements in the areas of SME greening, including entrepreneurship as a key competence in the policy documents that guide the national education agenda and supporting women's entrepreneurship. In the specific case of Ukraine, the government changed their approach to public sector management, allowing professional managers to take leading positions to improve the performance of state-owned enterprises (Conlon ed al., 2021). This approach largely, but not unanimously, resulted in substantial improvements, contributing to shifts toward an entrepreneurial mindset and stimulating more initiatives and risk-taking. One reason is the recent contribution of motivational attributes to public-sector entrepreneurial thinking. In addition, it is also necessary to associate entrepreneurial leadership with the attributes of entrepreneurial orientation assessment. Therefore, on the one hand, managers' application of entrepreneurial thinking in the workplace promotes the formation of an intrapreneurial mindset in their employees and stimulates employees' perception of managers as innovators. On the other hand, it displays an increasing willingness to take a proactive and creative approach, and this is the second hypothesis.

Hypothesis 2. The entrepreneurial orientation determinant positively correlates to public organisations' propensity to innovate.

Self-awareness

Studies of the self-awareness in relation to individuals' entrepreneurial competence development are common (Lans et al., 2010). In most cases, self-awareness within the public-sector context is associated with its reflective interrelation with the existing human relations

(HR) feedback system, as presented in section 2. It is worth interpreting this interrelation mechanism more precisely. According to Duval and Wicklund (1972), HR feedback is based on a motivational properties' set inherent for objective self-awareness. Other scholars also highlight the positive constructive feedback on performance (Weibel & Six, 2013). "When constructive feedback does not undermine employees' autonomy, it will enhance internalization of actions and employees' self-determination" (Demircioglu & Audretsch, 2017). Constructive feedback is an employee's propensity-driver, accelerating readiness to innovate and enhancing employees' involvement. The "feedback-gained" benefits include increased motivation for professional development, learning, and pro-activeness.

However, self-awareness in the public sector is more complex than in the private one. To discover if this category is a determinant of entrepreneurial behaviour in public sector organisations, it is not enough to consider the system of intrinsic motivation. There is another significant aspect that should be mentioned: attitude-behaviour of non-conformity, where external pressure leads to a speedy organisational transformation process. Lack of conformity increases the demand for public organisations to adopt to private sector practices. It leads to a natural institutional transformation toward a hybrid public-private structure (GCPSE, 2015). Simultaneously, society is changing quite slowly in relation to the new public management practices. Thus, it is necessary to examine the perception and displayed behaviour of "conformity" as an indicator for organisational stakeholders. Fletcher and Baldry (2010) assessed self-awareness by applying a measure of correspondence of self-rating with an external one and revealed a high correlation of such variables with performance outcomes. Hence, self-awareness is associated with the correspondence of self-determination and external attitudes and these main dimensions are distinguished as follows: i) necessity to relieve intrinsic contradictions between pure-entrepreneurial interest and public value creation (Currie et al., 2008); ii) development of the ability to recognize and exploit opportunity, aligned with core individual task-level performance; and, iii) balance between organisational and personal risk, under the predominant condition (Kearney et al., 2008; Kearney & Meynhardt, 2016). All these dimensions are manifestations of the main task to generate public value in a proactive and innovative way (Moore, 1995) at an individual level.

Hypothesis 3. The self-awareness determinant positively correlates to public organisations' innovation management.

Intrapreneurial self-efficacy

While self-awareness is related to the formation of self-determination under the condition of its correlation with external attitudes, self-efficacy indicates, in fact, Bandura (1997) explains that to believe in one's capabilities and to organise and execute the courses of action required to have given levels of attainments (Bandura, 1997). Perceived self-efficacy refers to the set of cognitive processes that condition resistance to obstacles and the ability to act according to a chosen model of behaviour to achieve certain goals (Ajzen, 2002). According to Bandura (1993), employees with self-efficacy have a greater ability to cope with new and difficult tasks and perform more effectively in general. Moreover, organisations' work context matters, as self-efficacy is one of the key drivers of work motivation (Wright, 2004).

Based on research on motivational aspects of public-sector organisations, it is reasonable to define the main indicators of self-efficacy as follows: i) clear understanding of organisational mission and a commitment to achieve these goals; ii) mitigation of ambiguity of goals and interests; iii) willingness to overcome procedural constraint barriers (Wright, 2004, Desmidt & Prinzie, 2018). These indicators compose a theoretical framework for work motivation from the standpoint of the conditions that support self-efficacy.

Self-efficacy within entrepreneurial studies is considered to be a pivotal dimension of intrapreneurial self-capital and entrepreneurial motivation (McGee et al., 2009; Di Fabio, 2014). Intrapreneurial self-capital, in turn, is represented as "a set of individual psychological resources that could help individuals to cope with frequent changes and transitions and transform constraints into resources during a period of work change and uncertainty" (Di Fabio & Kenny, 2018, p.8). Moreover, self-efficacy as a construct of intrapreneurial self-capital is an effective tool that supports one's ability to work out an appropriate answer to the rapidly changing entrepreneurial environment (Duradoni & Di Fadio, 2019). More importantly, it implies the possibility of developing managerial practices to enhance employees' self-efficacy. Entrepreneurial self-efficacy explores the strength of a person's belief that he or she is capable to perform in a successful way the different roles and tasks of entrepreneurship (Chen et al., 1998). The direct and indirect effects of self-efficacy positively correlate it with the propensity to innovate, job autonomy and pro-active, intrapreneurial behaviour (Cetin, 2011). Therefore, the fourth hypothesis to test is:

Hypothesis 4. The intrapreneurial self-efficacy determinant positively affects public organisations' propensity to innovate.

Knowledge-enabling

The knowledge–enabling indicator is used in public-sector studies on knowledge management processes (knowledge creation, sharing, and exploitation) within an entrepreneurial and innovative context. The significant ability of such managerial processes to foster innovation at an organisational level is reported and confirmed in several studies (Martín-de Castro et al., 2011; Mardani et al. 2018). In turn, organisational knowledge and the management of knowledge-sharing channels (external and internal) are important for achieving organisational objectives in the context of new public management (Cong & Pandya, 2003; Audretsch & Belitski, 2020). These relationships are explicitly described by Shane (2004) using the example of academic entrepreneurship, where a department or a student innovates within the academic institution (i.e., exploiting knowledge gained within an academic context). Knowledge-gaining and sharing in intrapreneurial contexts is highly related to awareness issues. It implies a deep comprehension of the internal barriers that prevent organisations from achieving their objectives a (i.e., innovation activities), as well as the tools or drivers to overcome them (D'Este et al., 2012, Demircioglu & Audretsch, 2017). Moreover, the impact of a knowledge management system is multidimensional. Mardani et al. (2018) highlight a significant positive correlation between knowledge creation and the speed, quality, and quantity of innovative processes within an organisation, which has an indirect impact on an organisation's propensity to innovate.

Nowacki and Bachnik (2016) emphasize the role of knowledge management as applying, in fact the expertise of the workforce, adding new value by making people collaborate on new information, extract vital data and process it appropriately to the organisational needs (Nowacki & Bachnik, 2016). It implies both horizontal and vertical collaboration to provide explicit channels of information exchange and sharing with the full engagement of employees and managers (Whitford et al., 2010; Whelan 2015). Such knowledge-enabling management ensures that recognition of opportunities occurs at all levels of the hierarchy (Currie et al., 2008). Management of the channels of new knowledge transfer can only support a favourable environment for public sector organisations to innovate if it stimulates experimentation and provides access to managerial information (Zampetakis & Moustakis, 2010). In addition, knowledge-enabling regarding innovation regulates employees' entrepreneurial intentions concerning the general course of the organisation (Arundel & Huber, 2013).

Furthermore, within a knowledge management system, managers are considered to be the individuals who are aware of the allocation of the knowledge resources at a particular organisation, while employees are perceived as knowledge mediators (Nowacki & Bachnik, 2016). Thus, the treatment of the knowledge-enabling indicator requires exploration the simplification of knowledge gaining and knowledge transfer — i.e., identifying explicit channels to exchange knowledge across different hierarchical levels without losing information clarity. Simultaneously, it includes a system of incentives to find or exploit new knowledge, aligned with the general availability of additional resources to increase knowledge. Thus, the formulation of the fifth hypothesis is:

Hypothesis 5. The knowledge-enabling determinant positively correlates to public organisations' innovation culture.

Ukrainian context disclosure

The selection of context was performed using the criteria of relevance, data availability and practical necessity. The public services sector in Ukraine is currently under active transformation. These processes include intensive modernization of production and appropriate adaptation of new managerial techniques to generate public value more effectively. Ukraine is a country with a "catching-up" economy, where fostering innovation in the public (state) sector is an effective tool to stimulate economic development (Antoniuk & Cherkas, 2018). According to the Global Innovation Index 2021, Ukraine ranks is the third most innovative country in the lower-middle-income category, after Vietnam and India (WIPO, 2021). The country has relative strengths in human capital, creative industries and knowledge/technology outputs, and recent reforms have improved the quality of the country's entrepreneurial ecosystems. There are a range of new innovative businesses and entrepreneurs, primarily in the IT sector, but also in the finance, high-tech and digital services sectors (Conlon et al., 2021). Ukraine is associated with European business and innovation support programmes that support entrepreneurship with digital transformation and, among other, contributed to the development of a pan-European network of Digital Innovation Hubs.

A targeted approach was used to address the issue of poor management in public companies, and several experienced private sector managers were hired by the government to improve the efficiency of major public enterprises (energy sector, public railways, etc.). This caused the paradigm shift regarding the perception of innovativeness in the public sector. The transition to the market economy from the planned economy of the Soviet era that largely persisted in Ukraine's public sector at the end of the 20th and beginning of the 21st centuries was a rather slow process. It was dependant on the natural replacement of an older workforce by the younger generation educated in modernized, post-Soviet universities and colleges. After reforms were implemented, the public sector developed wider networks within local entrepreneurial ecosystems that significantly accelerated their transformation. Moreover, this transformation was accompanied by the appearance of local public service entrepreneurship in the sphere of public services (for instance, within the water supply industry). In these cases, private entrepreneurial initiatives offered alternative approaches in comparison to the generally accepted practices of public management. From a purely theoretical perspective, this phenomenon includes the concept of prior knowledge of customer needs (i.e., fast access to the necessary knowledge) and discovery theory (adhering to the idea of the objective nature of the entrepreneurial opportunities).

The significant feature of Ukraine's transformation is the dominance of targeted state programs, which implies the incorporation of public-private partnerships (PPP) as an instrument for new ideas and elaboration of public studies at the pre-market stage to achieve conformity with European standards. The core of PPP introduction is to aid "new innovative companies, including the creation of incentives for public bodies to establish start-ups, facilitation of commercial exploitation of new public R&D products, information services, etc." (Yegorov, 2017, p.160). Hence, the state's use of PPP as a core antecedent to fostering public sector innovation somewhat reflects the statements of the Oslo Manual on Assessing recent developments in innovation measurement (Statistical Office of the European Communities, 2005). Since PPP is not considered to be more effective by itself, the focus shifts to the flexibility of managerial practices, confirming the significance of appropriately incorporating commercial principles as an attribute of public sector development from the standpoint of efficiency (Bloch & & Bugge 2013).

Nevertheless, innovation management in Ukraine's public sector is often considered inefficient. For instance, the State Energy Saving Programme has developed several innovative projects for utility energy efficiency (the reduction of water waste, the rational use of heat, etc.). However, some of these projects were not implemented or were only partially implemented (SAEE, 2020). It is also worth mentioning that the public service sector has great social and economic significance, providing essential services to households, public sector organisations and numerous businesses. Public sector organisations own about 25% of the state's fixed assets in Ukraine. In this context, the public services sector is a quasi-market environment that requires cooperation between government and business to stimulate investment activity. In addition, the peculiarities of Ukraine's public sector transformation include the following attributes:

1) support for the competitive management of innovation projects under the state's targeted programmes (to derive benefits from private sector management tools with simultaneous state support for innovation and to develop a collaborative, pro-active and change-oriented network) (Moutinho et al, 2016);

2) introduction of public sector innovation and entrepreneurship within educational and training programmes (Belitski et al 2020) and, 3) development of state programmes aimed at providing a higher level of the SME participation within public sector innovations. The success of this substantial transformation requires appropriate developments at both organisational and individual levels, as it implies a high level of reliable exchange regarding public-private managerial practices.

For these reasons it is important to explore individual-level causality relationships in the Ukrainian context. That is why the exploration of the causal relationship between the formation of an entrepreneurial mindset and an organisation's propensity to innovate is of significant interest. In this sense, elaborating the theoretically and empirically substantiated instruments to improve public sector management systems is a primary task for researchers. Furthermore, the importance of these studies within the Ukrainian context is further supported by the great practical importance of the reforms that are taking place there in comparison to countries with more developed formal institutions. It is also worth mentioning that there is a significant theoretical benefit to studying such causality relationships within an ecosystem under transformation because doing so can provide additional precision regarding future data generation and analysis.

Hence, this study explores the public sector within the Ukrainian context, concentrating on the water supply and sewage sectors. The service sector is recognized as one sphere of the larger public sector that has generated significant scholarly interest (Yegorov, 2017). The primary reasons for having chosen this sector are as follows:

(1) they have the most developed and transparent innovation programmes within Ukraine's public service industries (Riaz et al. 2018); (2) their managers have extensive experience realizing innovation projects, including internationally; and, (3) they both evidence the phenomenon of local entrepreneurship. All of these facts make the industry we chose the most conducive for studying how entrepreneurial behaviour impacts organisations' propensity to innovate.

Anyway there are some contradictory results in this study about the water supply and waste industry globally. For instance, even though the majority of high-income countries were positively affected by privatization (e.g., Italy), a minority resulted in less efficiency (e.g., France and partially Germany, in the case of Berliner Wasserbetriebe) (Werle, 2004). Moreover, findings in the context of countries that are described as middle- or low-income are even more inconsistent. In some cases, a positive effect was demonstrated, while other results were the opposite (GCPSE, 2015). Since, as was mentioned before, ownership issues are not crucial per se, analysis of additional factors (progress of the reforms, established competitive environment, institutional development, service delivery features, managerial effectiveness,

price-quality disequilibrium, etc.) is required to improve the quality of analysis (GCPSE, 2015). However, these conditions alone cannot guarantee either improvements in efficiency or foster innovation. Moreover, this work, try to enrich the current literature with respect to the base for the analysis, as entrepreneurship in the public sector was examined mainly within the health care sphere, on the example of the university research activities or public-private transfers, omitting analysis of the utilities industry's cases (Iliashenko, 2015). Hence, this study shows the necessity of specific surveys aimed at understanding the internal processes that condition public sector innovations. These surveys should be designed to disclose the particular aspect of innovation processes to obtain reliable data. The Oslo Manual (2005), among a set of potential sources to obtain data concerning different activities of public sector organisations, emphasizes the importance of specialized surveys (i.e., consumer, employee and manager surveys) designed for target respondents (Statistical Office of the European Communities, 2005). Since it is difficult to identify uniform innovation practices within the public sector context in Ukraine, a specialized survey is a highly recommended data collection method to obtain relevant indicators for further analysis. Thus, the present research considers issues that are highly relevant to the Ukrainian public service sector's modern economic environment. Furthermore, this study has the potential to provide findings that will be helpful in the context of different countries, as it seeks to contribute to theories of public sector entrepreneurship as well as to the innovation literature within the modern paradigm of public management.

Data and Methodology

Data and Sample

Methods and data

The survey was conducted with individual public-sector managers and employees, with a focus on respondents who are typically involved in the decision-making processes regarding innovative aspects of their organisation. The survey consisted of two parts. The first part included a set of questions aimed at assessing the organisation's perceived innovativeness from the standpoint of the employees and managers. The questions were based on the Harmonised Innovation Survey Questionnaire used by Eurostat to analyse "innovativeness of sectors by type of enterprises" in the frame of their Community Innovation Survey (Appendix A). Such adaptation is justified because research has shown that assessments of innovativeness within a private context are also appropriate for exploring innovation in a public context (Torugsa & Arundel, 2016).

The second part included separate sets of questions specifically devoted to each factor (as explained in the previous section) of the theoretical model. The questions were formed using the literature on public organisations' entrepreneurial behaviour to provide a comprehensive assessment of the different features of each factor (Appendix B). As far this survey aimed to understand perspective at an individual level, it requires assessing personality traits to provide a comparable quantitative measurement. Therefore, a five-point Likert scale was used (for further information see Likert, 1932, Boone and Boone, 2012; Drucker 1993). Both parts of the

questionnaire request that respondents assign a degree of agreement to a set of statements using a scale from 1 to 5, where “1” means completely disagree and “5” means completely agree.

Eight water supply and water sewage industry enterprises (5 big, 1 medium and 2 small) from different regions (representing the south, north, central, east and west parts of the country) were surveyed. The sample included 87 valid responses from employees (63%) and managers (37%), mostly between the ages of 41 and 50, with a 73% response rate. The questionnaires that contained missing values were not used for analysis.

Dependent variables

Since this study is aimed at discovering the effects of entrepreneurial behaviour on the formation of enabling environments for innovation with public organisations, it focuses on employees' and managers' perceptions of the described phenomenon. To explore the effects of entrepreneurial behaviour on public sector organisations’ propensity to innovate perceived organisational innovativeness are used as an output variable.

Independent variables

The input variables, which are used to describe the perceived entrepreneurial behaviour of public-sector organisations, include Entrepreneurial orientation, Entrepreneurial leadership, Self-awareness, Intrapreneurial self-efficacy and Knowledge-enabling. The determination of the independent variables was based on comprehensive literature review of the entrepreneurial behaviours of public-sector managers and employees.

Control variables

Moreover, considering the peculiarities of public-sector innovation activities, control variables were added to describe structural and organisational factors (for instance, the organisation’s size and gender structure) and job position classification (involving employees and managers), as well as Lack of qualified personnel and Lack of adequate finance (Wise, 1999; Wynen et al., 2014; Demircioglu & Audretsch, 2017). The addition of these control variables is reasonable because factors such as specialized education and budget constraints are conducive conditions for innovation in public-sector organisations (Demircioglu & Audretsch, 2017).

Model

The dependent variable “perceived organisational innovativeness” represents a meaningful order with five categories — how respondents evaluate their opinion. If a dependent variable has more than two categories, and the values of each category have a clear sequential order where there is a value higher than the previous one, the ordered models should be used.

As previously stated, the Ordered Logistic Regression model will be used for this analysis. This is a regression model for an ordinal response variable, and it is based on the cumulative probabilities of the response variable. More specifically, the logit of each cumulative

probability is assumed to be a linear function of the covariates with regression coefficients constant across response categories (Gelman & Hill, 2006).

The OLOGIT model used in this study can be written as follows:

$$\mathrm{P}(y_t > j|\boldsymbol{X}) = g(X_i\beta') = \frac{\exp(X_j\beta_j - a_j)}{1+\exp(X_j\beta_j - a_j)}, j = 1,2,\dots,m-1, \quad (1)$$

where y_t is the probability of the response; X_i is a (k x 1) vector of observed non-random explanatory variables; β is a (k x 1) vector of unknown parameters to be estimated; *m* is the number of categories of the ordinal dependent variable; and, *j* is the number of observations. The parameters of the model (β_j) and the cut-points (a_j) are estimated by the method of maximum likelihood. The Ordered Logistic model is associated with important assumptions. The first assumption of an OLOGIT is the homoscedasticity of error variances. Another assumption is the proportional odds assumption (assuming the same relationship between each pair of outcome groups), which was tested with the Brant test. This test measures whether the observed deviations from the Ordinal Logistic Regression model are bigger than what could be attributed to chance alone (Brant, 1990).

One of the model's assumptions is that the independent variables should be uncorrelated. If this does not occur, and the explanatory variables are strongly correlated, there is a multicollinearity problem. Briefly, it is a regression model problem that determines important changes in the values of the regression coefficients and for the p-values for minimal changes in the least squares equation. Furthermore, it can also reduce the significance of explanatory variables that are important for estimating the value of y. The multicollinearity among the independent variables was checked using the correlations matrix as well applying the variance inflation factor (VIF)[1] in the models as dependent variables.

Summary statistics

The sampling period covers data collected from January to June 2018. Table 1 presents descriptive statistics for dependent and independent variables. About 34% of employees are male, while 66% are female; 77% of all respondents have tertiary education. One hundred percent of employees work full time.

As previously explained, it is important for this analysis to calculate the correlation between variables and the related significance tests. From a theorical point of view, statistically significant correlations affirm that x_i variables are correlated with y, and for this motivation it makes sense to include them in the model.

[1] For further information about VIF and multicollinearity, see Thompson et al., 2017 and Tamura et al., 2019.

Table in Appendix C provides the correlation matrix. In this table it is possible to observe the high correlation between Self-awareness and Entrepreneurial leadership ($r=0.718$, $p<0.05$) and Entrepreneurial orientation ($r=0.712$, $p<0.05$). This is in line with concepts presented in previous research findings (Demircioglu & Audretsch 2017; Rogowska et al., 2017).

Perception of the Knowledge-enabling and Self-awareness aspects of innovation activity are quite high (mean 3.82 and 3.75, respectively, Table 1), with a significant correlation between these variables ($r=0.695$, $p<0.05$, Appendix C). Entrepreneurial leadership is evaluated as a significant parameter (mean 3.27) that is highly correlated to Knowledge-enabling ($r=0.703$, $p<0.05$). In turn, Entrepreneurial orientation and Intrapreneurial self-efficacy are perceived as less significant parameters in comparison to other dependent variables (mean = 1.80 and 1.3). Perception of personnel qualifications and Adequate financing are also quite significant (mean 3.55 and 3.59); however, these parameters do not show substantial correlation with both organisational and individual innovativeness. The general perception of the parameters presented in the study is consistent with contemporary entrepreneurship research in the public sector context (Lewis et al., 2018; Miao et al., 2018). Furthermore, respondents, in general, evaluated perceived organisational innovativeness, as well as individual innovativeness (mean 3.62 and 3.34, respectively) highly, with a significant correlation between parameters ($r=0.782$ $p<0.05$). This is relevant to Arnold's (2019) findings.

Based on those results, the highly correlated variables are not included in the same models. Therefore, on Appendix B there are a separate regression models for each of the entrepreneurial behaviour indicators.

Insert here Table 1

Results

To test our hypotheses, according to five specifications, an Ordered Logistic regression model is used and the results are on Table. Each model includes one of the entrepreneurial behaviour variables (Appendix B) as well as the variables of perceived limitations (Lack of qualified personnel and Lack of adequate finance) and a list of control variables (company size and individual characteristics of respondents). Additionally, the results of the Ordered Logistic regression without control variables are reported in Appendix D.

Insert here table 2

Mostly, the coefficients across the models are stable. Table 2 summarizes the four out of five entrepreneurial behaviour variables that show statistically significant positive effects on perceived organisational innovativeness. Entrepreneurial leadership positively impacts organisational innovativeness ($\beta = 1.69$, $p<0.001$), supporting H1. These findings are in line with the research carried out by Mishra and Misra (2017) and Widyani et al. (2020). There is also a significant positive impact of Entrepreneurial orientation ($\beta = 2.00$, $p<0.001$), confirming support for H2. The positive relationship between entrepreneurial orientation and innovation performance was emphasized by Karyotakis and Moustakis (2016) and Freixanet et al. (2021). An increase in Self-awareness of innovation activity is found to be a strong indicator of Perceived organisational innovativeness ($\beta = 2.86$, $p<0.001$), thereby supporting H3, as well as the previous findings of Kim and Choi (2020). According to the model results, Intrapreneurial self-efficacy is not associated with the growth of Perceived organisational innovativeness, as the coefficients in specification (4) were not found to be significant, rejecting H4. An increase in Knowledge-enabling affects positively effects the dependent variable, though the coefficients are almost half of those of Self-awareness ($\beta = 1.15$, $p<0.001$), thus supporting H5. These results are consistent with the findings of a study conducted by Dang et al. (2018), indicating that knowledge-enabling factors improve various aspects of organisational effectiveness.

Hereby, our findings confirm H1, H2, H3 and H5 and reject H4. Intrapreneurial self-efficacy does not seem to affect Perceived organisational innovativeness. Interestingly, the Lack of qualified personnel and Lack of adequate finance variables had no effect, while individual innovativeness was found to be a strong predictor of perceived organisational innovativeness ($\beta = 1.96$, $p<0.001$).

The results indicate no significant relationship between perceived organisational innovativeness and company size. Respondents with university degrees evaluated perceived organisational innovativeness higher than those without university degrees ($\beta = 2.43$, $p<0.001$), whereas relationships for gender were negative for the first and fifth factors. The perception of organisational innovativeness decreases with the age of respondents ($\beta = -0.77$, $p<0.05$, Table 2).

Discussion

This research aimed to provide a systematic approach to analysing entrepreneurial behaviour in the public sector by considering an organisation's propensity to innovate in the first step the determinants of public sector entrepreneurship are identified also taking into account the entrepreneurial behaviour of public sector employees and managers at the individual level. To provide a basis for the development of a comprehensive theoretical framework, this study employed a set of generic proxies for entrepreneurial behaviour in a public-sector context based on this exploration of the most relevant concepts in the literature. In this sense, the results are in line with findings, based on the empirical analysis of the Australian Public Service Commission dataset, which affirm that public organisations should concentrate on intrinsic

attributes of jobs and increase employee motivation to have innovation (Demircioglu & Audretsch 2017) and, as sustained by De Vries et al., (2016), that a relevant role is played byorganisational antecedents to enable innovation in different sectors. Moreover, this research supports the concept of 'day-to-day' entrepreneurship (Mair, 2005), which defines entrepreneurial behaviour at an individual level as a set of whether they are collective, or individual should be aimed at overall innovation.

To affirm the relationship between perceived entrepreneurial behaviour and perceived organisational innovativeness in the public sector, several studies on public sector organisations' propensity to innovate are analyzed and determinants of entrepreneurial behaviour are considered. This work studies the effects of the five entrepreneurial behaviour determinants on the propensity to innovate in the public sector based on the test of a set of articulated hypotheses. The results suggest that entrepreneurial leadership, self-awareness, knowledge-enabling, and entrepreneurial orientation are the core determinants of entrepreneurial behaviour that have a positive correlation to the public sector organisations' propensity to innovate.

According to the results, self-awareness of innovation activity seems to be a substantial driver of public organisation innovativeness. This is reflected in its potential to enhance innovation activity within a particular field defined by the organisation beforehand (Currie et al., 2008) and to stimulate public value generation in a pro-active and innovative way (Moore, 1995). On the one hand, this result aligns with papers that highlight the positive impact of constructive feedback on innovative processes at the organisational level and uncovers its role as a motivational driver of employees' willingness and incentive to innovate at an individual level (Demircioglu & Audretsch, 2017; Duval & Wicklund, 1972). Moreover, in the public sector context, constructive feedback is represented as a system that includes "employees - managers - society attitude". On the other hand, these findings show a strong correlation between intrinsic motivation and public sector managers' and employees' abilities to most efficiently and innovatively create public value. The higher the level of self-awareness demonstrated by public sector employees, the more effective a motivation system will be in terms of influencing their work outcomes. Also, the correspondence between self-determination and external attitudes (i.e., between displayed behaviour and its external perception) in the public sector context significantly affects employees' abilities to explore and exploit opportunities within their regular work-related activities. Hence, it is expected that in the process of developing a system to incentivize managers to act creatively and proactively within their core task-performance (i.e., introducing entrepreneurial approach), public administration gains a potent instrument to regularize organisational and personal risks and stimulate public sector innovation. In this respect, a promising direction for future studies is testing how the self-awareness determinant affects public sector employees and managers' attitudes toward risk, particularly the balancing of personal and organisational risks.

The results also reveal that impact of public sector employees' displays of entrepreneurial potential and pro-activeness while performing a regular task at the workplace. These are illustrated by the positive effect of the entrepreneurial orientation determinant on perceived

organisational innovativeness. In this sense, entrepreneurial orientation is also a proxy for appropriately assessing public-sector employees' entrepreneurial behaviour regarding their ability to pursue innovative opportunities (Rogowska et al., 2017). The study suggests that the mechanism of this impact takes place in the same manner in both public and private sector contexts and supports employees' empowerment. Simple constructs, such as past entrepreneurial experience or previous contacts with entrepreneurs, determine employees' entrepreneurial behaviour by providing a greater ability to react to external changes efficiently and promptly (Kim, 2010). Consequently, entrepreneurial orientation in the public sector context functions as an indicator of employee empowerment. In turn, the persistent encouragement of participatory decision-making and knowledge-enabling tends to create a favourable environment for innovation, translating created knowledge into new innovative opportunities. A significant perspective for further studies is the interrelatedness of the speed and diversification of public sector innovation and the perceived entrepreneurial behaviour of managers and employees.

The third parameter that demonstrated a significant influence on the propensity of public sector organisations to innovate is entrepreneurial leadership. Entrepreneurial leadership shapes development of the intrapreneurial mindset of public sector employees, directing the transfer of knowledge and experience related to entrepreneurial thinking from managers to their employees. It corresponds to the findings of recent research that recognized leadership as "the most important contributor to self-rated innovation capacity" (Lewis, et al. 2018). Therefore, the category of entrepreneurial leadership is considered to be a supplementary determinant of entrepreneurial orientation. This statement is in line with the findings of Miao et al. (2018), who highlighted the stimulating effect of entrepreneurial leadership on employees' innovative behaviour, connecting the mechanisms of such impacts to the dimensions of psychological empowerment. Moreover, it supports the idea of the dependence between "managerial empowerment practices and employee alertness to new opportunities" in public sector organisations (Arnold, 2019, p.1). However, according to the literature review, in contrast to the private sector, public sector employees have low expectations regarding their leaders' innovative competence (Mishra & Misra, 2017). Considering the previous findings, a useful insight could be linked to the underestimation of public sector managers' abilities to be pro-active leaders would have a negative effect on the development of an intrapreneurial mindset among public sector employees. Thus, ignorance of entrepreneurial leadership as a determinant of public sector managers' entrepreneurial behaviour (due to its interdependence with the entrepreneurial orientation indicator) can significantly inhibit the stimulation of organisational innovativeness in the public sector. Therefore, it is of great importance to consider the following peculiarities of public sector organisations as places for improvement when developing a top-down innovation strategy:

- attribution of "leadership" issues to departments in general, rather to one particular person;
- the strong bureaucratic character of interdepartmental connections;
- association of top-down innovation strategy with governmental regulation, rather than with top-down management initiatives or innovative and pro-active attitudes regarding decision-making processes.

Thus, according to these results, entrepreneurial leadership has a significant impact on the propensity of public sector organisations to innovate. Hereby, consideration of the entrepreneurial leadership category within the public sector context is a prospective avenue for future research, which should shed light on the development of innovative management systems. Further studies can discover new prospects for enhancing the top-down innovation strategies of public sector organisations.

Furthermore, the knowledge-enabling determinant seems to be another key driver that has a positive impact on the dependent variable, though it is less significant than the self-awareness or entrepreneurial leadership and orientation determinants. Hence, the development of external and internal channels of knowledge creation, sharing, and exploitation that make managerial information available and clear at all hierarchical levels is a substantial prerequisite to the creation of a favourable environment for innovation in public sector organisations. In addition, enhancing knowledge-enabling processes in public organisations leads to a sustained increase in the ability to commercially exploit knowledge gained within innovation activity, which is consistent with Shane's (2004) findings. As mentioned earlier, the knowledge-enabling determinant is highly connected with self-awareness in such a way that the latter provides a deeper understanding of the internal barriers to innovation, while the former provides tools to overcome them (Demircioglu & Audretsch, 2017). Likewise, it requires complete involvement of public sector managers and employees in the opportunity-seeking processes, as well as their commitments to the core goals of public sector organisations (Currie et al., 2008). Thereby, the empirical results confirm Mardani et al.'s findings (2018), which emphasized the positive correlation between knowledge-enabling and the fostering of innovation, in this case, in the public sector context. Moreover, according to recent research, the public sector generates knowledge that is aimed at supporting knowledge-intensive entrepreneurial organisations (Audretsch & Link, 2019). Thus, further exploration of the knowledge-enabling processes as a determinant of entrepreneurial behaviour in the public sector enriches the knowledge of the public sector by providing new insights.

It was demonstrated that intrapreneurial self-efficacy does not significantly influence the innovativeness of public sector organisations. Entrepreneurial self-efficacy beliefs as intermediate variables can translate perceptions of cognitive components into perceived entrepreneurial behaviour (Mair, 2005). Nevertheless, intrapreneurial self-efficacy in the public sector context performs the role of the indicator that reflects the cognitive processes of the transformation into perceived entrepreneurial behaviour for the employees. Thereby, according to the results of the analysis, this indicator seems to have explanatory potential from the standpoint of the entrepreneurial behaviour displayed within public sector organisations, but it does not determine the relations between entrepreneurial behaviour and perceived organisational innovativeness. However, it is worth admitting that within analyses without control variables (Appendix D), intrapreneurial self-efficacy demonstrates a positive impact on public sector organisations' propensity to innovate. This suggests that the ability to translate perceptions of cognitive components into entrepreneurial behaviour under distinct conditions directly impacts the fostering of innovations in the public sector and this determinant requires further study.

Individual innovativeness is important for improving a company's innovative capacity. According to Efrata et al. (2021), individual innovativeness has a positive effect on entrepreneurial intentions. Proactiveness and risk-taking complement individual innovativeness as key competencies that support entrepreneurship. The decision to switch careers to become an entrepreneur requires mental readiness as well as specific skills and abilities (Kraus et. al., 2019). Syed et al. (2020) confirmed innovativeness as one of the important elements of entrepreneurship that helps business's grasp opportunities in the most effective way.

Additionally, an explanatory framework of the analysis includes indicators at the employee and managerial levels as well as the governmental element, which is represented by the Lack of qualified personnel and Lack of adequate finances variables. In this regard, the findings suggest that these indicators were not identified as a problem from the standpoint of organisational innovativeness. The significant impact of the whole framework introduced in this study was demonstrated for the indicators reflecting public sector employee's and managers' entrepreneurial behaviour, affirming its potential to enhance organisations' ability to pursue innovative activity opportunities.

Within the public sector context, it is of great importance to consider the reasons entrepreneurial behaviour. Thus, in this study, an "innovative component" for analysis is introduced, assuming that stimulation of entrepreneurial behaviour within the public sector has the potential to foster innovation in organisations. Finally, the development of entrepreneurial potential among public sector employees and managers can significantly improve several innovation strategies. Moreover, doing so requires both top-down and bottom-up managerial strategies that allow human resources reformations based on performance screening. Another valuable achievement of the study is widening the context for considerations of entrepreneurship within the public sector, since it shows how to analyse self-reported data from the water supply industry, while previous studies used data related to academic entrepreneurship or health care institutions.

Conclusion

This paper explores the causal relationships between entrepreneurial behaviour and innovation in the public sector. It discovers the innovation impact of five core entrepreneurial behaviour determinants on the public sectors' organisational stakeholders. The empirical analysis in the context of a developing country that has enacted transformational processes in their public service sector is a meaningful source of information on the cognitive processes underpinning changes in managerial systems at the individual and organisational levels. The data collection process employed a self-reported questionnaire to obtain appropriate information to test the hypotheses articulated in the study. The Ordered Logistic Regression method was used to test the hypotheses.

According to the results of the analysis, the following determinants of entrepreneurship positively impact the innovation processes of public sector organisations: self-awareness, entrepreneurial orientation, entrepreneurial leadership, and knowledge-enabling. Moreover, intrapreneurial self-efficacy has a positive indirect effect. Entrepreneurial leadership is identified as a supplementary category to entrepreneurial orientation, and it has an indirect

impact on the propensity to create new opportunities for innovation and this support H1 and H2. Moreover, intrapreneurial self-efficacy was found to be an intermediate determinant, forcing the transformation of "intention-into-action" in the public sector context. Consequently, displays of entrepreneurial behaviour from staff employed in the public sector support the development of environments that conducive to improving public sector organisations' propensity to innovate that support H3. Enhancing innovation activities, improving managerial systems, and forcing entrepreneurial thinking on managers and employees can produce the substantial potential to overcome internal barriers to innovation and increase the effectiveness of innovation strategies in the field. The findings demonstrate that intrapreneurship in the public sector can be a supportive tool to foster innovation, which creates great improvements in top-down and bottom-up innovation strategies. Therefore, the obtained results have important theoretical and practical implications. For instance, they suggest that it is important to provide public sector employees with enough space to realise their pro-active and innovative desires in relation to core organisational goals, simultaneously stimulating managers to behave as proactive and innovative leaders. Hence, it is reasonable to discourage managerial practices that impede intrapreneurial thinking, while implementing practices that promote intrapreneurial intentions. The research identifies conditions that are conducive for recognising and exploiting opportunities to innovate in the public sector. Thus, the study contributes to the public sector entrepreneurship and innovation literature by exploring the role of entrepreneurial behaviour regarding innovation and presents insights and directions for further studies in the field.

Limitation and future development of the work

The current study has several limitations. The first limitation is related to the method of data collection, which was based on a self-reported questionnaire and, therefore, relied on individual judgments. However, involving public sector employees in a survey avoids "top-down" innovation strategy biases (Torugsa & Arundel, 2016, Demircioglu & Audretsch, 2017). The second limitation is the sample of organisations from one particular industry. Nevertheless, focusing on the "perceived" variables, this study appeals to the cognitive processes that make applied approach flexible to the context, implying prospects for the further cross-industry exploration. The third limitation is the focus on only one country with a transitional economy. However, being oriented to the perceived entrepreneurial behaviour, the approach could also be applied within the context of developed countries. Moreover, it opens new prospects for cross-country analysis. In such a way, the findings open promising perspectives on the possibilities for future research from the standpoint of theoretical and practical contributions to public sector entrepreneurship and innovation concepts.

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Table 1. Descriptive statistics

Variable	Mean	Std. Dev.	Min	Max
Perceived organisational innovativeness (1 = strongly disagree; 5= strongly agree)	3.62	0.88	1.4	5
Entrepreneurial leadership (1 = strongly disagree; 5= strongly agree)	3.27	0.53	1.9	4.5
Entrepreneurial orientation (1 = strongly disagree; 5= strongly agree)	1.80	0.63	0.4	2.6
Self-awareness of innovation activity (1 = strongly disagree; 5= strongly agree)	3.75	0.60	1.8	4.6
Intrapreneurial self-efficacy (1 = strongly disagree; 5= strongly agree)	1.30	0.80	0.4	2.6
Knowledge-enabling (1 = strongly disagree; 5= strongly agree)	3.82	1.02	1	5
Individual innovativeness (1 = strongly disagree; 5= strongly agree)	3.34	1.02	1	5
Lack of qualified personnel (1 = strongly disagree; 5= strongly agree)	3.55	1.05	1	5
Lack of adequate finance (1 = strongly disagree; 5= strongly agree)	3.59	1.11	1	5
Size of the company (1= small: less than 50 employees, 2 =middle: 50 ≤ 250 employees; 3 = big: more than 250 employees)	2.72	0.66	1	3
Manager (respondent's position is manager =1, otherwise 0)	0.37	0.49	0	1
Education level (university degree=1; otherwise 0)	0.77	0.42	0	1
Gender (female=1, otherwise 0)	0.66	0.48	0	1
Age group (18 -30 = 1; 31-40 = 2; 41-50 = 3; more than 50 = 4)	3.00	0.84	1	4

Table 2. Results of Ordered Logistic regression for Perceived organisational innovativeness

Explanatory variables	Dependent variable: Perceived organisational innovativeness				
	(1)	(2)	(3)	(4)	(5)
Entrepreneurial leadership	1.689*** (0.50)				
Entrepreneurial orientation		1.998*** (0.45)			
Self-awareness of innovation activity			2.865*** (0.50)		
Intrapreneurial self-efficacy				0.529 (0.30)	
Knowledge-enabling					1.154*** (0.29)
Individual innovativeness	1.995*** (0.37)	2.019*** (0.35)	1.845*** (0.36)	2.220*** (0.35)	1.713*** (0.38)
Lack of qualified personnel	-0.166 (0.21)	-0.042 (0.21)	-0.149 (0.20)	0.019 (0.21)	-0.236 (0.22)
Lack of adequate finance	0.115 (0.20)	0.093 (0.20)	0.286 (0.20)	0.014 (0.21)	0.183 (0.21)
Size of the company	0.609 (0.46)	0.415 (0.47)	0.651 (0.45)	0.349 (0.47)	0.842 (0.48)
Manager	0.812 (0.47)	0.930* (0.46)	0.907 (0.47)	0.597 (0.46)	0.988* (0.46)
Education level	2.458*** (0.57)	2.175*** (0.58)	2.631*** (0.57)	2.487*** (0.56)	2.407*** (0.59)
Gender	-0.545 (0.45)	-1.267** (0.46)	-1.337** (0.46)	-0.716 (0.44)	-0.662 (0.44)
Age group	-0.708** (0.26)	-0.772** (0.25)	-0.853*** (0.26)	-0.838** (0.26)	-0.677** (0.26)
Cut-point 1	4.293 (2.42)	1.029 (1.90)	6.996** (2.31)	-0.061 (1.89)	2.266 (2.03)
Cut-point 2	5.363* (2.37)	2.120 (1.83)	8.462*** (2.27)	0.896 (1.79)	3.391 (1.98)
Observations	86	86	86	86	86
R^2_p	0.199	0.213	0.237	0.185	0.207
Chi^2	124.069	133.051	147.975	115.320	129.531
p	0.000	0.000	0.000	0.000	0.000

Notes: *, **, and *** indicate statistical significance at the 10, 5, and 1% levels, respectively. Standard errors are reported in parentheses.