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Exploring the Determinants for Public Sector Innovation across National Borders

A holistic approach to the Interdependencies of the Factors for Public Sector Innovations and the national context.

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This thesis is worth 30 ETC.

Abstract

Purpose – The public sector is an essential contributor to achieving the sustainability development goals (SDGs). At the same time, it faces increasingly complex challenges due to demographic change, climate crisis, and social exclusion. The welfare state is under pressure, and it is unlikely that the wicked problems of today and tomorrow can be solved with yesterday's methods. The public sector needs innovation, but innovation in the public sector seems to be a wicked problem.

In this study, we aim to explore the ecosystem of public sector innovation drivers to better understand the complexities and suggest ways to increase innovation success. A particular focus is on the role of a country's cultural dimension in the success and inhibiting factors of innovation in the public sector.

Design/methodology/approach – The research questions are analysed using content analysis, verbatim quotes, and regression analysis. Using a mixed-method approach, we obtain a qualitative and contextual understanding of the case study reports analysed, and a quantitative approach for further validation. The mix allows the research an iterative process where further research is conducted as new insights emerge.

Findings – The findings show that a) factors influencing public sector innovations can be a barrier for innovation or a condition for success, depending on context and availability, b) factors influencing public sector innovations can be generalized across borders, and c) that the six dimensions of a country's culture developed by Hofstede can be used to some extent to explain innovation success.

Contribution to the field/value of research – This research fills gaps in the literature by exploring the interdependencies of factors influencing public sector innovations and arguing the generalizability of the factors across borders and boundaries. Another contribution is the *conceptual framework* offered, which takes a more interdisciplinary and holistic approach to the complexity of public sector innovation than has previously been the case in the literature. The framework incorporates the complexities of the public sector innovation ecosystem, making it more relevant to its efforts to address Sustainable Development Goals.

A novel *PSI Factors Matrix* is introduced based on the conceptual framework and the empirical analysis of the OECD OPSI case study library. The matrix shows how a country's cultural dimensions influence public sector innovation efforts. Finally, a *Roadmap* guides how to use a country's scores in the Hofstede 6D model to improve innovation efforts in the public sector.

Keywords Public Sector Innovation, Public Sector Governance, Hofstede, OECD OPSI case study library, Sustainable innovation, determinants of public sector innovations, collaboration.

Paper type Master Thesis

Contents

Foreword

As my job is to innovate in the public sector, I have had a particular stake in researching this topic. At times, I have felt utterly submerged, eating, sleeping, and breathing impact factors for innovation in the public sector while searching for information, gaining knowledge, and regularly experiencing the existence of factors.

It has been an intense trip down the rabbit hole, and I have enjoyed every step of the journey.

I am very thankful for the patience I have received at home when I, in periods, have used most of my off-work time writing, reading, and researching.

The interest in the research I have met at work and within national research communities (The Norwegian Association of Local and Regional Authorities (KS) and Telemark Research Institute) has further helped me keep on track, as they expect me to share results once the study is finished.

My supervisor's constructive feedback and support significantly benefitted the research and construction.

Bø i Telemark/May 2023

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1 Introduction

"In some countries with aging populations (i.e. more people retired than ever before and fewer people working in the public sector), it will be all the more important for governments to figure out how to maximize its resources. No longer can the public sector afford to dedicate teams to the same kinds of issues and problems it did in the past"

Lessons Learned, Canada, Central Government

(Artificial Intelligence and the bomb in a box scenario. Risk-based oversight by disruptive technology, 2018).

Innovation is often considered a significant factor in sustainable development in the public sector (Meuleman, 2019, pp.4-14). However, it appears that innovation in the public sector is difficult to achieve due to the complexity of barriers that impedes the sector's ability to initiate, implement, and sustain innovative practices (Rogers, 2003, pp. 404-405). As an enforcer of sustainability development, the sector must enhance its innovation capabilities (Bason, 2010 p:8; Sørensen & Thomsen, 2018 p:144; Mazzucato, 2014 Ch. 4 and 10). Looked the other way around, the countries that are doing best in addressing the SDGs, are also the ones that innovate a lot (Mathur & Berwa, 2017, pp.295-296; Reverte, 2022, p.1890).

The changing needs of citizens, demographic challenges, and scarcity of resources are also important reasons why the sector needs innovation (Mendez et al., 2022; Wittberg, 2021; Meuleman, 2019, p:5).

Innovation in the public sector, or public sector innovation[1], has received more attention in recent years (Torfing, 2016, p.11). Some of the most researched topics have been barriers and drivers, what PSI is, and how to evaluate the outcomes of innovation efforts (De Vries et al., 2016, pp: 18-24).

Although the need for innovations in the public sector is present (Sørensen & Thomsen, 2018, p.144), and successful PSI can have far-reaching positive side effects (Mazzucato,

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[1] In this study they are seen as one and the same and will be referred to as PSI.

2014, ch. 2), the sector still struggles to innovate due to complex barriers, and the innate risk potential of innovations (Osborne & Brown, 2011, pp. 4-5).

We argue that public sector innovation, as a means to address sustainability challenges and society's wicked problems, becomes a wicked problem (Bason, 2017, pp.26-32). We will explore the determinants of PSI and their potential interdependencies to support such an argument.

Despite the increased attention to PSI and the challenges during the innovation process, there is still a gap in research that explores the potential interconnectedness of the determinants of innovation, the generalizability of the determinants across countries, and the impacts and outcomes of PSI (De Vries et al., 2016).

1.1 Research Question

The study focuses on exploring the factors influencing innovation in the public sector, the potential interdependencies of the factors, the possibility of cross-border generalization, and the relevance of a nation's culture. This will be examined using four research questions that build upon each other's results:

Q1: What are the key determinants for innovation in the public sector?

Q2: How do determinants influence each other in the public sector innovation ecosystem?

Q3: In what way is it possible to argue that determinants of the public sector are generalizable across borders?

Q4: To what degree can the dimensions of a nation's culture, as described by Hofstede, influence public sector innovation efforts?

Based on a content analysis of the OECD OPSI database, Q1 is answered in Chapter Four. Q2 and Q3 are analysed in Chapters Five and Six.

The main question, Q4, is discussed through the regression analysis results in Chapters Seven and Eight, where we suggest a roadmap for leveraging a nation's cultural dimension for innovation success. The last research question is supported by resent research exploring how countries' SDGs focus varies due to their cultural dimensions and their respective innovation ecosystem (Reverte, 2022, pp.1884-1887).

The expected outcome of this research is to provide a deeper understanding of the interconnectedness of impact factors, as they are described in different public sector innovation efforts presented in the OECD OPSI case study library.

By offering a holistic system approach incorporating dimensions of national culture, the research will likely have important implications for how public sector organizations and policymakers address public sector innovations within and across borders.

1.2 Field of Research and data collection

The research aims to fill the abovementioned gap by exploring determinants, their possible interconnectedness, the potential for borderless generalization of impact factors, and how a nation's culture can influence a country's public sector innovation efforts.

Data Collection

The complexities of impact factors for innovation in the public sector will be examined by analysing the OECD OPSI Case Study Library of public sector innovation projects (source: https://oecd-opsi.org/case_type/opsi). This database provides a wealth of empirical information on the factors influencing public sector innovation. An analysis of the database can help us better understand the complexities of determinants. Using this database of case study reports from public sector innovation projects, we will systematically map the impact factors and analyse the results.

2 Conceptual Framework

Due to the all-encompassing and interdependent nature of public sector innovation, the phenomenon has been studied widely across disciplines and perspectives. The complexity of the ecosystem of public sector innovation has a broad reach, and it was necessary to combine the relevant literature across disciplines for a comprehensive overview. In this study, we synthesize seminal theories from innovation, cultural anthropology, organizational and management research, political science, adaptive problem-solving approaches, and public sector governance reforms. All the theories are somehow linked, creating a theoretical system that addresses different aspects of the PSI ecosystem.

This chapter will briefly introduce the research that makes up the conceptual framework for innovation in the public sector.

In Figure 1, the conceptual framework is visually synthesized to give a better understanding of the forces at play in PSI. We go through the model, describing what the different theories add to the holistic approach and how they combined present a framework that we later will draw on as the theoretical support when presenting the novel *PSI Factors matrix* in Chapter Six.

Figure 1 A Conceptual Framework Map for Public Sector Innovation

A Conceptual Framework Map for Public Sector Innovation

· **Internal factors** ·

Difussion of Innovation (2000's)
How new ideas and technologies are spread , and what factors affect the diffusion of innovation and change

External factors
How a nation's cultural values impact behaviors in the population, as well as within institutions, and organizations

Organizational and Management Research / Innovation theories

The importance of organizational resources and abilities

The importance of external resources and abilities

Resource-Based View (RBV) (1980's / 1990's)

Resource-Dependency Theory (RDT) (1970's)

Resourcefulness: "make use of what we have"

Bricolage (1960/2000's)

6 Cultural Dimensions (1980's)

Stakeholder Approach (1980's)

Collaboration: innovation is not only an internal process, it requires collaboration with external partners / stakeholder involvement

Open Innovation (2000's)

The importance of co-creating solutions with citizens and different stakeholders. The need for supportive organizational culture and leadership, as well as the opportunity to experiment and learn from failures

The importance of digital technology for driving innovation

Digital Innovation (2010's)

Co-creation Innovation (2000's))

Governing systems (Federal / Unitary) 1960's

How a nation's power is being distributed throughout levels of government

Focus on the importance of balancing the benefits of innovation in the public sector with its potential downsides, in order to ensure the long-term success and sustainability

The importance of ethical, social and environmental implications of innovations from ideation to implementation. Important to engage with stakeholders

"The dark side" of public sector innovation (2010's)

Multiple Stream (1980's)

Responsible Innovation (2010's)

A complex network of stakeholders that collaborate and interact to create and adopt new responsible ideas and technologies

Trifactor needed for policy changes: the public and policymakers must perceive something as a problem, policies will be proposed to address the problem and the political conditions (changes in leadership or public opinions) creates the window of opportunity for change to occur

Ecosystem Innovation (2010's)

Adaptive Problem-Solving Approaches
Maximizing end-user value while minimizing waste/ inefficiency through continuous improvement and process optimization (Toyota Production System)

Lean (originally 1950's, academically in the 1980's / 1990's)

Focus on flexibility, adaptability, and collaboration in project management to deliver quality, customer-centric results

Agile (1990's / 2000's)

A human-centered problem-solving approach that emphasizes empathy, experimentation, and iteration

Design thinking (1950's / 1960's originally, academically in the 1990's / 2000's)

A holistic approach to understanding complex systems and their interrelationships. Systems thinking requires a shift in perspective from linear thinking to circular and holistic thinking

Systems thinking (1950's originally, academically in the 1990's / 2000's)

Public Sector Reforms
(NPM) wants to improve public sector efficiency and effectiveness through private-sector management techniques and market orientation

New Public Management (1980's / 1990's)

---- GOVERNANCE ----

Focuses on the coordination and cooperation between different actors in a network

Involves balancing the tensions between cooperation and competition, transparency and confidentiality, and flexibility and stability

Network Governance (1990's / 2000's)

Collaborative Governance (1990's / 2000's)

How to govern governance by coordinating the efforts of multiple actors across different levels and sectors. The reform emphasizes the importance of collaborative governance, experimentation, and learning processes

Metagovernance (1990's / 2000's)

"New" Institutionalism (1990's)
How rules and regulations form the way an organization operates and their ability to adopt to changes

Note: my own work (Appendix A).

To go deeper into the complexity of impact factors for innovation in the public sector, we need to discuss the theoretical background of the research topic.

We have categorized the factors into external and internal factors, as this is supported in the literature and the following empirical research. The external are the conditions outside the public sector organization, and the internal are the conditions at play within the public sector organization.

2.1 The External Factors for Innovation in the public sector

(*Light green in Figure 1*)

A nation's cultural impact

In his research and introduction of the different dimensions of a nation's culture, Geert Hofstede argued that a nation's cultural dimensions impact how organizations operate (Erdman, 2018, p. 47). His first four dimensions introduced in 1980 were Power Distance, Masculine vs. Feminine, Individualism vs. Collectivism, and Uncertainty Avoidance. A few years later came the Long-Term Orientation vs. the Short-Term Orientation (Hofstede, 2013, p.351). The last dimension was added by Bulgarian social anthropologist, Michael Minkov, reflecting a nation's inclination for Indulgence vs. Constraint (Erdman, 2018, p.63). These dimensions of a nation's culture have been both validated and criticized. Empirical research by Søndergaard has strengthened the validity of the six-dimensional model of national culture. At the same time, McSweeny offers critique, debating the limitations of the theory's validity for nations with multiple cultures (Erdman, 2018, p.68). The model receives an additional critique from Ybema & Nýiri that argues that a nation's culture is not static or universal within the country (Ybema & Nyiri, 2015). Hofstede claims that a national culture changes very slowly, so unless the culture is presented with a massively burning platform that can potentially speed up the process, the 6D model stands its ground (Erdman, 2018, p.69; Hofstede, 2011, p.7; Soares et al., 2007, p.281).

Whether or not a crisis could make pivotal changes in a nation's cultural dimensions, it is likely that the dimensions influence the culture of organizations (Beugelsdijk et al., 2017, p.35). As such, Hofstede's dimensions could be relevant to public sector innovations (Reverte, 2022).

The power distribution within nation–governing systems

As we will discuss later, the OECD OPSI case study library of public sector innovation reports has a *Level of Government* category. The levels are National, Federal, Central, Regional, Local, and Other (like NGOs). This makes the governing system of a nation relevant for the research. As most countries are based on a federal system, a unitary system, or a hybrid of these two systems, both systems are briefly introduced in the conceptual background (Lijphart, 2012, p.177).

Federalism is a decentralized power structure where individual states or areas have the political liberty to govern as they see fit while keeping a minimum of unity amongst the different federation partners (Elazar, 1995, p.2; Lijphart, 2012, p.176).

Table 1 gives an overview of the countries in the OPSI case study library and their affiliation with the different systems.

Table 1 OECD OPSI Countries' governing system

Country	Number of published PSI reports	Federalism decentralized	Federal and centralized	Political systems with federal arrangements / Semifederal	Unitary and decentralized	Unitary and centralized
Argentina	11		X			
Australia	21	X				
Austria	1		X			
Azerbaijan	3					
Belgium	9	X				
Botswana	1					
Brazil	21	x				
Canada	35	X				
Chile	4					
China	1			X		
Colombia	8			X		
CostaRica	1					X
CzechRepublic	1					
Denmark	7				X	
Estonia	9					
EU	1			X		
Fiji	1			X		
Finland	12				X	
France	14					X
Georgia	1			x		
Germany	5	X				
Greece	3					X
Iceland	2					X
India	7		X			
Indonesia	13					
Ireland	20					X
Israel	11			X		
Italy	9					X
Japan	2				X	
Kenya	2					
Korea	22					X
Latvia	11					
Lebanon	2			x		
Lithuania	5					
Macedonia	1					
Madagascar	1					
Malaysia	1	x				
Mexico	8	x				
Moldova	1					
Mongolia	1					
Morocco	1					
Namibia	1			x		
Nepal	2					
Netherlands	14			X		
NewZealand	6					X
Nigeria	4	x				
Norway	4				X	
Pakistan	3	x				
Paraguay	5					
Peru	1					
Philippines	1					
Poland	9					
Portugal	14			X		
Romania	2					
Russia	1	x				
Serbia	2					
Singapore	4					
Slovenia	12					
Somalia	1					
SouthAfrica	6			x		
SouthSudan	1			*x*		
Spain	10			X		
Sweden	5				X	
Switzerland	1	X				
Tanzania	2			x		
Thailand	1					
Togo	1					
TrinidadandTobago	1					
Turkey	3					
Uganda	1					
Ukraine	6			x		
UnitedArabEmirates	4	x				
UnitedKingdom	48				X	
UnitedStates	32	X				

Source: Based on the OECD OPSI database, Elazar(1995) and Lijphart (2012), my own work.

Note: The Orange mark is because Elazar operates with Sudan. South Sudan seems to become purely federal, but it is not yet established (Akech, 2022). Green X'es signify countries Elazar labeled not mentioned in Lijphart's later work (Lijphart, 2012, p.178). The white rows are countries with public sector innovation project reports published in the OECD OPSI case study library, but Elazar or Lijphart does not mention them.

31 out of 74 countries, Federal nations, and nations with federal associations add up to a little less than half of the database (approximately 42 percent). The governing systems seem equally distributed in the database. However, this could be a false assumption if the countries without an assigned governing system in Table 1 lean heavily toward one or the other system.

Federalism is based on cooperation and shared consent for policy decisions unless the different regions/states/provinces are asymmetrical. They will have different views, visions, and focus areas than the federation (Burgess, 2006, p.213).

On the other hand, Unitarianism is the centralized power that unifies across territorial and hierarchical levels of power (Lijphart, 2012, p.175). The main agenda in a unitary system is decided centrally at the top, with the rest of the hierarchy of governmental levels following close on the heels. We can expect that unitary countries with increased power diffusion without necessarily turning federal, are rapidly growing, especially in Europe (Marks & Hooghe, 2010, p. 23).

The governing systems could influence how public sector innovations experience decision processes, distribution of power in co-creation, and the extent of hierarchical structures (Gesierich, 2023, pp. 1-3).

The right time

Hofstede's 6D model of national culture makes a strong base for us to further our understanding of the ecosystem of PSI. We can form a picture of how a nation's culture and norms can impact PSI efforts in a country.

However, in the external environment of PSI, we also need to understand how ideas emerge and get initial traction within the public sector. Multiple Stream theory by Kingdon (2014) offers a well-established approach to this subject. Where Hofstede focuses on culture, Kingdon (2014) presents the trifactor that needs to be aligned for new ideas to be accepted and adopted within the public sector. In order to address a

policy issue, Kingdon (2014) argues that there are three different streams of actions that need attention; the problem stream (where a problem emerges), the politics stream (political climate and actors: what are the political and public opinions regarding the problem), and the policy stream (development of possible solutions) (Kingdon, 2014, p.87). When these three streams are aligned, we get an opportunity for action (Kingdon, 2014, p.88). From the Kingdon perspective, external factors like policy, politics, funding, and public opinion could influence innovation efforts.

The importance of stakeholders

Although a management strategy, the Stakeholder approach (Strategical management – a stakeholder approach – SMASA) is presented as part of the external factors, as stakeholders generally are found outside of the organization, in the external environment of the public sector. The stakeholder approach broadens the focus from the shareholder found in agency theory (Jensen & Meckling, 1976) to include the role of all who have an interest in the development, not just those who stand to gain profit (Freeman et al., 2010, ch.8).

This more responsible view is why the stakeholder approach is vital for public sector innovation. The sector has a welfare vision and a mission that goes beyond icing the cake for some select few.

The stakeholder approach emphasizes the importance of managing relationships with various stakeholders to ensure the long-term success of an organization (Freeman, 2022, p.67). Having good absorptive capabilities in the organization will reduce the risks and enhance the assimilation of external ideas and the utilization of the ideas for the organization (West & Bogers, 2014, pp. 822-823). However, the substitution effect might arise eventually, leading to a potential decrease in internal capabilities as the use of external resources increases. For PSI, it will be essential to balance strengthening internal competencies and innovation capabilities and leveraging external resources (Laursen & Salter, 2006, p.145).

PSI should be aware of how and when to address the right type of stakeholders, which are strategic and beneficial for the overall goal (Mitchell et al., 1997, p.854; Stieb, 2009, p.402). Although collaboration with all possible stakeholders, much like that of corporate social responsibility (CSR), can enhance an organization's reputation and

legitimacy, the divergence in stakeholders' interests can be tricky to coordinate and will require a clear focus in order for alliances to bear fruits (Donaldson & Preston, 1995, pp.85-88; Harrison et al., 2015, p.865)

Factors important in the public sector ecosystem highlighted in the stakeholder approach are stakeholders, resources, coordination, and management.

"New" Institutionalism

How organizations align problems, policy, and politics, and collaborate with stakeholders, comes from the norms and values that have been institutionalized for the actors within the organization. More specifically, we can identify it as the official rules, regulations, routines, and processes that structure the interactions among individuals across the diversity of economy and policy units. Although cultural norms are seen as being of lower status in comparison, the structure is not solely based on formalized rules. Practices that have become norms through time will also be part of an organization's institutionalist framework (Hall, 1986, p.19).

These norms and values, as seen in Figure 1, are influenced by the cultural dimensions of the country and the type of governance system adopted in the country. We suggest the government reforms go in a feedback loop with the organization's institutional environment.

Like Peters et al. (2005), we share the concern that explaining changes, as seen through reforms, in a historical institutionalist way could reduce our understanding of what governing ideas are at work within the public sector to the most prominent of the time (Peters et al., 2005, p.1277). As we will argue later in the study, the public sector operates today in a postmodern world where a conglomerate of ideas and values will influence its modus operandi. Even so, the theory of "new" institutionalism is important as it describes how institutions can get trapped in their way of thinking, so much so that it can impede their ability to make critical changes when needed (Peters et al., 2005, p.1276). Ways to prevent the path dependency of institutions is through the dynamics of political differences and stakeholders leading to incremental changes rather than significant shifts (Peters et al., 2005, p.1278).

The part played by the external factors of the ecosystem of public sector innovation is crucial for the sector's innovation efforts towards the SDGs and the complex challenges the welfare state is facing (Reverte, 2022, p.1886).

Synthesized clusters of theories

Internal factors of PSI are clustered in thematic categories with a somewhat different focus that can be seen as building blocks of the holistic PSI ecosystem. The clusters are resources, collaboration, and ecosystem (colour-coded in the model). The adaptive problem-solving approaches are also internal organizational theories but offer practical methods for driving forward optimization and development. As such, the approaches are displayed as somewhat of a bridge between the organizational/management/innovation theories and the external factors of public sector government reforms.

It can be argued that the proposed clusters of theories are constructed, which they quite rightly are. However, they present to the reader an overall view of the complex research field readily available with a glance, a technique well-used within the field of design -and systems thinking to further understanding (Brown et al., 2020, p.29; Lewrick et al., 2018, p.218).

By relating the development of the most impactful and contemporary currents, within public sector reforms, to the conceptual framework, the model signals an influential interplay between international academia, research, and government reforms.

As we will discuss, there is no linear development or strong paradigm shifts of either innovation theories or public sector reforms. Arguably we could say that in today's PSI landscape, all theories and reforms presented in the associative conceptual framework are at play all together, all at once (Hartley, 2010, p.29; Torfing & Triantafillou, 2016, p.13).

We will further address this claim when introducing the empirical research to the conceptual framework in chapter six. However, first, we will investigate the suggested clusters in Figure 1.

2.2 Internal Factors of the PSI Landscape

Adoption and Diffusion

The "diffusion of innovation" is a theoretical framework investigating what enables or

hinders innovation adoption and diffusion by individuals and organizations

(Rogers, 2003). Rogers' theory is seminal in innovation adaption, focusing on

understanding how organizations adopt innovations. It highlights the social and

cultural context in which innovations are adopted as essential factors, arguing

that innovation adoption often will be affected by factors that have no direct

relation to the actual innovation itself.

Most interesting from Roger's theory regarding this research is the influential factors,

like the attributes of the innovation and that of the adopter, time, the communication

channels, and the social system in which the innovation takes place (Rogers, 2003).

Attributes of innovation refer to factors of the product or idea that need to be adopted;

is it very complex? Is it compatible with existing norms and values, and does it offer

something better than alternatives (Rogers, 2003, pp.14-15)?

News of innovation travel can also affect adoption (Rogers, 2003, p.18).

Innovation adoption usually follows a predictable pattern shaped like a Bell-curve; for

this reason, time is a vital factor that can influence an innovation's success (Rogers,

2003, pp.20-23).

The social system, on the other hand, refers to norms, habits, and values. An

organization, an individual, or for that matter, a nation's norms and values might impact

how innovations can be adopted and spread, and this is not a "one size fits all" -

situation; it relies on several factors, amongst which all determine whether an

innovation is adopted or cast aside (Rogers, 2003, p.24).

Although Roger's Diffusion of Innovation is primarily based on the diffusion of

innovation on an individual level, his research also applies to organizations. There are

similarities and differences in the adoption and diffusion of innovation between

individuals and organizations. The most significant difference is the increased

complexity of spreading ideas and innovations within organizations (Rogers, 2003, pp.402-403).

Also, we will find similarities and differences between the private and public sectors in the innovation landscape. Both sectors face challenges such as lack of funding, too few available resources, rules, and regulations (Mazzucato, 2014; Windrum & García-Goñi, 2008, p.650), but some important differences make innovation in the public sector challenging in other ways. One of these differences is the public sector's mandate to ensure welfare for citizens. This can make it difficult to allocate resources to prioritize innovations over the day-to-day welfare services that need to be done, especially since innovations in the public sector must be justified as making something better, in contrast to the private sector, where being innovative in itself is an advantage for the organization (Hartley, 2010, p.31). It is also claimed that the innovation pace in the public sector is slower than what you will find in the private sector, which is explained by lack of incentive to innovate in the public sector, as well as the constraining regulations and bureaucratic hierarchy (Mazzucato, 2014, ch.1).

Some argue that the slow pace and the lack of incentive to innovate in the public sector is a myth and that the public sector, in actuality, is a core driver for innovation also in the private sector, by procurements, own innovations, demands on behalf of citizens, and public-private partnerships (Mazzucato, 2014, ch. 3-6).

Discussing diffusion and adaption of innovation in the public sector, factors of interest are complexity, adoption, time, scale, implementation, information, organization, and management.

Resource focus for innovation (yellow in the framework visualization)

Resource-based theory (RBT) and resource-dependency theory (RDT) are two prominent theories in organizational development and strategic management that provide insights into how organizations utilize resources to achieve advancements in business.

RBT is rooted in the work of Penrose, first termed in 1959 (Penrose, 1995, p. ix), and further developed by Wernerfelt (1984, p.171). Barney and others argue that firm-specific resources and capabilities are critical drivers of competitive advantage and performance (Barney & Clark, 2007, p. 49). RBT emphasizes having an array of

resources, preferably rare and non-substitutional, within a firm to contribute to a sustainable competitive advantage (Barney & Clark, 2007, p.83). However, RBT is criticized for the potential danger of "cognitive sunk cost" – why change a perfect thing? - where the firm's investments in already available skills become a hindrance resulting in resistance from either hinder employees from adopting new skills or managers in changing the company's vision (Oliver, 1997, p. 702). This is exemplified by Kodak's inability to transform into digital photos, resulting in a fall from being a leading company to a footnote (Lucas & Goh, 2009, p.48).

RDT, as introduced in 1978 by Pfeffer & Salancik, shifts the focus from internal resources to the relationship between organizations and their external environment, emphasizing the role of external resources and the importance of managing dependencies (Stern, 1979, p.612). According to RDT, organizations must actively manage their resource dependencies by engaging in acquisitions and strategic alliances (Hillman et al., 2009, pp:405-408). RDT's strong point lie in the attention to the role of external stakeholders and power dynamics in shaping organizational behaviour (Davis & Cobb, 2010, pp:36-38).

Besides the RBT and the RDT, The theory of bricolage, introduced by Levi-Strauss (1962, pp:11-14) and adapted to entrepreneurship by Baker & Nelson (2005), suggests that organizations can innovate by recombining and repurposing existing resources in novel ways (Baker & Nelson, 2005 p.354). Bricolage highlights the creative process of resource utilization and complements both RBT and RDT by emphasizing the importance of resource recombination and improvisation in driving innovation (Desa & Basu, 2013, p.31)

RBT, RDT, and Bricolage each provide valuable perspectives on resource management and innovation. By integrating these theories, organizations can better understand the complex interplay between internal and external resources and the role of creativity and improvisation in driving innovation. This holistic resource management approach leverages resources and adapts to changing environments. The combination of theories can also be applied to the Lean management approach and public sector reform: New Public Management (NPM) to provide insights into how these management paradigms focus on resource management and innovation.

Lean management, initially developed in the context of Toyota-manufacturing in Japan (Ries, 2019, p.18; Womack et al., 2007), focuses on continuous improvement, waste reduction, and the efficient use of resources to deliver value to customers (Liker & Meier, 2012, ch.7). The Lean approach integrates well with the theories of RBT, RDT, and bricolage, as they combined offer insights into how organizations can leverage both internal and external resources to drive innovation and continuously improve performance.

In addition to relating adaptive problem-solving approaches with seminal works, the conceptual model integrates public sector reforms, considering relevant theories.

New Public Management, a management paradigm that emerged in the 1980s, emphasizes the importance of market-oriented management practices in the public sector, such as performance measurement, accountability, and customer focus (Hood, 1991, pp.4-5). NPM aims to improve public sector efficiency and effectiveness by drawing on private sector management techniques, much like what we find in the Lean approach (Bason, 2017. p.69; Pollitt & Bouckaert, 2017, p.10).
New Public Management paradigms can be enhanced by considering resource management and innovation from these theoretical perspectives. By incorporating the insights, the public sector can develop more effective strategies for leveraging resources, driving innovation, and improving performance.

Some practical applications of these combined perspectives include encouraging cross-functional collaboration by fostering knowledge sharing between different departments and functions (Nonaka & Takeuchi, 1997, p.600). Also, building on the insights from RDT, public sector organizations can form strategic alliances, partnerships, or collaborations with external stakeholders to access valuable resources, knowledge, and capabilities (Gulati, 1999, pp:401-403). Equally important is promoting the proper use of the organization's cognitive resources. Through continuous learning, the public sector can enhance its internal capabilities and adapt to changes and new demands in the environment (Argote & Guo, 2016, p:78). To adapt to changes and new demands is a further potential for improvement. Drawing on the principles of bricolage, public

sector organizations can adopt a more flexible and adaptive approach to resource allocation, which allows for the rapid reallocation and repurposing of resources in response to changing conditions (Baker & Nelson, 2005, p.335). Bricolage, RBV, and RDT can help organizations co-create with stakeholders, including customers, suppliers, and other external partners (Prahalad & Ramaswamy, 2004, p.12).

Public sector innovation areas of special importance, not previously mentioned, related to resource theories, NPM, and Lean are infrastructure, learning, and skills.

Collaboration (*Light blue in Figure 1*)

Open innovation (OI) theory suggests that through the diffusion of knowledge, organizations should use both internal and external knowledge, ideas, and resources to drive innovation and create value (Chesbrough, 2003, pp:43-48).

The OI theory encourages collaboration between organizations, leveraging external sources and advancing knowledge exchange of ideas and innovation, increasing the innovation potential (Chesbrough, 2003, p.50). Regarding sustainability development, arguments are that collaboration is needed to address the wicked challenges (Bason, 2010; Niesten et al., 2017, p.5).

Open innovation and collaborations can, on the other hand, risk a potential loss of knowledge from inside the organization, increased costs and complexity, and an increased need for coordinating resources (Chesbrough et al., 2014, pp.169-188; Enkel et al., 2009, p.312; West & Bogers, 2014, p.820).

Co-creation

In today's society, with abundant choices and information channels, co-creation transforms value creation by personalizing the value-creation and experience in cooperation with the user (Prahalad & Ramaswamy, 2004, p.6). While this is a marketing-oriented theory, others, like Christian Bason and Jacob Torfing, are, through seminal works, adopting the co-creating idea for public sector innovation and governance (Ansell & Torfing, 2021; Bason, 2010; Torfing, 2016). Through co-creation, previous views of handing over a produced good purchased by a consumer are being challenged, and value is defined in the interplay of producers and consumers, where both sides are actively engaging in the value creation (Payne et al., 2008, p.93; Vargo &

Lusch, 2004, p.6). From a PSI perspective, the transformation from linear production of goods to a co-creation of value is discussed as a shift from the market-oriented New Public Management-reform to collaborative governance, such as network governance and collaborative governance (Pollitt & Bouckaert, 2017, p.22; Torfing & Triantafillou, 2016, pp.14-16).

Theories of co-creation, whether focused on marketing or more specifically tailored for PSI, highlights access, transparency, equality, risk assessment, and dialogue as important aspects to be aware of in the process of co-creation (Bason, 2017, pp.66-69; Prahalad & Ramaswamy, 2004, p.6).

Additionally, both Bason and Torfing emphasize the great potential in co-creation for PSI, arguing that shared value-creation can contribute to better solutions to complex societal challenges and user-centred services (Bason, 2017; Torfing, 2016, p.12). Although co-creation might struggle with standardization and will have to find new ways of framing the efforts for measurement, the integration of stakeholders in the value process fosters a collaborative culture that enhances the innovation outcomes (Bogers et al., 2010, pp. 867-868; Ramaswamy & Ozcan, 2014, pp.179-180). As co-creation innovation incorporates the principles of open innovation theories and the stakeholder approach, it can be seen as a natural continuance and evolvement of collaborative innovation. It is essential, however, for the public sector to be conscious of the potential obstacles that might arise, such as the increased complexity of visions and conflicts of interests, when co-creating. Influential factors for public sector innovations found in this literature are, amongst others, silothinking, collaboration, support, engagement, culture, communication, and resistance.

Digital Innovation

Digital innovations are more than what the technology brings to the innovation efforts in the form of software or hardware; it also has transforming effects on cultural and organizational changes, not to mention ideation (Dunleavy, 2005, p.468). Innovation that relies on collaboration and co-creation can be enhanced with digital technology resulting in increased effectiveness and improved sharing of information that will benefit any PSI effort (Gil-García & Pardo, 2005, p.190; Nambisan et al., 2017, p.225). When the distances between public sector administration and the citizens are reduced

due to social media, collaboration efforts are less costly and more available (Nambisan & Nambisan, 2013, p.8). Furthermore, digital technologies bring opportunities for increased transparency resulting in increased citizen engagement (Sivarajah et al., 2015, p.474).

Digital innovation can help reduce conflicts between the public sector and the citizens, as well as grow the collective knowledge where both citizens become more informed, hence better at contributing to policy making, and the administration adopts knowledge from the citizens that can lead to improved products and services (Nam, 2012, pp.13-14).

Although digital innovation can raise concerns about privacy and data protection, where increased use of technology has the potential of infringing on citizens' rights to privacy, proper data regulation and security measures, as well as transparency in what data is being collected, can reduce the risk and increase the trust (Owen et al., 2013, p.75). The digital capabilities of citizens can pose another risk for the impact digital technology can have on PSI since low skills in part of a population can reduce the willingness to adopt new technologies. This can result in poor engagement by some, potentially creating a digital divide among the population (Mergel et al., 2018; Purwanto et al., 2020, p.6). For the public sector to use the potential of digital technology and transformation, the sector should focus on making digital public services accessible to all, whether they have the technology and the skills readily available or not.

In addition to other factors already mentioned, public sector innovation areas of particular importance related to digital innovation are technology, digital, and data.

Agile

An adaptable problem-solving approach that goes hand in hand with co-creation and digital innovation is the Agile method. With its origin in the software development domain, the agile approach's primary focus is adaptability in changing stakeholder needs, flexibility, and collaboration for value-creation (Conforto et al., 2014, pp.22-24).

Several new reforms for governing the public sector saw the light of day in the 1990s. The new reforms all have a stronger focus on the value added by different forms of collaboration with stakeholders (Klijn, 2008, p.811; Pollitt & Bouckaert, 2017, pp.21-23).

The focus shifts from private sector influences in the form of linear market-based management (NPM) to various governance strategies, like network governance and collaboration governance.

Rather than taking over in a paradigm shift after NPM, different forms of governance have become alternatives, resulting in the public sector making use of elements from several approaches simultaneously (Pollitt & Bouckaert, 2017, p.27).

Reforms focusing on collaboration align with the principles discussed of the stakeholder approach, open innovation, co-creation, and agile methods. They all highlight how working with stakeholders will benefit the public sector in addressing complex challenges (Ansell & Gash, 2007, p.545). Although the theories, reforms, and method have their unique focus, clustering them together in the associative conceptual framework offers a holistic understanding of the need for the public sector to be flexible. It stresses the importance of cooperation and knowledge sharing for PSI. Public sector innovation areas of special importance related to an agile approach, which adds to other factors, are testing and experimenting.

Ecosystem (*Light orange in figure 1*)

We see the development of a meta-perspective to address the issues discussed in collaborative-focused theories, reforms, and methods.

Responsible Innovation

A responsible approach to PSI will increase societies' and the public sectors' ability to do more good with every innovation effort (Owen et al., 2013, p.82). When discussing how digital innovation can enhance PSI capabilities and collaboration among stakeholders, we also addressed the risk of inequality in digital adoption is present. This risk and others like unintended consequences or increased stress are concerns we find within the theories of responsible innovation. Responsible innovation highlights that we should reflect on the ethical, social, and environmental consequences of innovation to show consideration of what innovations and change can mean to the different actors in the whole ecosystem (Owen et al., 2013, p.128). The impact of innovations has the potential to be both beneficial and harmful. A responsible approach, where potential

negative consequences are addressed, involves considering the present and future social and ethical implications throughout the innovation process (Stilgoe et al., 2013, pp.1569-1570).

The dark side of public sector innovation

The dark side of innovation in the public sector should be addressed when discussing the different theoretical currents that influence the PSI landscape. After decades of optimism in the PSI discourse, there is now an emerging interest in the dark side of the innovation efforts (Adhikari et al., 2021, p.887; Meijer & Thaens, 2021, pp.140-143). The dark side of PSI highlights its negative impact on employees, high costs and risks, loss of knowledge, and a lack of successful implementation. In addition, the research looks at the potential loss in radical innovation capacity that can occur when relying heavily on co-creation with citizens, arguing that they rarely can innovate beyond their experiences (Di Giulio & Vecchi, p.147, 2023; Greco et al., 2022, pp.699-705). Policy innovation can have unintended consequences, for instance, the difficulties of including the unheard voices of people experiencing poverty when doing affordable housing projects (Carmon & Fainstein, 2013, p.222).

Although the dark sides of PSI are underexplored, future innovation projects should heed the warnings by thinking of potential impacts for the whole ecosystem, trying and find ways to engage the underprivileged in society in collaboration efforts, and innovating responsibly and transparently.

Public sector innovation areas of special importance related to the dark side of public sector innovation, which adds to other factors already mentioned, are consequences and inequality. The dark side of public sector innovation is a relatively new research field. The content analysis did not find a significant focus on these determinants, as we will see in the following chapters. Nonetheless, the theory is brought to attention in the conceptual framework due to its emerging importance.

Ecosystem innovation

The increased interdependencies of societal and sustainability challenges call for a systematic innovation approach (Paasi et al., 2023, pp.142-143). Ecosystem innovation theory highlights how the complexities of actors and systems shape the innovation

outcomes and that innovation means new services or products and new strategies and relationships between actors (Adner & Kapoor, 2016, pp.62-63). One distinction that sets ecosystem innovation apart from an innovation system is that the ecosystem focus on co-creating solutions and the causality of change for all stakeholders. In this way, an ecosystem approach to innovation will highlight interdependencies and impacts for all in the system and how changes in both external and internal factors can alter the innovation outcome (Paasi et al., 2023, p.151). Another difference is that the ecosystem approach to innovation incorporates the impact and interplay of all stakeholders, not just during the innovation, but with a future-oriented, ecological, and sustainable focus (Zheng & Cai, 2022, pp.4-5).

Hence, collaboration, coordination, and alignments between the broad range of stakeholders in an ecosystem are vital, as are the value creation and trade-offs within the system (Adner, 2017). However, to ensure that an ecosystem can be understood and facilitated, we must create boundaries on factors inside and outside, based on factors' impact on the PSI effort (Meadows & Wright, 2008, pp.96-97).

By strategically considering all the actors from a larger metasystem perspective, the more significant sustainable social, environmental, and ethical implications of development and change for stakeholders are at the forefront of the innovation processes (Zheng & Cai, 2022, p. 22).

Public sector innovation areas of special importance related to ecosystem innovation, which adds to other factors already mentioned, are systems.

Design thinking and systems thinking

Design thinking engages stakeholders and fosters a culture of innovation (Bason, 2010, 2017). A user-centred, problem-solving style involves collaboration and understanding the issue from the user's perspective (Brown, 2008, p.86). Moreover, while the approach is iterative and empathetic and creates prototypes that can be tested and adjusted to be customized for the specific context, the design thinking's benefits could decrease unless it considers the whole system of complexities in order to design solutions that are both scalable and possible to implement (Wyatt et al., 2021, pp.43-46). This is why the design thinking approach must always address the context in which

a challenge is situated to prompt a holistic and user-centric solution (Gharajedaghi, 2011, p.136). Another concern is not how but when PSI makes use of design thinking by waiting to introduce design until the implementation stage of a new policy rather than actively engaging in design from the start of the policy-innovation process (Villa Alvarez et al., 2022, p.91).

Systems thinking is, by default, holistic, as its main focus is on understanding how stakeholders "are bound by invisible fabrics of interrelated actions" within complex systems (Senge, 1994, p.10). To think in a system is to understand the feedback between factors and the interactions of impact for all, which, in a sustainability context, will help PSI efforts to adopt better solutions to wicked societal problems (Meadows & Wright, 2008, p.25; Schlüter et al., 2023, p.2). The system embeds other systems where the factors are interdependent, and the sum of the system of systems is more than the factors it consists of (Meadows & Wright, 2008, p.12). By enabling a more holistic comprehension of complex issues, engaging cross-sectoral collaboration, and offering sustainable, future-oriented solutions, systems thinking can improve PSI (Gharajedaghi, 2011, p.116; Meadows & Wright, 2008, p.178).

Design thinking and systems thinking do not produce new determinants to the research, but the approaches affect public sector innovations, as explored in Chapter Five.

Metagovernance

To adapt to the currents of the time, metagovernance offers a fresh take on management in the public sector that seeks to address the limitations of traditional hierarchical governing structures towards viewing collaboration as a means for governance that drives innovation efforts (Torfing & Triantafillou, 2016, pp.185-186). Where collaborative governance stresses the importance of building trust, honest dialogue, and a shared understanding among stakeholders to address complex issues, metagovernance complements collaborative governance by providing a framework for common principles and guidelines to align the cooperative efforts of stakeholders needed for collaboration and co-creation to succeed (Emerson et al., 2012, p.13; Jessop, 2003, pp.108-109). One key aspect of metagoverance is to act as a facilitator within the innovation ecosystem, ensuring that different actors' present and future

needs and resources are understood and utilized to provide sustainable innovation outcomes (Paasi et al., 2023, p.144).

The adaptability of metagovernance aids the ability for experimentation and learning needed for PSI (Mariani et al., 2022, p.1080). Also, by enabling the public sector a structural frame from which to "shop" different governance approaches for whatever suits the current challenge, or aspect of a challenge, to be solved, metagovernance becomes a way to cope with the fuzzy boundaries between different sectors and responsibilities that society faces today (Allmendinger & Haughton, 2009, p.631; Meuleman, 2008, p.2). Metagovernance does not bring new impact factors to the research. However, in Chapter Six, we will examine how metagovernance governs all the impact factors as they are presented as results in Chapters Four and Five.

2.3 Theoretical Contribution

Much research has been conducted on the role of management, strategy, and organizational culture regarding innovation. However, underexplored areas are the role of a nation's culture and governance for PSI, the interdependencies of impact factors, and whether PSI determinants can be generalized across borders (De Vries et al., 2016, p.163).

The same goes for research on innovation in the public sector in developing countries. So far, the research is mainly conducted in developed countries. Another underexplored area is research on implementing, scaling, and sustaining innovation activities (Bason, 2017).

This paper offers several theoretical contributions:

1. Exploring the vast information on public sector innovation found in the OECD OPSI database, a highly underexplored source of knowledge
2. Bridging gaps in the literature:
   a. Exploring the interdependencies of public sector innovation factors
   b. Arguing the factors' generalizability across borders
3. Suggesting a holistic conceptual framework for public sector innovation theory
4. Suggesting a novel PSI Impact Matrix arguing that a country's six cultural dimensions can influence the determinants of public sector innovation

5. Suggesting a practical roadmap for how to leverage a country's 6D scores to improve innovation efforts in the public sector

By offering a broader systematic approach to understanding the interdependencies, the generalizability of determinants within the PSI ecosystem, and nations' potential impacts, we will provide additional insight into less examined areas of public sector innovations.

3 Methods

This study uses a mixed method. We strengthen overall conclusions by integrating finds from each method (Creswell & Tashakkori, 2007, p.108). Using qualitative and quantitative methods gives the research an advantage allowing for a holistic view of the complex interrelationships of factors in the ecosystem (Battaglio & Hall, 2018, p.825). A content analysis will be conducted on the OPSI library of Public sector innovation reports, where clear coding enables a contextual understanding of the empirical data (Hendren et al., 2022, p.2). A conceptual framework, synthesized by leading and emerging research within the interdisciplinary field of public sector innovation and related areas, is discussed in relation to the analysis, resulting in a suggested factors matrix for PSI (Chapter Six). The matrix strengthens the argument of a nation's cultural relevance for PSI and the potential for generalizing PSI determinants. Using regression analysis, we will test the validity of the findings.

3.1 Data Sources

OECD, the Organization for Economic Co-Operation, and Development, has an Observatory of Public Sector Innovation (OPSI). Their case study library of PSI reports offers an ample collection of wide-ranging case studies reporting PSI experiences from around the world (*OPSI Case Study Platform data*, 2022). The goal is to provide the public sector with a library where experience can be shared, and ideas can be gathered to help the sector to innovate (*Empowering governments to achieve new possibilities*, 2023).

The published reports follow a fixed template that gives information within the variables in Table 2.

Table 2 Variables in the OECD OPSI Case study library of public sector innovation reports

ID	Year Launched	**Challenges and Failures**
Title	Short Explanation	**Conditions for Success**
Case Study URL	Innovation Summary	Potential for Replication
Submission date	Tags	**Lessons Learned**
Organisation	What Makes Project Innovative	Any Other Relevant Information
Country	Innovation Status	Images
Level of Government	Innovation Status Description	Files
Primary Sector(s)	Collaboration and Partnerships	Video Pitch
Title of Innovation	Users and Stakeholders	Project Video 1
Innovation Website	Results and Impact	Project Video 2

Source: OPSI Case Study Platform data, 2022.

The OECD OPSI is linked to the Six 6D database developed by Hofstede, measuring the nation's culture at the country level. We have analysed information about determinants found in the three columns of Challenges and Failures, Conditions for Success, and Lessons Learned (bold orange in Table 2). Country, Level of Government, Year Launched, and Primary Sector(s) have served as both additional information and control variables.

The three columns of, Challenges and Failures, Conditions for Success, and Lessons Learned, were selected as analytical bases for research as they contained information about perceived hindrances and drivers in the innovation efforts. The "Collaboration and Partnerships" and "Users and Stakeholders" columns were not analysed. This information mainly focused on mentioning specific partners, which would have made it more difficult to generalize beyond the exact project.

Four cases were removed from the analysis because they were written in French, leaving 517 public sector innovation projects for analysis. Of these, 498 are assigned to a country and a launch year.

The innovation projects span from 2003 to 2021, and as shown in Table 3, most public sector innovation projects were launched between 2016 – 2018.

Table 3 Number of published reports per launch year in the OECD OPSI case study library for public sector innovation projects

Year Launched	Freq.
2003	1
2006	1
2009	4
2010	5
2011	7
2012	12
2013	15
2014	31
2015	41
2016	91
2017	99
2018	106
2019	57
2020	17
2021	11
Total	498

Source: OPSI Case Study Platform data, 2022.

We will not discuss the potential role of COVID-19, or the possibility of a delay in the publication of innovation project reports, to explain why the number of reported projects declined from 2018 to 2019, and the continuing trend. A future updated library will likely change this picture of declining innovation efforts. We also have access to OECD OPSI's unpublished database of 1082 reports, where 859 reports are from 2020-2022 (appendix N). As the unpublished data are not yet sorted by the different categories used for the published reports, we decided not to analyse the unpublished reports in this research.

We focus on the 498 case study reports of public sector innovation projects published with a country and a launch year.

The 76 countries in the data consist of more than the 38 member countries of the OECD (*Our global reach*, 2023). Table 4 displays the different countries, while Figure 2 presents the reports' regional distribution to illustrate that most regions are represented. It also signals that this study, as many before, is mainly based on innovation projects in Westernized developed countries.

Western Europe, North America, and Australia account for 54 percent of published innovation projects.

Table 4 Countries in the OECD OPSI case study library of public sector innovation reports, sorted by region

North America	South America	Africa	Europe West	Europe East	EU	Russia	Middle-East	Asia	Australia
Canada	Argentina	Botswana	Austria	Azerbaijan	EU	Russia	Israel	China	Australia
UnitedStates	Brazil	Kenya	Belgium	CzechRepublic	sum = 1	sum = 1	Lebanon	India	NewZealand
sum= 67	Chile	Madagascar	Denmark	Estonia			Turkey	Indonesia	Fiji
	Colombia	Morocco	Finland	Georgia			UnitedArabEmirates	Japan	sum = 28
	CostaRica	Namibia	France	Latvia			sum = 20	Korea	
	Mexico	Nigeria	Germany	Lithuania				Malaysia	
	Paraguay	Somalia	Iceland	Macedonia				Mongolia	
	Peru	SouthAfrica	Ireland	Moldova				Nepal	
	Sum= 59	SouthSudan	Italy	Poland				Philippines	
		Tanzania	Greece	Romania				Singapore	
		Togo	Netherlands	Serbia				Thailand	
		TrinidadandToba	Norway	Slovenia				Pakistan	
		Uganda	Portugal	Ukraine				sum = 58	
		Sum = 23	Spain	sum = 63					
			Sweden						
			Switzerland						
			UnitedKingdom						
			sum = 178						

Source: OPSI Case Study Platform data, 2022, own calculations.

Figure 2 Geographical distribution of public sector innovation reports in the OECD OPSI library
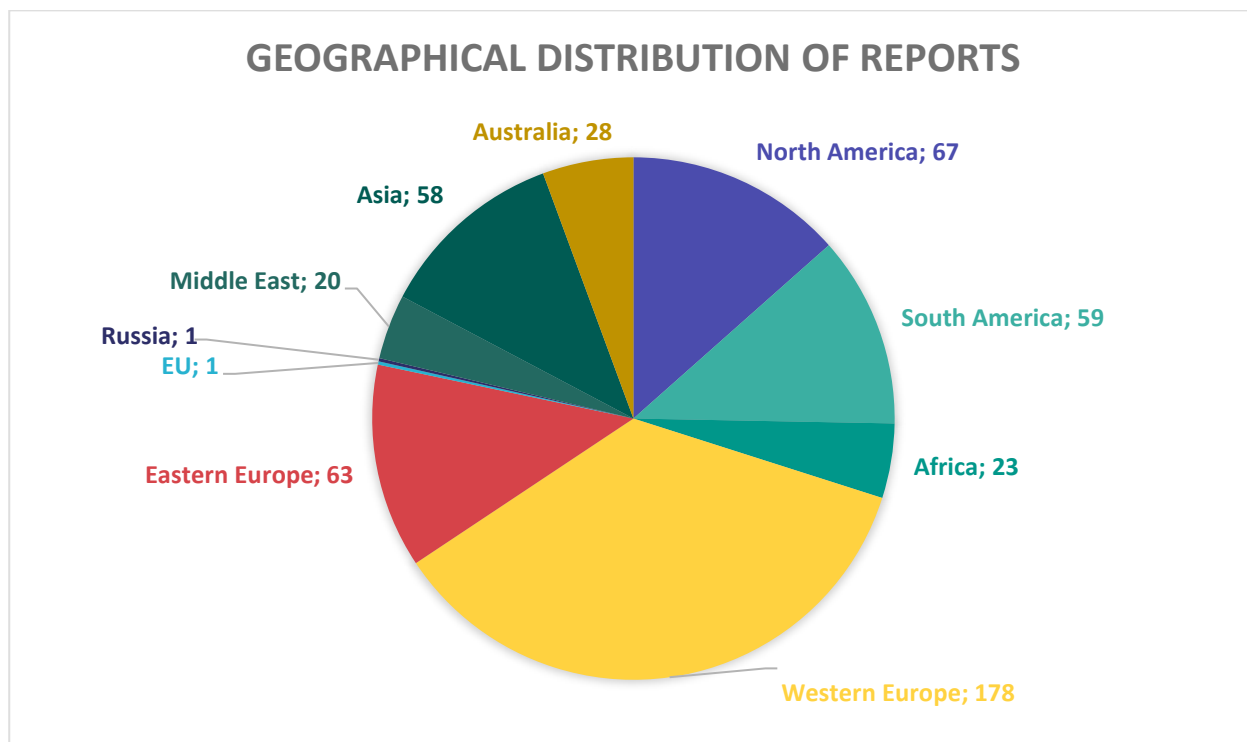
Note: distribution based on published reports in the OECD OPSI database, own calculations.

By providing insights into PSI projects' reported challenges and failures, as well as their conditions for success and lessons learned, the case study library is a goldmine for anyone interested in a deeper understanding of the innovation ecosystem for the public sector (*Case study library*, 2023).

By creating an elaborate conceptual framework based on the leading works regarding PSI and analysing all published case study reports of PSI in the OECD OPSI library, we believe that the database is representative of public sector innovation projects in general, thus reducing the risk of selection bias. The latter could have occurred if we had based our analysis solely on the reports without also searching literature (Goertz, 2006; Miles & Huberman, 1994, p.26).

3.2 An Iterative Approach to Research Design

The research process chosen is an iterative and inductive approach where relevant knowledge can be added throughout the process (Creswell, 2009, p.164). The iteration, which is a common feature in the grounded theory approach, results in a multiple-step analysis, where the first and open focus is on the key determinants for PSI, derived from the combination of the conceptual framework and the content analysis of the case study reports (Hartman, 2001, p.80). Examining the determinants from a continuous rather than a dichotomy perspective opens the possibility of impact factors being both barriers or enablers, depending on the context (Goertz, 2006, p.34).

The next step is a more selected analysis giving room for a deeper contextual analysis of the role of a nation's culture for PSI based on the use of determinants in different countries, where the last suggest a new model in which to understand better the PSI Ecosystem (Giske & Hjälmhult, 2014, p.27).

By formulating open-ended research questions to explore the determinants of PSI and their potential interaction, we allow for a holistic examination of how the interplay could drive forward or create barriers to innovation in the public sector (Hendren et al., 2022, p.4).

To base the research on the seminal works within innovation, public sector administration and governance, management, and strategy, as well as problem-solving approaches adopted by the public sector and emerging trends within associative

research, we initiated scoping existing literature. The literature provided us with a broad contextual frame that would act as a safety check on whether the findings from the OECD OPSI reports' content analysis would make sense. The iterative research method meant that we could add to our conceptual framework as findings from the content analysis presented dimensions not well enough discussed in the framework. The framework supported a more detailed analysis of the impact factors in the PSI ecosystem, specifically the role of a nation's culture (Krippendorff, 2018, p.45; Toulmin, 2022,208).

Establishing a conceptual framework

Establishing the broad contextual framework for the thesis underwent structural and loose approaches to finding the crucial works within the chosen academic fields. Using Scopus, USN's ORIA search, and especially the reference lists of the articles and books read, the conceptual framework emerged slowly but steadily. Search words used were, amongst others, innovation, public sector innovation, innovation ecosystem, systems thinking for PSI, public sector governance, design thinking, agile, lean, and sustainable innovation. The framework consists of seminal and more recent trends within a wide range of research directly relevant to discussing public sector innovations: innovation, governance, management and strategy, problem-solving approaches, sustainability management and innovation, and culture. To limit the framework to the most immediately relevant research areas, the framework did not address organizational psychology, game theory, agency theory, chaos theory, and the emerging focus on future -and foresight-thinking. These areas are of no less importance, but they are even more relevant for some of the areas we left for future research, namely scaling, innovation in developing countries, implementation, and innovation outcomes. The conceptual framework offers a solid foundation for exploring the determinants of PSI, enabling us to understand the complexities of the PSI ecosystem better.

Content analysis

Using a content analysis is a systematic and replicable way of analysing report patterns, making it a suitable choice for exploring the OECD OPSI case study library (Krippendorff, 2018, p. 24).

The case study reports were analysed using Nvivo. Although Nvivo offers a fully automatic coding of the text inserted, all coding of the case reports was done manually to ensure that critical information was not interpreted out of context. While this was very time-consuming, it offered the possibility to grow a more profound understanding underway in the actual coding process as opposed to starting the analytical ideation first when the program has chewed and spitted out its suggestions. This was valuable as it also allowed for extending the conceptual framework based on findings that would appear while coding that the initial framework did not include (Giske & Hjälmhult, 2014, p.43). The problem-solving approaches of Lean, Agile, Design, and Systems Thinking were included during the coding. The second research question also emerged from the coding process, as there were several references that the cultural attributes of a nation were seen as important influencing factors for innovation efforts.

The first coding coded three sections of the reports into two relatively large codes: barriers for innovation and conditions for success. The coded sections of the reports were Challenges and Failures, Conditions for Success, and Lessons Learned.

By doing a word query based on stemmed words in each of the codes, we can get a better understanding of which factors had the most significant impact on the successful implementation of the innovation projects in total by finding the 50 most used words describing barriers and conditions for success (Appendix B). There was a correlation between the barriers and the conditions for success, suggesting that the same influencing factors could be either a barrier or a condition for success, depending on context and availability. This is supported in the conceptual framework and has raised the question of when a determinant becomes a barrier, when it becomes a condition for success, and whether a better understanding creates better chances for PSI efforts.

First, it would help to categorize the impact factors to discuss possible interactions and look at them holistically (Alvesson & Sköldberg, 2009, p.63). Two categories could be supported by both the conceptual background and the actual empirical findings: external factors and internal factors.

Data is difficult to analyse since data in this context is everything between lack of skills, access, sharing, technology, integrations, and systems. Therefore, we removed Data from the search (appendix C: stopwords) but kept the words that specify the data factor

better; technology, systems, digital, access, and skills (Appendix D). By focusing on the words from the barriers for innovation code, we added the word data to the list of stopwords. We grouped the words into two categories from this new list of words most frequently used to describe barriers to innovation. We continued reducing information by sorting different words associated with each other, such as *Available* being joined with *Access* and *Budgets* being joined with *Funds* (Appendix E). The dimensionality reduction process simplifies the understanding of how the different factors impact each other and their influence on PSI efforts. It refines the analysis providing insights that can have practical implications for the public sector (Krippendorff, 2018, p. 362).

However, in analysing texts, we must find the contextual layers represented in words used, to find the text's meaning for the writer "in their respective worlds" (Hendren et al., 2022, p.10; Krippendorff, 2018, p.27). We will add to the layer of context by introducing the Hofstede Model to understand further the importance of the different determinants for PSI in countries.

The analysis of impact factors presented in Chapter Four gives us an initial understanding of the complexity. However, we analysed the interdependencies with verbatim quotations from the reports to go deeper into the context.

Still focusing on the three columns of Challenges and Failures, Conditions for Success, and Lessons Learned, we examined how the impact factors are represented in the reports. As we see in chapter five, determinants of PSI efforts are often explained as a combination, strengthening our suggestion of their interdependency. The way different countries use the same impact factors but with slightly different emphasis also suggests that we can claim that the impact factors are generalizable across borders.

To make the key initial findings easily accessible, we used descriptive quantitative analysis to present the frequency and distribution of barriers to innovation identified through the content analysis (Krippendorff, 2018, ch. 10). A descriptive visualization facilitates a clear understanding of the importance of the different determinants in the PSI ecosystem. Although such a method can oversimplify, since it relies on aggregated information, it contributes to synthesizing a holistic system overview.

As presented in Chapter Four, the impact factors' results give us an initial understanding of the complexity. However, we analysed the interdependencies with verbatim quotations from the reports to go deeper into the context.

Verbatim quotations

Using verbatim quotations as an analytical method in especially social sciences is gaining support as it offers credibility in the relationship between the researcher's analysis, interpretation, and conclusions with the original data examined (Corden & Sainsbury, 2006, p.98; Greenhalgh & Taylor, 1997, p.742; Tong et al., 2007, p.356). Still focusing on the three columns of Challenges and Failures, Conditions for Success, and Lessons Learned, we examined how the impact factors are represented in the reports. As Chapter Five shows, determinants of PSI efforts are often explained as a combination, strengthening our suggestion of their interdependency. Using verbatim quotes bridges the conceptual framework with the initial content analysis, creating a clear understanding of how the interdependency is argued (Seale, 1999, p.105). In order to reduce the risk of researcher bias in presenting the verbatim quotations as a base for our further interpretations and analysis, we have consciously used quotes from different project reports throughout instead of making several points from just a few well-articulated reports (Sheard, 2022, p.6).

The way different reports from all countries use the same impact factors but with slightly different emphasis also suggests that we can claim that the impact factors are generalizable across borders.

After the initial findings and the interdependency exploration in Chapters Four and Five, new coding was needed to arrive at a novel theoretical understanding (Alvesson & Sköldberg, 2009, p.68). First, we used information derived from the quantitative program Stata to give us an overview of how many PSI reports each of the countries in the library had published. We wanted to assess the possibility that a nation's cultural dimensions could impact a country's PSI efforts.

We manually coded each case report in the OECD OPSI database again, but only the column conditions for success to gain information. This time we were armed with the determinants we already had established as impacting PSI efforts. In Hofstede, several impact factors in the OECD OPSI database were explained based on a country's scores.

High individualistic countries would, according to Hofstede, be more willing to use new technology (Hofstede, 2013). Countries with a long-term orientation would most likely prepare and put aside enough resources to successfully implement an innovation project (Hofstede, 2013). Countries with a high Uncertainty-Avoidance and/or high scores on Collectivism were suggested could be more resistant to change. At the same time, silothinking could be a sign of high power distance and individualism (Hofstede, 2013). Masculine and/or short-term-oriented countries could gain momentum in innovation projects by delivering quick wins to appease competitive, impatient, and assertive needs. On the other hand, a high feminine or long-term orientation score would signal a need for socially responsible development and a sustainability focus on innovation efforts (Hofstede, 2013). Although the conceptual background and the suggested PSI Factors Matrix (Chapter Five) support the notion that the national dimensions play a part in the public sector innovation efforts, we chose to test the likelihood by doing regression analysis on some of the impact factors.

In research involving the public sector, especially within the administration and policy research, mixed methods are usually based on quantitative methods with qualitative methods as "add-ons" (Hendren et al., 2022, p.2). In this study, we offer the opposite approach, where the primary research design is qualitative, with quantitative methods added to strengthen the validity of the suggested overall understanding. Even when the regression analysis turns out to back our hypothesis, we will not suggest that our findings are proven without a doubt. We will only suggest that the results make the answer found for research question 4 probable (McKillup, 2012, p.11).

3.3 Regression specifications

The study's central research question is whether there is a connection between the cultural dimensions of a country and the implementation of innovation processes in the public sector. This relationship is analysed using qualitative and quantitative research methods. The quantitative analysis investigates the relationship between two important elements of the innovation process in the public sector, namely top-level support, and resistance. As shown in the conceptual part, leadership, resistance to change, or the role of innovation support are crucial factors for organizational innovation (Lloréns Montes et al., 2004; Zaltman et al., 1973).

Top-level support and resistance are likely to depend on many other factors, such as the level of government, the stage of the innovation process, and the type of technology used. In the following, the likelihood that a public sector innovation project is characterized by top-level support and resistance is modelled as a function of two indicators of the cultural dimensions developed by Hofstede and control variables that measure characteristics of the project or the underlying organization, where i=1,…459 is the individual public sector innovation project for the time and α_0 and β_0 are the constant and f denotes the link function between the probability of outcome and explanatory variables. The underlying dependent variables are either the likelihood of top-level support (*Support*) or *Resistance* as indicated in the three answer categories "Lessons Learned", "Conditions for Success" and "Challenges and Failures". The two equations are specified as follows:

$$\text{Prob }(Support = 1)_i =$$

$$= f(\alpha_0 + \alpha_1 IDV_i + \alpha_2 PDI_i + \sum_{l=1}^{7} \alpha_{3l} Level\_government_{il}$$

$$+ \sum_{D=1}^{7} \alpha_{4D} Department_{iD} + \sum_{s=1}^{6} \alpha_{5s} Innovationstatus_{si}$$

$$+ \alpha_6 Technology_i + \gamma_t)$$

(*Equation 1*)

Note: Definitions used to find the dependent variable for Support, appendix K.

$$\text{Prob }(Resistance = 1)_i =$$

$$= f(\beta_0 + \beta_1 IDV_i + \beta_2 PDI_i + \sum_{l=1}^{7} \beta_{3l} Level\_government_{il}$$

$$+ \sum_{D=1}^{7} \beta_{4D} Department_{iD} + \sum_{s=1}^{6} \beta_{5s} Innovationstatus_{si}$$

$$+ \beta_6 Technology_i + \gamma_t)$$

(*Equation 2*)

Note: definitions used to find the dependent variable for Resistance, appendix L.

The variables are defined as "one" if top-level support or in the form of a synonym occurs, and as "zero" otherwise (Wooldridge, 2013, p.248) (for the definitions of the

dependent variable see Appendix K). The main explanatory variables are either the Individualism Versus Collectivism (IDV) score or the Power Distance Index (PDI) score. These variables are included separately because they are highly correlated (with a Pearson correlation coefficient of -0.69 and a -value of 0.01 based on 459 innovation projects). In addition, several control variables are included. $Level\_government$ is a set of dummy variables measuring the level of government (central, local, regional) with other as the reference category. *Department* is measured as a set of dummy variables that can be overlapping and consists of public administration, education, health, information, science, employment services, and economic affairs. The other control variable is the *innovation_status* which is measured as a set of dummy variables for evaluation, generating ideas developing proposals, identifying problems, diffusing, and implementation. The *technology* variable is a dummy variable indicating one if the project enabled by digital innovation and zero otherwise. This variable is also calculated using text-mining analysis methods (see Appendix J). γ_t denotes a set of year dummy variables that measure the project's launch date (with the reference period 2015 and earlier). Country dummy variables are not included as they are highly correlated with the cultural dimension scores.

The regression equation can be estimated by a probit, logit or linear probability model (Wooldridge, 2013). The cultural dimension score variables are measured at the country level, while the remaining data are measured at the project level. This leads to the so-called Moulton (1990) bias that the standard errors of the variables at the higher aggregation level are underestimated. To solve this problem, cluster-adjusted standard errors at the country level are used. The results section reports the marginal effects of the probit model. The logit and probit models usually give similar results (Wooldridge, 2013).

Table 5 reports descriptive statistics based on the estimation sample.

Table 5: Descriptive statistics of the estimation sample

	Number of observations	Means	Standard deviation	Min	Max
<u>Dependent variables</u>					
Support	459	0.22			
Resistance	459	0.13			

___

Cultural dimensions:

Idv score	459	60.3	25.7	13.0	91.0
Pdi score	459	48.8	17.7	11.0	104.0

Explanatory dummy variables:

central	459	0.58
local	459	0.19
regional	459	0.14
other	459	0.10
Publicadministration	459	0.41
education	459	0.12
health	459	0.10
information	459	0.24
science	459	0.19
employment	459	0.08
economic	459	0.11
IS_evaluation	459	0.30
IS_generating_ideas	459	0.13
IS_developing_proposals	459	0.14
IS_identifying_problems	459	0.10
IS_diffusing	459	0.41
IS_implementation	459	0.60
Technology	459	0.64
year 2015 or earlier	459	0.23
year2016	459	0.18
year2017	459	0.19
year2018	459	0.21
year2019	459	0.14
year2020	459	0.05

Note: The dummy variables are calculated using the Stata command regexm. Source: See text. OECD OPSI database.

Although the database used for the regression is not randomly collected, the reasonably large but possibly arbitrary dataset offers the possibility that the results could be generalized as data over a certain size becomes more stable (Wooldridge, 2013, p.14).

4   Factors found in the research.

In this chapter, we will present the content analysis results to discuss research question 1: What are the key determinants for innovation in the public sector?

We present the impact factors that emerged as the most important, according to the innovation projects examined. By discussing the determinants using verbatim quotations, we aim to explore the context of innovations to argue the interplay of factors in the innovation ecosystem, as described in research question 2. These results are further analysed in Chapter Five.

In Chapter Six, we suggest a new theoretical model, *the PSI Factors Matrix*, that synthesizes the research and the conceptual background into a novel model of the public sector innovation ecosystem and the interdependencies of PSI factors. Research question 3 is examined considering the matrix to argue the general applicability of the determinants across borders while implying the role of a nation's cultural dimension in PSI efforts. From this, we arrive at the main research question, Q4: To what degree can the dimensions of a nation's culture influence public sector innovation efforts?

We advocate a practical roadmap on how to leverage a nation's culture to improve conditions for innovation success. In the roadmap, we suggest, with some validation from regression analysis and from the conceptual framework, how the different determinants considering a nation's cultural dimension scores can be used as drivers for public sector innovation. In Chapters Seven and Eight, this will be the discussion.

To arrive at the culmination of the roadmap, we will start at the beginning.

The first content analysis focused on exploring what determinants were the most frequently mentioned as barriers or as conditions for success within the public sector innovation reports published in the OECD OPSI library of PSI.

Figure 3 The 20 most frequent words to describe success or barriers for public sector innovations
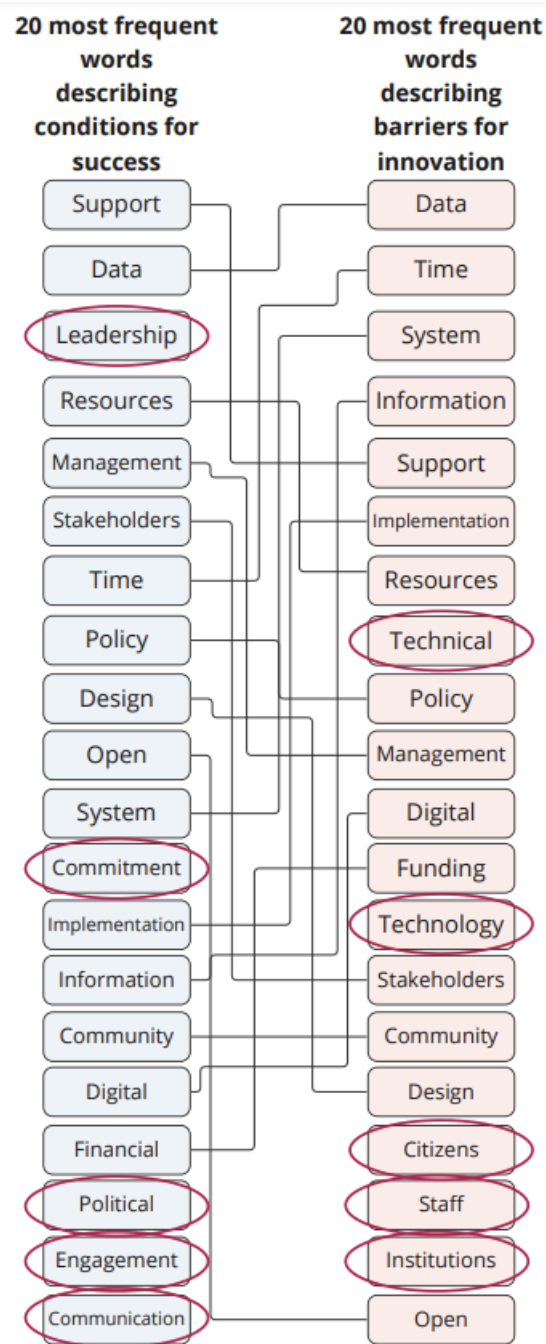
Source: Based on the OECD OPSI library, my own work.

Note: The red circles show the words not present in both columns. They are not encircled even though they are not the same word since they are closely associated. One word, financial in the column for conditions for success, is linked with the word funding in the column for barriers for innovation.

As Figure 3 displays, several of the determinants are being discussed as both a barrier and a success factor. With only five differences in the top 20 words in each column, 75 percent of the most frequently described impact factors can be both a condition for success and a barrier to innovation.

The determinants are all supported in the conceptual framework. Using the conceptual framework as guidance, we divide factors into two categories of internal and external factors to get a more holistic and systematic view of the public sector ecosystem.

Since the similarities between conditions for success and barriers for innovation – factors are high, we have focused on the fifty most frequently used words within the code of barriers for innovation.

By reducing and grouping the determinants, we end up with factors we will discuss to gain a broader comprehension of the public sector innovation ecosystem.

4.1 External factors

Figure 4 External factors as they are described in public sector innovation projects

PERCENTAGE DISTRIBUTION OF THE EXTERNAL FACTORS WITHIN REPORTED BARRIERS FOR PSI

Open / transparent 4 %
Trust 3 %
Security 3 %
Legal 3 %
Citizens 14 %
Policy 10 %
Politics 15 %
Resources 7 %
Access 8 %
Funds 10 %
Stakeholders 13 %
Technical/Data/Digital 10 %
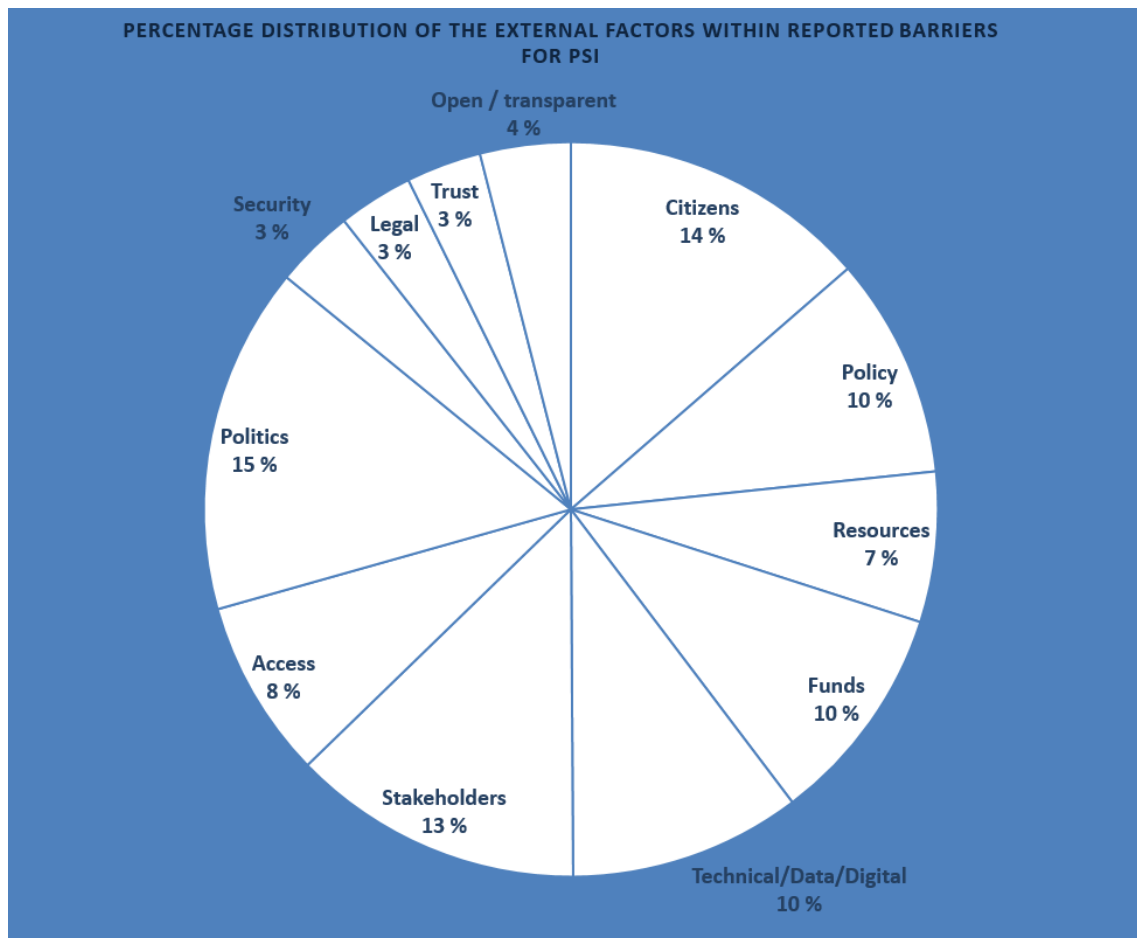
Note: For more details, see Appendix E.

Source: Based on the OECD OPSI library, my own work.

Figure 4 The external factors can be understood in relation to Hoftsede's six dimensions of national culture, multiple stream theory by Kingdon (2014), governing systems, "New" Institutionalism, government reforms, and stakeholder theory. The external factors that impact PSI efforts are concentrated on how a society is organized, the political climate, the transparency and trust amongst people, and the citizens' view on authority. It also engulfs the innovation capacity in the form of access and technical infrastructure, resources, and the environment for cooperation between stakeholders in the ecosystem. As we can read from Figure 4, there are mainly three areas that are of major importance for public sector innovation efforts:

- The relationship with the outside community (citizens, stakeholders, trust, open/transparency)
- Access (funds, digital/technological/data, and resources)
- The political environment (legal, politics, policy, and security)

The stakeholder approach describes the relationship with the outside community, where citizens and shareholders might have different emphases on what is essential for the actions taken (Freeman et al., 2007, p.107). In the "New" Institutionalized theory, the relationship with the community is vital for the institution's legitimacy, which is needed to drive forward innovation efforts (Scott, 2008, p.59).

Both Kingdon (2014) and Dunleavy et al. (2007, p.219) argue the need for public opinion for policy choices and changes within public sector organizations.

The political environment is also discussed as influential for public management reforms, where the public management will struggle to make changes unless the political environment it operates agrees with the importance of the direction of development (Pollitt & Bouckaert, 2017, p.165). Allocating resources and getting access to funds, workforce, and technical resources is, without a doubt, vital for any public sector innovation. However, government reforms tend to be adopted to make the sector more efficient, often in practice meaning a "look after the pennies" approach that can make innovation efforts, which in nature has uncertain outcomes, hard to prioritize (Kooiman, 1993, p.185).

As we have discussed, external factors play an important role in public sector innovations, as found in the conceptual framework and the empirical research conducted in this paper. We will now closely examine the internal factors for public sector innovations.

4.2 Internal factors

Figure 5 Internal factors as they are described in public sector innovation projects
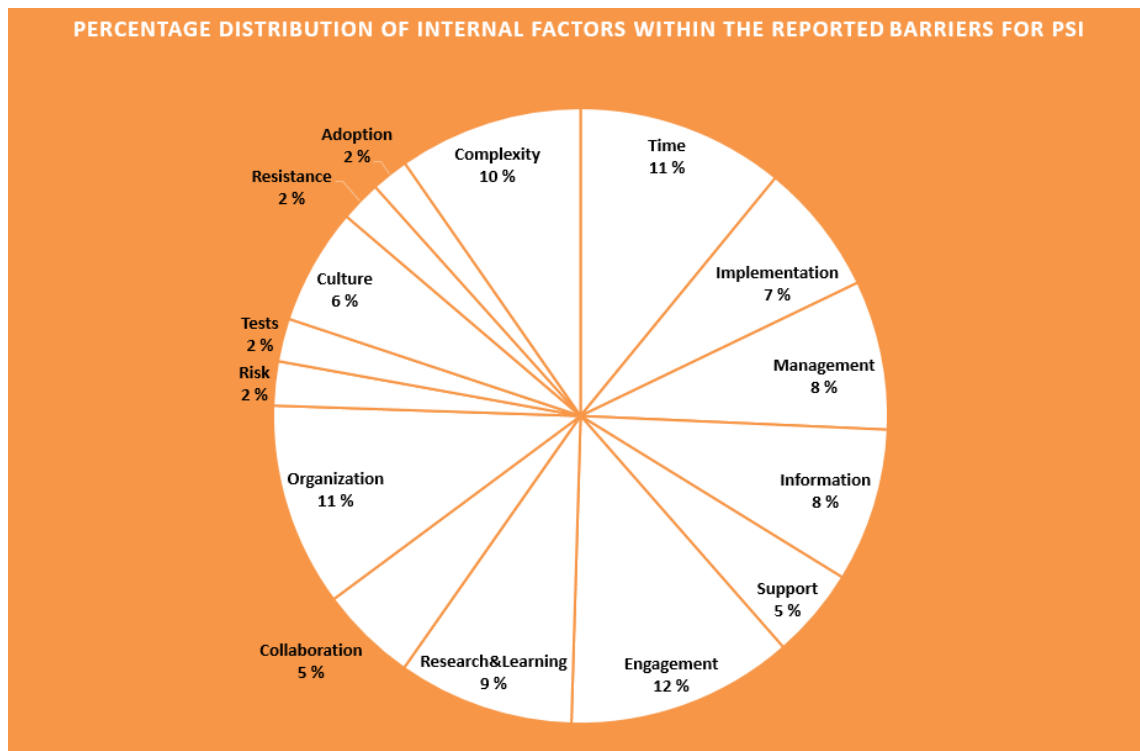
Source: Based on the OECD OPSI library, my own work.

Note: For more details, see Appendix E.

Although implementation and innovation outcomes are not addressed in detail in this research, it is worth noting that implementation is a significant difficulty for many PSI projects. As we can read from Figure 5, the main hindrances to public sector innovation efforts are organizational engagement, complexity, skills, research needed, and time factor. Close after, we find implementation, management, information, and support.

It is important to understand how to read the figure. Information, support, engagement, collaboration, adoption, research & learning, and tests should be read with a "lack of" in front. The factor organization contains how the organizational structure, its rules, and norms can be an obstacle to innovation, as can bureaucracy, hierarchical decision-making, staff, and administration. Time can be read in many ways: too little time to implement, it takes too long to innovate in the public sector, the time differences between efforts done by external and internal partners can create friction and frustrations, decisions take too long, a project is given too little time, resources are only available for a short time, and so on. Complexity is the complexity of a certain

innovation project and public sector governance, aligning priorities between collaborators, the whole ecosystem of public sector innovation, and the wicked problems to be addressed. Support entails every form of support thinkable; internal, external, between partners, financial, visionary, leadership support, and public support.

To further aggregate the results to discuss their influence on public sector innovation, we can group the determinants into three main areas:

- Organizational structure (organization, management, complexity)
- Organizational culture (resistance, risk, research & learning, culture, implementation, tests)
- Collaborative environment (engagement, support, information, time, adoption, collaboration)

In network or collaboration governance and resource theories, the structure of an organization can influence the access to resources, both internal and external (Ansell & Gash, 2007; Barney & Clark, 2007; Jones et al., 1997, p.914).

Likewise, organizational culture plays a significant role in any innovation project. Innovation in the public sector needs a culture for learning, testing, accepting risk, and ensuring a thorough implementation (Chesbrough et al., 2014; Osborne & Brown, 2011; Senge, 1994). The culture in an organization can also heavily impact adaptability and the best use of resources (Baker & Nelson, 2005).

Collaborative initiatives are also better at responding to complexities where development is going in a responsible and sustainable direction, and many stakeholders are directly or indirectly involved (Bason, 2010; Stilgoe et al., 2013).

From this first analysis, we have suggested the most common impact factors of public sector innovation efforts, supported by content analysis findings and the conceptual framework literature.

Furthermore, we have established that the factors of PSI can be both enablers and barriers for innovation efforts. The next step is to explore research question 2: How do determinants influence each other in the public sector innovation ecosystem?

We will discuss this in the next chapter, where we, using verbatim quotes, add context to the determinants to understand the possibilities of interconnectedness better.

5 Interplay of Factors for PSI

A contextual approach is needed to explore how the different determinants of public sector innovations might influence each other (Corden & Sainsbury, 2006; Tong et al., 2007). In Appendix M: verbatim quotes and interdependencies, we have selected direct quotations from the dataset of 521 innovation project reports in the OECD OPSI database that represents different countries, all portraying the interconnectedness of determinants. The table in Appendix M is too large to display in the thesis, but the discussion will refer to the verbatim quotations as they are numbered in the appendix. To give a brief visual of the way the table is arranged, we have included three quotations here in Figure 6:

Figure 6 Verbatim quotes and their interdependencies

	Verbatim quote	Main factor Internal (I) External (E)	Influenced factors	Related litterature from the conceptual framework	Country	Hofstede Scores
3	*"The first challenge was political - two months into the programme, a new government came into power which was very sceptical of technology. That meant that the willingness of the private sector to cooperate was also lower". Challenges and Failures, Estonia, Central Government (Accelerate Estonia, 2019).*	Politics (E)	Technology (E) Resistance (I) Stakeholders (E) Collaboration (I)	Multiple Stream Governing systems Stakeholder approach Collaborative Governance Digital Innovation Diffusion of innovation	Estonia	Power distance: 40 Inndividualism: 60 Masculinity: 30 Uncertainty Avoidance: 60 Long Term Orientation: 82 Indulgence: 16
4	*"Achieving buy in from senior staff is always a challenge. By creating a pilot and demonstrating positive results it can be possible to overcome this resistance. Our objective is to use the promotion and support of innovation to lay down new pathways within a healthcare system seriously hampered by legacy bureaucracy and silo mentality", Challenges and Failures, Ireland, Central Government (The spark innovation programe, 2017).*	Support (I)	Resistance (I) Test/ Experiment (I) Organizational structure (I) Organizational culture (I) Silothinking (I) Engagement (I) Administration (I) Legal and regulatory framework (E)	Governing systems "New" Institutionalism Systems thinking Ecosystem innovation Design thinking Lean	Ireland	Power distance: 28 Inndividualism: 70 Masculinity: 68 Uncertainty Avoidance: 35 Long Term Orientation: 24 Indulgence: 65
5	*"Doctors' resistance to the implementation of the module and unwillingness to use e-forms of the sick-leave certificates instead of paper forms. The main reasons of the resistance were insufficient digital skills and fear of the transparency". Challenges and Failures, Latvia, Central Government (Sick-leave e-certificate, 2016).*	Resistance (I)	Technology (E) Skills (I) Transparency (E) Implementation (I)	Governing systems Digital Innovation Resource-Based View	Latvia	Power distance: 44 Inndividualism: 70 Masculinity: 9 Uncertainty Avoidance: 63 Long Term Orientation: 69 Indulgence: 13

Source: Based on the OECD OPSI library of public sector innovation case study reports, my own work (Appendix M).

In Figure 6, the verbatim quotations are shown with what has been analysed as the factor the report ascribes the most significant importance in the second column. In the third column, we see the influenced determinants, while column four connects the

impact factors to relevant literature from the conceptual framework. The two last columns display the country where the innovation project is reported, with the last showing the Hofstede scores for the country's six cultural dimensions.

The last column will only briefly be referred to in this chapter, as we aim to establish the likelihood of determinants influencing each other. The Hofstede scores are represented since they will be the main topic of the following two chapters, examining the dimensions of national culture and the potential influence this might bring to the innovation ecosystem.

Using the three quotes (3-5) from Figure 6, we will examine the potential interdependencies of factors as they are described.

Factors and their interplay in quote 3:

The emphasized factor is politics. It explains challenges with a shift in government that changed the focus away from the innovation project. Being sceptical of technology, the new political climate became a barrier to engagement amongst external stakeholders, reducing chances for public and private sector collaboration. This interplay of determinants is supported by Kingdon (2014) as a political change can pivot the multiple streams needed for change, as well as make collaboration less interesting for the private sector as they often highlight technology in innovations (Ansell & Gash, 2007; Nambisan et al., 2017). Estonia is a country that scores 16 on the indulgence-restraint axis, 40 on the power distance, and 82 on the long-term orientation, which could imply that innovation projects could face more scepticism in using new technologies as it would be riskier. The relatively low power distance score makes it more likely that top-level resistance could impede innovation efforts.

Factors and their interplay in quote 4:

The main factor is top-level support. Top-level support is argued as influential in much of the conceptual framework. Top-level support can drive forward a wanted organizational culture, such as a learning culture, and it will be of importance for how a public sector organization operates within its legal and regulatory framework as well as acting as support for experimentation and collaboration while reducing the occurrence of silothinking (Scott, 2008). The opposite of silothinking, systems thinking, is also

impacted by top-level support, as coordinating in a complex system needs managerial finesse (Brown, 2008; Senge, 1994).

The quote describes getting top-level support as a challenge, and it explains that the way to get the support needed, they focused on piloting for quick results. Without getting ahead of ourselves, quick wins are one of the ways explained in Chapter Eight to improve chances for innovation success in countries with a high masculinity score. Ireland, in this quote, has a score of 68, which is considered high.

Factors and their interplay in quote 5:

Resistance is the most highlighted factor in this quote, with technology, skills, transparency, and implementation as impact factors. The interdependencies are described in seminal works in the conceptual framework, where resistance can impede innovation adaptation, especially if technological skills are poor (Barney & Clark, 2007; Rogers, 2003). Resistance can often derive from a lack of skills. It becomes too uncertain an outcome when the employees do not feel like they know how to implement the changed behaviour needed for the development suggested (Barney & Clark, 2007; Kotter, 1995). Clear and transparent communication can reduce resistance (Kotter, 1995). If we look at the Hofstede scores of Latvia, we see a high Uncertainty avoidance score (63), which can increase the likelihood of innovation efforts being more successful if there are available skills and experts in the organization.

What can we derive from these quotations?

As we have examined, determinants of public sector innovation are prone to influence each other. In the following, we will summarize other interplays surfacing from the verbatim quotations in Appendix M.

Stakeholders

Innovation projects might depend on external factors, such as stakeholders, political support, and trust between partners, not to mention the technological infrastructure needed. Moreover, at the same time, you need an organizational culture that can drive forward change (quotes 1,3,9,12,14, Appendix M).

Getting everyone onboard with an innovation project is not a simple task.

Getting different stakeholders to work together can include various perspectives that must be incorporated to succeed.

Metagovernance

Innovation efforts involving internal and external collaboration need strong management, clear and concise communication, and understanding that the stakeholders represented will have different reasons for collaborating and maybe even conflicting goals (quotes 4,7,8,10,13, Appendix M).

Government must learn how to share power, and the democratic processes must be supported to have support from public opinion for the legitimacy to maintain (quote 14, Appendix M).

Government must govern in new ways, and problems must be dealt with collaboratively. Another critical factor for innovation efforts is to address challenges from a systematic and holistic perspective.

Silothinking

Figure 7 The Elephant Fable
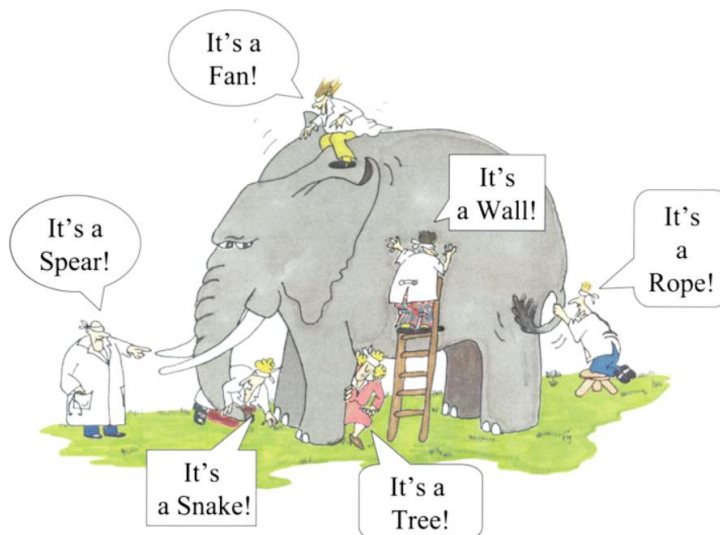
Source: (Wozny, 2020).

The challenge of silothinking causes concern in several innovation efforts.

Innovation projects have experienced that in opening silos, sharing resources, and empowering collaborators, innovation efforts will experience public support and trust, leading to greater chances for succeeding (quotes 4, 9,12, Appendix M).

What can be seen as associated with silothinking is the need for joint ownership of prioritizing which problem is to be addressed, which could be influenced by who puts the problem on the agenda and how the idea is diffused (quotes 9-11, Appendix M). Another area often discussed is how stakeholders can agree. It requires both internal and external factors working together, creating knowledge, allowing for time, keeping information transparent and all communication open while having strong management, trust between partners and sectors, a willingness to diffuse an idea into a practical change, and organizational adaptability to implement the innovation (quotes 2,8, 11-14, Appendix M).

Willingness or resistance to change

Willingness, or the opposite, resistance to change, relates to the organizational culture and the nation's cultural dimensions as seen as the willingness to collaborate and compromise between stakeholders (quotes 1,3,8,12,14, Appendix M).

Moreover, as argued earlier, factors can be both facilitators of success and barriers to innovation. In Portugal (quote 9), support is a condition for success, while in Estonia and Ireland (quotes 3 and 4), the lack of support is a barrier to innovation efforts (Appendix M).

Technology

There is no debate about the importance of digitalization and harnessing the potential of new technologies to address the SDGs (Mathur & Berwa, 2017, p.292). A technological infrastructure is needed to make technology an innate part of the innovation efforts (quote 15, Appendix M). Nevertheless, even then, you need trust, collaboration with stakeholders, and skills to use the available technology best (quotes 1,3,5,15, Appendix M).

Cultural dimensions of a nation

Israel is a highly individualistic country with a slight preference for masculine values. Here, stakeholders are reluctant to adopt an innovation due to values in the national culture. The country has a very high uncertainty avoidance. It is oriented toward the short-term (Appendix I: Hofstede scores of the 16 countries with the most published innovation projects in the OECD OPSI database). These scores combined create a national culture where it is harder to gain support for responsible and social innovation, as viewed in quote 11 (Appendix M).

We will explore these findings of interdependencies and to what degree a nation's cultural dimensions can influence innovation efforts more thoroughly in Chapters Seven and Eight. We will, however, implement the influence of a nation's cultural dimensions already in the next chapter, where we, based on the conceptual framework and the results from both chapter four and this chapter, suggest a systematic approach to the factors and their interdependencies for PSI.

6   The PSI Factors Matrix

"Given that the complex challenges faced by today's global society require collective solutions and innovations, a holistic approach is essential".

Lessons Learned, Argentina, Local Government *(Innovacion Publica 360, 2020)*

While barriers can be discussed separately in theory, an innovation project will seldom, if ever, encounter a single barrier to its efforts («Public Sector Innovation», 2016). A single barrier, say resistance, can impact the entire ecosystem and lead to problems with implementation and scaling, stakeholders' collaboration, public opinion, funding, political goodwill, etc.

Donatella Meadows suggests that complexity is difficult to explain with words alone. Visualizing from a systems perspective creates the holistic approach needed to see interdependencies and feedback loops in the system (Meadows & Wright, 2008, p.5).

A systematic synthesis of the factors of PSI aggregated from the analysis of PSI cases worldwide is a novel approach to exploring generalizability. Combining the international aspect with the role of a nation's culture by incorporating Hofstede's 6D model provides a new theory for exploring innovation in the public sector across borders. Figure 8 offers an imagery of the public sector innovation ecosystem and its interdependencies, as we have discussed in previous chapters.

Figure 8 The PSI Factors Matrix - a systematic approach to interdependent factors
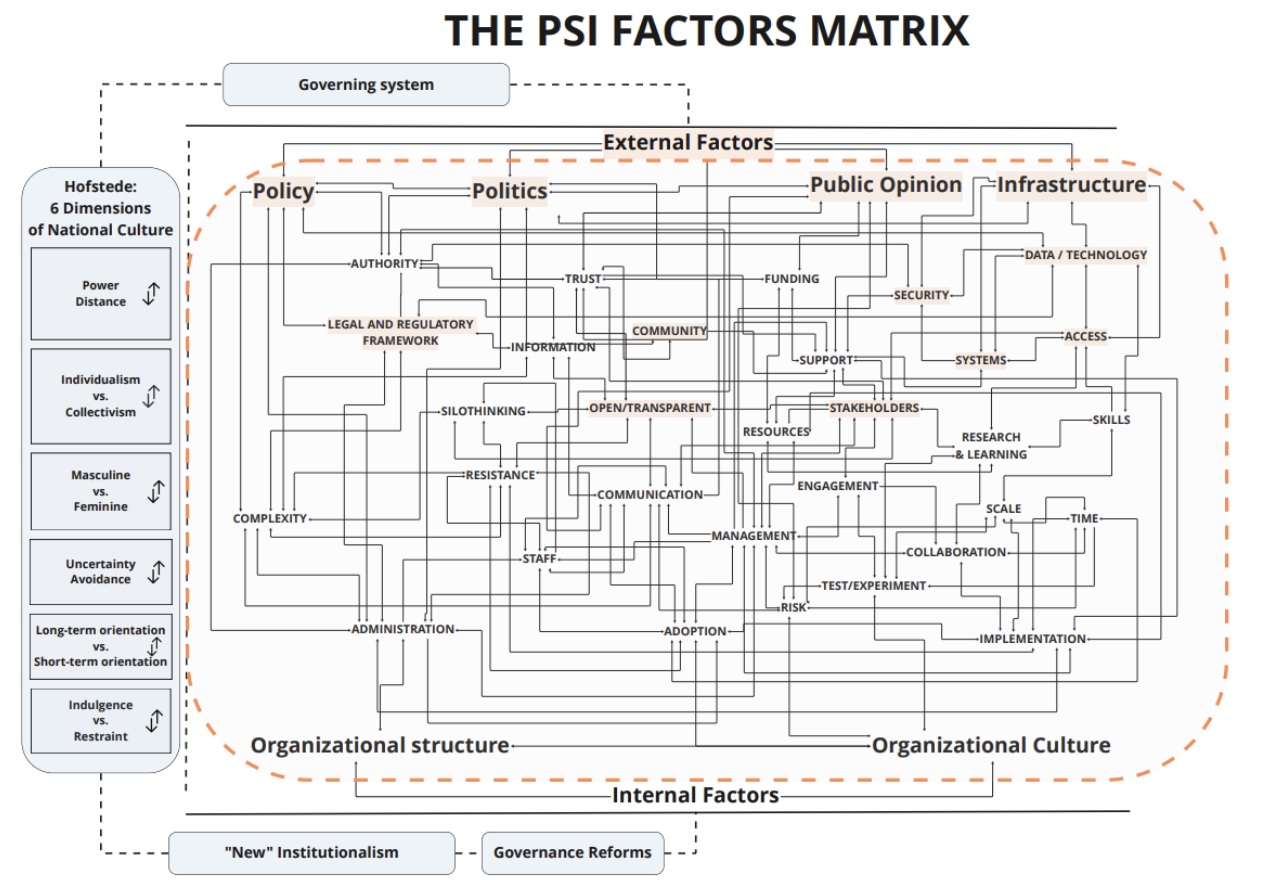
Source: Based on the OECD OPSI database and the conceptual background, my own work (Appendix H).

By conceptualizing the interrelatedness of factors within public sector innovations, figure 8 emphasizes the need for a holistic approach to innovation in the public sector. The model recognizes that different factors of public sector are influenced by other factors, that in turn are influenced by other factors again.

Neither of the factors acts in isolation, and a nation's cultural dimensions could influence what factors enable or hinder innovation efforts. For example, in a nation with a high power distance, hierarchical decision-making may be more prevalent, which could impede innovation efforts' flexibility and lead to wasted time, funds, and resources.

Wasted time, depleted funds, and resources could cause an organization to avoid risks, which could halter the innovation, and implementation could come to a complete stop.

Suppose a nation's culture lacks trust and is highly authoritarian. In that case, chances are that the citizens will not engage in innovation efforts out of fear or apathy, which could reduce the chances of success in innovation efforts.

With the integration of a nation's cultural dimensions, which are usually studied separately, the suggested PSI matrix (Figure 8) contributes a new value to the research field of PSI, where not only the formal structures of governance but also the culture are acknowledged as influential for PSI efforts (Lijphart, 2012, p.300).

It is acknowledged that a holistic approach is necessary to create an environment that fosters innovation in the public sector (Bason, 2017; Brown, 2008). In addition, we suggest that although factors can be seen as being generalizable across borders, as discussed in Chapter Five, it is likely that the cultural dimensions of the nation in which PSI efforts occur play a role in what determinants are the most prominent. It is important to consider what Hofstede also highlights in his suggestions, that all governments will not necessarily display the same influence from the cultural dimensions of the country (Hofstede et al., 2010, p.469). We see signs of this when we examine two often occurring factors with regression analysis in the following chapter.

The PSI Factors Matrix suggests a more comprehensive and nuanced understanding of innovation in the public sector than what has previously been offered in the literature and research. By considering a variety of factors and their interdependencies, from the approach of external and internal factors, with the potential influence from the cultural dimension of the respective nation, this model can guide policymakers and practitioners internationally in developing effective strategies for promoting innovation in the public sector.

7 Regression results

Empirical model on innovation factors and the cultural dimensions of a country.

We employed regression analysis to investigate the relationships between the different impact factors and the individual countries' scores in Hofstede's 6D model of National Culture. Innovation factors are measured as a dummy variable and the probit model, using the software package Stata, is used to estimate the equation. In our research, the impact factors for public sector innovation are seen in relation to whether indicators, such as 6D scores of power distance, individualism vs. collectivism, or control variables like Level of Government and Year Launched, influence the occurrence of the concepts.

Top-Level Support

Returning to the original OECD OPSI database, we re-read all case reports within the column of Conditions for Success, a coding that resulted in 100 definitions to describe top-level support (Appendix K). We did not include definitions and statements that could be seen as ambiguous, like the need for strong leadership or the commitment of the government. Only the definitions that unarguably were referring to top-level support as a condition for success were included.

We measured the explanatory variable, top-level support, by binary response, to determine whether the variable was mentioned as a condition for success. This way of evaluating the probability is why we chose probit regression analysis (Wooldridge, 2013, p.586). We used year launched, level of government, department of innovation and innovation status as control variables.

Table 6 Probit estimates of the likelihood of Top-level support

	Probit estimates of the likelihood of top level support			
	dy/dx	z-stat	dy/dx	z-stat
Level of Government (ref. pother)				
central	0.151 **	2.17	0.151 **	2.11
local	0.014	0.22	0.015	0.22
regional	-0.034	-0.43	-0.050	-0.62
Individualism Versus Collectivism (idv)	-0.0013 **	-1.98		
Power-distance index (pdi)			0.001	0.78
Department (ref other)				
Publicadministration	0.024	0.58	0.026	0.62
Education	0.065	0.90	0.070	0.98
Health	-0.031	-0.36	-0.028	-0.32
Information	0.038	0.79	0.043	0.87
Science	-0.028	-0.74	-0.030	-0.81
Employment	-0.060	-0.77	-0.066	-0.82
Eeconomic	-0.002	-0.03	-0.001	-0.02
Implementation status				
IS_evaluation	0.033	0.59	0.033	0.60
IS_generating_ideas	-0.040	-0.62	-0.050	-0.79
IS_developing_proposals	0.063	1.27	0.063	1.27
IS_identifying_problems	0.103	1.02	0.116	1.15
IS_diffusing	-0.012	-0.23	-0.013	-0.25
IS_implementation	0.034	0.99	0.037	1.04
Use of technologies	-0.007	-0.27	-0.001	-0.03
year2016 (reference before 2016)	0.004	0.08	-0.006	-0.12
year2017	0.048	0.80	0.037	0.62
year2018	0.019	0.41	0.010	0.22
year2019	0.055	0.96	0.050	0.89
year2020	0.035	0.30	0.045	0.39
Pseudo R2	0.065			
Number of observations	459			

*Note: Appendix F: ** denotes significance at the five per level. Stata command: probit y x, clust(Country), marginal effects calculated using margins dydx(*).*

Table 6 shows the marginal effects of the probit model for the determinants of top-level support. On average, 22 percent of public sector innovation projects can be characterized by top-level support (see descriptive statistics in section 3.3). The results show that the Hofstede index of "individualism versus collectivism" is negative and significant at the five percent level. This suggests that the more individualistic countries are characterised by a lower likelihood of describing top-level support as a condition for success in their innovation reports.

The magnitude of the relationships is quite large. Individualistic countries such as the US or the UK (with an IDV of 80 or more) are 5.3 percentage points less likely to report top-

level support as a condition for success (-0.0013 X IDV of 40) than countries with an individualism-versus-collectivism score of less than 40 (such as Brazil, South Korea, or Indonesia). However, the power distance index pdi index is not significant at the five per cent level. The control variables are not significantly different except central government, with a marginal effect of 0.15 (p-value < 0.05). This indicates that central government projects have a 15 percentage points higher likelihood of top-level support, as reported by the respondents.

Resistance

In Nvivo, using the automated text query for the word resistance with synonyms, we found 19 definitions used to describe resistance (38 search words when accounting for the caps sensitivity of Stata) in the column challenges and failures and lessons learned (Appendix L).

Table 7 Probit estimates of the likelihood of resistance

| | Probit estimates of the likelihood of resistance | | | |
| | Total sample | | Central and regional government level | |
	dy/dx	z-stat	dy/dx	z-stat
Level of Government (ref. pother)				
central	-0.005	-0.11	0.013	0.22
local	-0.013	-0.24		
regional	-0.017	-0.24		
idv	-0.001	-1.43	-0.002 ***	-2.81
Department (ref other)				
Publicadministration	-0.008	-0.29	-0.028	-0.82
education	0.027	0.46	0.069	1.00
health	-0.020	-0.48	0.016	0.29
information	-0.017	-0.55	-0.039	-0.85
science	-0.019	-0.50	-0.021	-0.44
employment	-0.051	-0.93	0.000	0.00
economic	-0.027	-0.49	-0.042	-0.64
Implementation status				
IS_evaluation	-0.006	-0.16	0.023	0.51
IS_generating_ideas	-0.071	-0.85	-0.179 **	-2.22
IS_developing_proposals	0.028	0.52	0.055	0.85
IS_identifying_problems	-0.164	-1.71	-0.052	-0.87
IS_diffusing	0.060 **	1.98	0.071 *	1.89
IS_implementation	0.039	1.10	0.049	1.33
technologyall	0.038	1.11	0.017	0.45
year2016	0.001	0.02	0.065	1.44
year2017	-0.065	-1.12	-0.041	-0.80
year2018	-0.115 **	-2.05	-0.079	-1.08
year2019	-0.041	-0.86	0.003	0.05
year2020	-0.118	-1.20	-0.075	-0.74
Pseudo R2	0.0772		0.1087	
Number of observations	459		327	

*Note: Appendix G ***,** and * denote significance at the one, five and ten percent level. See note to Table 6 for details.*

Table 7 shows the marginal effects of the probit model for the determinants of resistance during the innovation process. On average, 13 percent of public sector innovation projects can be characterised by respondent-reported resistance (see descriptive statistics in section 3.3). Estimates are presented for two subsamples, one for the overall sample, including all levels of government and the other for the level of central and regional governments. The reason for this distinction is that innovation projects at the regional or central government level are likely to be larger and more complex compared to projects at the local level. The results for the regional or central

government level show that the Hofstede index of "individualism versus collectivism" is negative and significant at the one percent level (p-value=0.005). This suggests that countries that are more individualistic are less likely to report resistance during public sector innovation projects. The magnitude of the relationships is quite large. In individualistic countries such as the US or the UK (with an IDV of 80 or more), the likelihood of resistance occurring during the innovation process is 7.7 percentage points lower (calculated as -0.0019 X IDV increase of 40 times 100) than in countries with an individualism versus collectivism score of less than 40 (such as Brazil, South Korea, or Indonesia). The control variables are not significantly different, except for the innovation stage generating ideas, with a negative coefficient indicating a lower resistance level. This is expected, as actors are more optimistic in this phase than in later phases.

The results of the two regression analysis suggest that the need for top level-support decreases as a country scores high on the individualism versus collectivism axis and that high individualism also implies lower reporting of resistance in innovation projects. In the next chapter, we will discuss the results of the regression analysis in combination with the conceptual framework, where we culminate the study by suggesting a roadmap for leveraging a nation's cultural dimensions to improve conditions for success in public sector innovation.

8 Leveraging a nation's culture

As found in the regression analysis, the cultural dimensions of a country are more likely to influence public sector innovations on the central and regional levels. This result makes it interesting to examine the distribution of governing systems within the countries in the OECD OPSI database as the governing system could impact the innovation efforts, as also discussed in the recent study by Cinar et al. (2022), where they examine how a national context can have an impact on what type of innovation the public sector initiates (Cinar et al., 2022).

Figure 9 displays the different levels of government as they are represented in the OECD OPSI database. We will start this exploration by first discussing the different governing systems and how they could play a part in what level of government a nation's cultural dimensions are influential for public sector innovation.
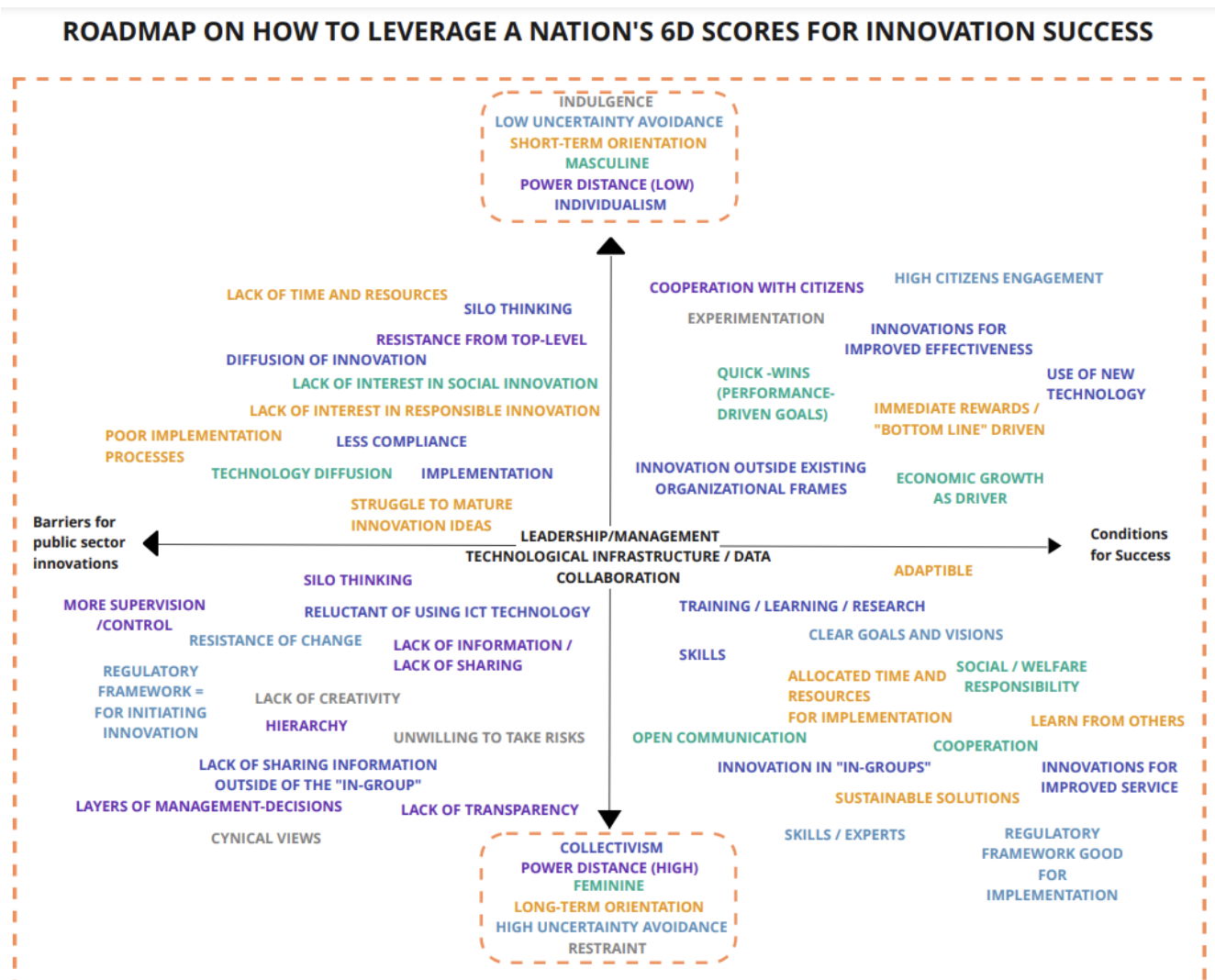
Figure 9 Levels of Government

LEVELS OF GOVERNMENT

OTHER LEVELS ARE INITITIATIVES, NETWORKS AND COLLABORATIONS THAT DOES NOT CONSTITUTE AS PART OF THE ORDINARY HIERARCHY OF POWER, POLICY AND DESICION-MAKING

OTHER

NATIONAL/ FEDERAL/ CENTRAL

REGIONAL

LOCAL

NATIONAL MATTERS: DEFENSE, INTERSTATE INFRASTRUCTURE (TRANSPORT/COMMUNICATION) FOREIGN POLICY, LABOUR-POLITICS. MANDATES AND REGULATIONS FOR PUBLIC SERVICES IN ALL LEVELS

POLICY IMPLEMENTATION AND SERVICE PROVISION IN SPECIFIC REGIONS

LOCAL: CITY/TOWN/VILLAGE LEVEL, WITHIN AREAS SUCH AS EDUCATION, HEALTH, URBAN PLANNING, WASTE/WATER, PUBLIC SAFETY

Note: Based on the OECD OPSI database, Elazar, Lijphart, Ter-Minassian, and Wollman, my own work (Elazar, 2006, p.74; Lijphart, 2012, p.175; Ter-Minassian, 1997, p.4; Wolman, 2008, pp.92-93).

To what degree power is shared or diffused through the levels of government is not always easy to understand just from the chosen system, federal or unitary. One way to get a better understanding is by exploring the percentage-wise distribution of a nation's fiscal budget that is central, regional and local (Ter-Minassian, 1997, p.6). We acknowledge that dividing levels of government into four/five simple levels (Figure 9) without further discussion on the nuances of power structures within each level can be too general. However, since the OECD OPSI database is using these levels, we choose to focus analysis on the generalization of the levels' power and roles in a nation's governmental system. Decisions are made to a large degree based on the policy-making context (Oliver et al., 2014, p.1). It is therefore unlikely that we will encounter disagreement arguing that the way power is diffused and shared within the governmental structures plays a part in determining to what extent actors in the system can adjust operations, alter desired results or make changes in an organization's efficiency (Crozier, 1984, p.147). A normal perception is that decisions and budgets within a field will be allocated to the nearest level of government (Hooghe & Marks, 2003, p.235). The objections to Hofstede treating culture within a nation as one argues that a country is not equal to a culture and that there is a plurality of cultures to consider (Baskerville, 2003, p.7). On these premises, the discussion of how a nation's cultural dimensions might impact PSI efforts will be seen in relation to the level of government where the innovation projects are being executed. In the preliminary

regression done of top-level support and the potential impact from cultural dimensions of power distance and individualism vs. collectivism, we encountered that the mentioning of top-level support as a condition for success was negatively significantly related to individualism, meaning that the more individualistic the country, the less need the innovation project had for top-level support for its success. Significance was also found with the control variable central level of government, signalling that top-level support was more critical on the central or regional level of government than in the other levels in the reports. Since the central and regional level of government are the highest levels[2] a nation has for policy and power unity, it can be argued that if a country consists of multiple cultures and governing structures, exploring these level of government with the Hofstede model will be the most significant levels to examine the relationship between the 6 dimensions of culture and the potential impact of determinants for success in PSI efforts, as done in the regression analysis.

The roadmap for leveraging a nation's cultural dimensions for innovation success could arguably be of most relevance to innovation projects conducted at the highest levels of government, although large and complex innovation projects at lower levels might also find it useful to consider the roadmap to strengthen their innovation efforts.

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[2] The OECD OPSI database operates with a national and federal level also, which arguably can be seen as a higher level within federal nations, but there is so much cross-use of a national and central level definition, also for the federal level, that it is possible to explore the central level as the highest (Franscisco, 2018).

Figure 10 Roadmap on how to leverage a nation's 6D scores for innovation success

ROADMAP ON HOW TO LEVERAGE A NATION'S 6D SCORES FOR INNOVATION SUCCESS

INDULGENCE
LOW UNCERTAINTY AVOIDANCE
SHORT-TERM ORIENTATION
MASCULINE
POWER DISTANCE (LOW)
INDIVIDUALISM

LACK OF TIME AND RESOURCES
SILO THINKING
RESISTANCE FROM TOP-LEVEL
DIFFUSION OF INNOVATION
LACK OF INTEREST IN SOCIAL INNOVATION
LACK OF INTEREST IN RESPONSIBLE INNOVATION
POOR IMPLEMENTATION PROCESSES
LESS COMPLIANCE
TECHNOLOGY DIFFUSION   IMPLEMENTATION
STRUGGLE TO MATURE INNOVATION IDEAS

COOPERATION WITH CITIZENS   HIGH CITIZENS ENGAGEMENT
EXPERIMENTATION
INNOVATIONS FOR IMPROVED EFFECTIVENESS
QUICK -WINS (PERFORMANCE-DRIVEN GOALS)   USE OF NEW TECHNOLOGY
IMMEDIATE REWARDS / "BOTTOM LINE" DRIVEN
INNOVATION OUTSIDE EXISTING ORGANIZATIONAL FRAMES   ECONOMIC GROWTH AS DRIVER

Barriers for public sector innovations   LEADERSHIP/MANAGEMENT TECHNOLOGICAL INFRASTRUCTURE / DATA COLLABORATION   **Conditions for Success**

ADAPTIBLE

SILO THINKING
MORE SUPERVISION /CONTROL
RELUCTANT OF USING ICT TECHNOLOGY
RESISTANCE OF CHANGE
LACK OF INFORMATION / LACK OF SHARING
REGULATORY FRAMEWORK = FOR INITIATING INNOVATION
LACK OF CREATIVITY
HIERARCHY
UNWILLING TO TAKE RISKS
LACK OF SHARING INFORMATION OUTSIDE OF THE "IN-GROUP"
LAYERS OF MANAGEMENT-DECISIONS   LACK OF TRANSPARENCY
CYNICAL VIEWS

TRAINING / LEARNING / RESEARCH
CLEAR GOALS AND VISIONS
SKILLS
ALLOCATED TIME AND RESOURCES FOR IMPLEMENTATION
SOCIAL / WELFARE RESPONSIBILITY
LEARN FROM OTHERS
OPEN COMMUNICATION
COOPERATION
INNOVATION IN "IN-GROUPS"
INNOVATIONS FOR IMPROVED SERVICE
SUSTAINABLE SOLUTIONS
SKILLS / EXPERTS
REGULATORY FRAMEWORK GOOD FOR IMPLEMENTATION

COLLECTIVISM
POWER DISTANCE (HIGH)
FEMININE
LONG-TERM ORIENTATION
HIGH UNCERTAINTY AVOIDANCE
RESTRAINT

Source: Based on Hofstede and the PSI Matrix previously introduced, my own work.

In Figure 10 we offer a roadmap on how to leverage a nation's cultural dimension scores to improve chances of innovation success in the public sector.

Individualism vs. Collectivism (IDV)

We have primarily focused on the dimension of Individualism vs. Collectivism for PSI efforts, using regression analysis to strengthen the suggested roadmap. The placement of the other impact factors in the roadmap is supported by theory, but it remains to validate their leverage by conducting further empirical research. In countries that are more collectivist, information sharing is likely easier if the parties involved already have established a baseline of trust (Hofstede, 2013, p.238). Collectivist-inclined countries might also be less ready to use of new technologies, especially the ICT types, as this

emphasizes more individualistic values (Hofstede et al., 2010, p.123). When collaborating with different stakeholders, we should be aware of a nation's individualistic or collectivistic orientation, as this could impact how the parties are treated. In collectivistic countries, those in an "in-group" are expected to be treated differently than those outside, while individualistic countries value treating everyone the same (Hofstede et al., 2010, p.122). Desmarchelier et al. (2016, p. 212) discuss how a high Individualism (IDV) score will impact the diffusion rate of innovation, and Hofstede claims that a focus on new technologies is related to the level of individualism (Hofstede, 2013, p.213).

Another factor that could be affected by a country's cultural dimensions is the occurrence of silothinking. Hofstede argues that in more individualist nations, a lack of loyalty could result in silo-thinking within organizations (Hofstede, 2013, p.239). Crozier's bureaucratic phenomenon challenges this argument somewhat as he argues that in bureaucratic organizations, you will find inflexible and hierarchical systems that breed "in-groups" within the organization, in which silo-thinking becomes a likely result (Crozier, 1984, p.142). Strong loyalties in the in-groups can hinder cross-discipline collaboration and innovation efforts. As seen, silothinking could occur in both collectivist and individualist countries. However, the emphasis is on the individualist countries due to the lack of loyalty, as high individualism leads to less compliance (Beugelsdijk & Welzel, 2018, p.1482).

Since the levels of IDV could impact the internal organizational environment for implementation, we tested the relationship between top-level support as a condition for success and the level of individualism with a probit regression of reporting top-level support in the column Conditions for Success with the IDV-scores of a country.

The top-level support probability was negatively significant, suggesting that there is more than a random chance that higher IDV scores would result in less need for top-level support for innovation efforts to be successful. As a control variable for the Individualism-Collectivism score, we could have used GNP scores as an increase in GNP usually leads to an individualistic shift in a country's culture (Brewer & Venaik, 2011, p.441; Hofstede, 2013, p.228). The Hofstede model of 6D is primarily based on data from the 1980s and the 1990s. There is a possibility that the IDV of nations has shifted since then due to an increase in GNP.

According to Hofstede, training/learning and skills are more meaningful factors in collectivist-oriented countries (Brewer & Venaik, 2011, p.439; Hofstede et al., 2010, p.93).

The factors we tested in this study was Top-Level Support and Resistance in relation to the Individualism-Collectivism and Power-distance axis. The central level of government was significant for reporting top-level support as a condition for success, while both the central and regional level of government was significant for reporting resistance.

Based on existing research, the PSI Impact roadmap suggests how other cultural dimensions could impact the determinants of public sector innovation. We will close this chapter briefly presenting the dimensions and their suggested influence on impact factors.

Power distance (PDI)

In a nation with a high PDI score, sharing of information in innovation efforts might be impeded (Kaasa & Vadi, 2010, p.585). This could be worsened by the strong hierarchy with many levels of management and control often found within high power distance countries (Hofstede et al., 2010, p.73). In addition, innovation efforts could be top-down rather than bottom-up initiated, impeding the workers on the frontline to contribute ideas for improvement. The hierarchical system of countries with a high power distance can also imply that the innovation efforts might encounter resistance as the levels below will fear failure (Hofstede, 2013). Another area where a high power distance score could influence the innovation efforts is in the sector's ability to openly communicate with citizens, and, at the same time, private sector could have a low willingness to cooperate on sustainability challenges (Reverte, 2022, p.1885).

Masculine vs. Feminine (MAS)

A highly masculine country might encounter difficulties implementing technological advances as it depends on the knowledge diffusion from masculine-oriented occupations such as engineers and scientists to other occupations less technology-

prone (Hofstede et al., 2010, p.150). Masculine-oriented countries, and occupations are more interested in the technical side of innovation rather than the human side, that we in Chapter Five argued is needed for all transformative changes. Results are essential in masculine environment, which could impede innovation processes that require time and patience (Hofstede et al., 2010, p.150). Masculine countries might have better success when addressing innovations whose goals are to improve effectiveness, while feminine countries will have an advantage towards service-oriented innovations (Hofstede et al., 2010, p.168). In this regard, it is no wonder that the Lean approach to production was developed in Japan, a highly masculine country with a masculinity score of 95 (Hofstede, 2023). The differences between the two positions can also be seen in development goals, where masculine countries tend to have an emphasis on economic growth and national defense development, while the feminine countries focus to a larger extent on welfare, aid, sustainability, and environmental protection (Hofstede et al., 2010, pp.170-177; Reverte, 2022, p.1884). Interestingly enough, even the way politics are being executed differs between the masculine and the feminine countries, with the masculine being oppositional in their treatment of politicians from another part, and the feminine often governing in coalitions with less hardened conflicts (Hofstede et al., 2010, p. 175).

The political climate plays a vital role in the public sector innovation ecosystem. Knowing how to manoeuvre the political landscape can make or break innovation efforts. Being aware of how masculine and feminine countries differ in perceived values in innovation efforts can also aid innovators in communicating the correct information to gain momentum for the innovation. Especially when addressing sustainable development goals, knowing how to get the external forces of politics and public opinion will be vital.

Uncertainty avoidance (UAI)

Nations with a high uncertainty avoidance score feel more secure when the workplace has well-known rules and procedures (Reverte, 2022, p.1885). Employees in organizations in such nations might be less willing to adopt the autonomous position where every worker is more free to decide the cause of action from their preference rather than that of formally organized rules and regulations (Hofstede et al., 2010,

p.191). High uncertainty-scoring countries are not afraid of taking risks, but ambiguity is a cause for concern. Wanting to know what will happen, or at least the probability of what will likely happen makes innovation processes where outcomes are highly uncertain less desirable (Hofstede et al., 2010, p.198). A lot of the wicked problems the public sector is facing, including the SDGs, demands innovation efforts where results are unknown, and where variables and dependencies are less than clear which could pose as barriers for innovation efforts in high-scoring uncertainty avoidance countries (Reverte, 2022, p.1885). To manage innovation in such environments, one should strive to create solid milestones along the way in the process that can be less ambiguous to reduce anxiety. Another area that can be a cause for concern is when innovation drives forward the need for changes in the organizational structure; this can be highly stressful and create a less- than-amicable environment for innovation diffusion (Hofstede et al., 2010, p.209). However, some impact factors could be an enabler in one part of the innovation process and be a barrier in another part. This is found to be likely when it comes to the need for rules and procedures in nations with a high uncertainty score. Although the proper regulatory framework can drive the implementation efforts forward, rigidity can be a significant obstacle for those at the other end of the innovation, those trying to initiate innovation (Hofstede et al., 2010, p.211). In most public sector innovation, there is a need for collaboration with different stakeholders. Citizens in countries with lower uncertainty avoidance have a greater belief in their ability to participate and engage in politics, the local community, and volunteering, giving collaboration efforts a better starting point (Hofstede et al., 2010, pp.219-220).

Long-term orientation vs. short-term orientation (LTO)

In short-term oriented countries, the immediacy of results is highlighted, often focusing on regular reports stating the financial progress (Hofstede et al., 2010, p.244). This tendency to need quick results can skew implementation efforts as they are not given the appropriate amount of time to diffuse. New innovation ideas might be dismissed as they do not seem to provide rewards fast enough (Hofstede et al., 2010, p.245). Long-term oriented countries, on the other hand, highlight sustainable development over time, being willing to learn from others, and have patience in their efforts (Hofstede et al., 2010, p.268).

Indulgence vs. restraint

Nations with high restraint score value moderation and perseverance, but they also foster a cynical society where citizens have a "glass half empty" view (Hofstede et al., 2010, p.289). This can impede innovation efforts as the innovation needs engagement and optimism to navigate complexities and the unknown.

By doing regression analysis and finding support in the conceptual framework, we have suggested answering research question 4 positively, arguing that a nation's cultural dimensions could be influential for public sector innovations, especially within innovation projects in the highest level of government. By offering a roadmap that can have practical use for innovation efforts, we leverage the synthesized analysis and research conducted in this study to contribute to the practice field of public sector innovation.

9 Conclusion

The research design chosen in this thesis allows for a thorough analysis of the interdependencies of the determinants within the ecosystem for public sector innovations.

Research design

Through using a mixed-method design and the creation of a broad contextual framework, this approach enables a thorough understanding of the complex interrelationships within the public sector innovation ecosystem.

The systematic exploration of about 500 case study reports, combined with the contextual framework, has identified patterns that have spurred the research toward the role of a nation's culture in public sector innovation efforts.

By testing the relationship between factors and the cultural dimension scores of a country using regression analysis, the research design further strengthened the validity of suggested answers to the study's research questions.

Results

The proposed matrix of PSI factors captures the multifaceted nature of determinants for innovation in the public sector. The model integrates different theoretical approaches, including the six dimensions of national culture, and the findings from the empirical research of the OECD OPSI library of PSI case study reports. The system can assist policymakers in developing a more nuanced understanding of the factors for PSI and develop effective strategies to overcome potential barriers. As the most practical contribution to public sector innovators, the study offers a roadmap for national influence in public sector innovations. With support from the conceptual framework and from the analysis in this thesis, we argue that factors are likely to be influenced by a country's cultural dimension scores. We provide a roadmap which is graphically presented to aid innovators in leveraging a nation's culture for improved conditions for success in their public sector innovations.

Limitations

There are, however, some potential limitations to the research, mainly on the reliance on the case study reports. As only published reports have been analysed, these may give a distorted understanding of the overall ecosystem of public sector innovation and

the innovation efforts, as it is likely that efforts that lead nowhere are not reported to the OECD OPSI, leaving only successful or partially successful innovations to be studied. Another thesis limitation is that the analysis does not address the differences between incremental and radical innovation. While these two types could present different challenges and conditions for success with this systematic and holistic approach to the public sector ecosystem, the only difference is likely the extent to which factor plays a role in success.

One last limitation is the distribution of countries reporting innovation projects to the database. With an emphasis on Westernized and developed countries, this study's results and suggested conclusions might not apply to developing economies. This needs to be verified by further research.

Contributions of study

This paper offers several theoretical contributions:

1. Exploring the vast information on public sector innovation found in the OECD OPSI database, a highly underexplored source of knowledge

2. Bridging gaps in the literature:

    a. Exploring the interdependencies of public sector innovation factors

    b. Arguing the factors' generalizability across borders

3. Suggesting the first-ever holistic conceptual framework for public sector innovation theory to address the sustainable development goals

4. Suggesting a novel PSI Factors Matrix arguing that a country's six cultural dimensions can influence the determinants of public sector innovation

5. Suggesting a practical roadmap for how to leverage a country's 6D scores to improve innovation efforts in the public sector

Suggestions

Future research: Exploring the complex system of PSI determinants, supported by a broad conceptual framework, has resulted in several novel findings that future research can further examine.

As a novel approach, testing the roadmap in different contexts, including various countries, and at all levels of government, could develop and improve its usability.

The thesis has not discussed the impact and outcome of innovation in the public sector. This is left for future research, as is innovation efforts in developing countries.

The public sector: This study explores the ecosystem of public sector innovations by analysing the factors described in case study reports for public sector innovations found in the OECD OPSI database. We implore public sector organizations to report as much as possible of their innovation projects to continue improving the data's information and relevance. In addition to reporting, we suggest the public sector use the case study library as it is a goldmine for inspiration and diffusion of knowledge from other public sector innovation projects.

The OECD OPSI: Our suggestion to the OECD OPSI is to continue to publish reports, to improve the quality of what is reported where in the different sections of the report. At present, reports can describe challenges in all three columns of Challenges and Failures, Conditions for Success, and Lessons Learned. To simplify the use of the database for future research, being stricter with how the projects are allowed to report in the different columns would be beneficial. Another area where the database could develop is by adding a column where the reports are to describe which of the 17 SDGs the individual innovation project is aiming at addressing.

To summarize

Overall, public sector innovation's ecosystem of factors is complex and multifaceted. By understanding the interrelatedness of factors that can enable or hinder innovation, and how leveraging a nation's cultural dimensions can further the promotion of innovation success, public sector organizations can better position themselves to drive innovation for sustainability and improve delivery of public services.

There is a need for more research to understand the complex relationships between these factors fully, and this study offers several contributions to future research topics.

10 Figures and Tables

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Appendix F: Probit estimates for top-level support

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Appendix J: Definitions used for dummy variable Technology in Stata probit regression

Appendix K: Definitions used for dependent variable Support in Stata probit regression

Appendix L: Definitions used for dependent variable Resistance in Stata probit regression

Appendix M: Verbatim quotations and their interdependencies

Appendix N: An overview of the distribution of reports from 2020-2022

(Source: unpublished case study projects reports, OECD OPSI)

REFERENCES FOR APPENDIX M: List of case study reports used for verbatim quotes:

(*Clear my Record*, 2016)

(*Developing Digital Services Using Low Code*, 2017)

(*Accelerate Estonia*, 2019)

(*The spark innovation programe*, 2017)

(*Sick-leave e-certificate*, 2016)

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