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OBSERVATORY OF PUBLIC SECTOR INNOVATION

The state of play and prospects for measuring innovation in the public sector

This paper provides a critical review of public sector innovation (PSI) measurement approaches and related gaps; explores alternative approaches to measure PSI, which respond to different use cases; and paves the way for operationalising a measurement framework for public sector innovation. The paper is based on desk research and a consultation of OPSI's national contact points (NCPs) conducted over the summer and fall of 2022. It is planned to publish the paper as an OECD Working Paper on Public Governance by end of 2023.

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Foreword

Over the past decade, public sector innovation (PSI) has attracted a lot of interest from policymakers and policy practitioners alike. The challenges faced by the public sector have grown in scale and complexity, creating a need for new ways of working. In parallel to countries' efforts to build an evidence base of methods and tools to promote and achieve public sector innovation, there has been a growing interest in measuring innovation. Several actors have examined the purpose and need for public sector innovation measurement, including countries as shown in this paper, academic literature (see Lopes and Farias, 2022; De Vries et al, 2016; Kattel et al. 2018 and 2013 for literature overviews), and international organisations such as the OECD (2018), the World Bank (2018) and the European Commission (2013).

This paper contributes to these efforts by reviewing the "state of the art" of public sector innovation measurement activities - including existing gaps in research. It also explores alternative approaches to measuring PSI and discusses options for operationalising international measurement. In doing so, the paper categorises the measurement activities and evaluates the different methodologies used. The aim of this paper to help identify common approaches to PSI measurement going forward.

More specifically, the working paper proposes:

- Creating a continuous stocktaking of PSI measurement activities in Member countries
- Improving existing frameworks or creating new frameworks that can guide PSI measurement more systematically at country level
- Identifying indicators that would be most useful for cross-country comparability.

1 The state of play for measuring innovation in the public sector

This chapter presents a comprehensive review of measurement activities in public sector innovation (PSI) and proposes future directions for developing a measurement framework. With the public sector facing growing challenges and a need to overcome previous reform plateaus, PSI has gained substantial interest from policymakers and practitioners. The objective of this research is threefold: (1) identify existing measurement activities and gaps in PSI measurement, (2) explore alternative approaches that cater to different use cases, and (3) pave the way for an operational measurement framework.

1. Introduction

This chapter presents the case for public sector innovation measurement (Section 1). It then reviews current PSI measurement activities at national and international level (Section 2). This section discusses different measurement methodologies (surveys, big data etc.) and the objectives and use of current measurement activities. It then discusses the remaining research gaps (Section 3) and suggests avenues for further research (Section 4). Section 5 briefly concludes the paper.

This chapter is based on a literature review and desk research, as well as a consultation (written and oral) of the national contact points (NCPs) of the OECD Observatory of Public Sector Innovation (OPSI) during July-August 2022, an NCP meeting in September 2022 and some additional consultation in September-o November 2022. Further discussions on the topic of measurement took place at the NCP meeting in May 2023.

1.1 The case for measurement

Public sector innovation (PSI) has been defined for the purpose of the work conducted by the OECD Observatory of Public Sector Innovation as “implementing something novel to context in order to achieve impact” (OECD, 2017a). PSI is central to improving both the efficiency and the effectiveness of how government works. Governments can contribute to setting the direction of innovation, within and across systems, and influence its design through a variety of policy mechanisms and tools (OECD, 2017a).

There is growing awareness that encouraging innovation in the public sector is key to improving public services (Torfing and Ansell, 2017; Arundel et al., 2019). Given that general government expenditures amounted to 46.3% of GDP on average across OECD countries in 2021 (OECD, 2023), the effectiveness and efficiency with which public resources are used has major effects on social and economic outcomes. Public sector innovation supports better outcomes for citizens through more effective policies and public services that are more responsive to user needs.

Comprehensive measurement of public sector innovation and the use of this data in research can help public sector managers and policymakers: (1) assess the contribution (positive or negative) of innovation to the quality and efficiency of public services; (2) plan adequate resources for PSI; (3) develop capabilities in government to ensure innovative and effective interventions; and (4) tackle barriers to and identify key enablers of PSI. Reliable measures of innovation inputs can help decision makers assess the cost of and returns on investing in innovative public services. There has been a great deal of discussion in management literature by academics and practitioners in recent years of the impacts of innovation and in demonstrating the value of innovation (OECD, 2018). This is a direct result of the extensive diffusion of innovative practices in the public sector.[1] The need for measures of public sector innovation has also been stressed by the OECD and in many other organisations such as the EU (European Commission, 2013; OECD, 2022). This interest has led to government support to measure public sector innovation.

Box 1.1 provides an overview of OECD work on measuring public sector innovation. Measurement requires an understanding of what needs to be measured as well as knowledge of what can be reliably measured. In response to strong demand for empirical evidence on public sector innovation, this paper addresses these requirements and outlines further experimentation to improve and extend public sector innovation data.

[1] Since 2017, the OECD has been collecting and analysing hundreds of examples of public sector innovations through its Observatory of Public Sector Innovation. The collected case studies feed in a published annual trends report (See https://oecd-opsi.org/work-areas/innovation-trends/).

Box 1.1. The evolution of OECD work on Measuring Public Sector Innovation

The topic of measuring PSI was first raised in the OECD at the 2006 OECD Blue Sky Conference in Ottawa, which discussed science and innovation policy indicators. This was followed by efforts from a group of countries to adapt the Oslo Manual (OM-2005) to measure innovation in the public sector. In 2009, results of the MEPIN survey (Bugge et al., 2011) were discussed by the OECD Working Party of National of Experts on Science and Technology Indicators (NESTI), the subsidiary body of the OECD Committee for Scientific and Technological Policy (CSTP) in charge of indicators on science, research, and innovation.

The 2010 OECD Innovation Strategy (OECD, 2010 pp. 154-157) outlined the importance of unleashing innovation in the public sector to address global challenges, public expectations and resource constraints and recognised the specificities (and challenges) of measuring innovation in the public sector. The wide variation in the content of different national innovation strategies was emphasised and deemed important to address.

Guidelines for the exploratory measurement of public sector innovation measurement were produced by NESTI, in partnership with the European Commission (EC). Given a lack of implementation consensus among member countries, these were not officially published as recommendations but were reflected in the fourth edition of the Oslo Manual, broadening concepts and definitions of innovation beyond the business sector. The 2018 Oslo Manual provides a generic roadmap for public sector innovation measurement considering the sectors' specific characteristics, i.e. non-market activity and dependence on political processes for decision making.

In its 2015 'Innovation Strategy' the OECD reiterated the importance of public sector innovation and emphasised its crucial role in the overall innovation agenda (OECD, 2015). Under the umbrella of the 2015 'Innovation Strategy', the Public Governance Committee set up the Observatory of Public Sector Innovation (OPSI). OPSI's mandate was to support countries in building a repository of innovative practices in the public sector and help decision makers set up institutional capacity to innovate. In 2017, OPSI conducted a review of approaches to measuring innovation in the public sector. The report examined the research gap in terms of effectiveness, efficiency, and impact of public sector innovation *vis-à-vis* private sector innovation measurement. The report emphasises individual characteristics, processes and strategies, and measuring transformative change as important factors for innovation success. It provided the basis for the current theoretical frameworks 'Innovation Facets' and the 'Innovation Capacity Framework'. Additionally, the 2019 report on 'Measuring Innovation in Education' by the OECD Centre for Educational Research and Innovation (CERI) has shown that there is a moderate level of innovation taking place in the education sector (up from a "fair" level in 2015). The study showcased several different examples of innovation in the education sector, including product innovations such as new literature and process innovations such as organisational changes and external relations. Measures of innovation in the education sector build upon traditional surveys and surveys of organisational change, but the report acknowledges that there is still a need for more diversification and better coverage of the education sector. The report provides useful methods for linking innovation activities with educational outcomes.

Research conducted for this paper showed that there are several definitions of innovation used in the public sector as well as differences of opinion both on the definition and on what should be measured (see Annex A). For private sector innovation, guidelines on how to use surveys to measure innovation and innovation activities have been available since 1992, including for example the Frascati Manual; these guidelines expand on work started in the 1960s, which was focused on measuring research and

experimental development to reflect the broader nature of innovation.. Recognising that innovation takes places across all sectors, the 2018 Oslo Manual provides a general statistical definition for innovation after covering key defining features.[2] and a framework for developing sectoral measurement approaches.[3] It includes a section on PSI (2.6.1 on "Innovation in the General government sector") indicating key aspects that should be taken into account for measurement. While additional attempts to develop guidance on PSI measurement have been pursued within the OECD and elsewhere, there is still neither a consensus nor a comprehensive action-oriented framework that addresses the sector's specificities. PSI is often service-centred and has specific drivers (public value, political cycles, etc.) that are difficult to quantify, contextual in nature and challenging to capture in measurement (OECD, 2018).

One of the main objectives of measuring public sector innovation is to inform policies to improve public sector outcomes such as the quality of public services, their impact and responsiveness. It is therefore important to determine whether different approaches and capabilities lead to similar or different results/outcomes (Arundel et al., 2015). Measuring public sector innovation can identify which approaches to innovation or type of innovation (organisational, product, process, communication etc) produce which outcomes, or which inputs support incremental versus transformative innovations.[4] In addition, measurement can point to the capabilities needed for different types of innovation in the public sector. By conducting such analysis public sector organisations can learn from each other and improve their performance. Furthermore, measurement efforts can shed light on the barriers to innovation – at individual, team, organisation, or system level – and how they can be mitigated or removed.

The research in this study shows that many measurement activities have been conducted in various countries and for different purposes. Denmark developed an Innovation Barometer (CO-PI, 2019), which focusses on measuring the incidence of public sector innovation and its drivers and barriers. These activities have inspired many subsequent surveys in different countries using the Innovation Barometer as reference and the Copenhagen Manual, which was developed by Denmark to provide guidance on implementing Innovation Barometer-type surveys. (CO-PI, 2021). Other examples presented in this paper illustrate measurement initiatives conducted to evaluate the success of innovative programmes and to increase innovative capacity. Another important goal of measurement activities for many participating countries is to raise awareness on public sector innovation through surveys that show what public sector organisations can do with innovative approaches and solutions.

The research shows a variety of uses for measurement, including understanding the incidence of innovative activities; barriers, or enablers to innovation at the organisation level; and to identifying the impacts of innovation programmes. Results from measurement studies conducted at national level have mostly been used in academic research and disseminated to national authorities and other stakeholders. In some cases, results have led to new policy directives or contributed to decisions on policies and services. For example, in the Czech Republic, data from the innovation survey feeds into the national policy on client-oriented public administration and has led to recommendations for promoting and supporting public sector innovation. In Denmark, results from the Innovation Barometer have been used in several reports that contributed to decisions on innovation policy, such as the Public Sector Innovation Scan of

[2] These concern the central role of knowledge as basis for innovation, the requirements of novelty with respect to potential uses and that of implementation for an innovation to exist, as well as the ambition of value creation, preservation or compliance as potential drivers of innovation.

[3] This framework calls for innovation measurement approaches to make choices regarding the scope of measurement, the innovation phenomena for measurement, the measurement perspective on the subject or the object, sources of data and responsibilities for measurement.

[4] For the purpose of this paper, incremental innovation is understood as a series of small improvements made to a existing products or service; transformative innovation refers to developing something novel (product, service, or business model) that significantly alters how individuals, organisations, or societies function.

Denmark (OECD & CO-PI, 2021) which provided an overview of the drivers, supports, organisational and systemic factors that influence the development and diffusion of innovation in the Danish public sector.

While progress has been made on international comparability through frameworks such as the Innovation Barometer, countries have adapted them to their needs by changing questions and targeting different respondents.

The OECD consultation of NCPs also discussed the gaps identified in current measurement activities. The research has shown a need to continue with international statistics on public sector innovation performance, but also to explore other topics.

One topic mentioned by several country experts was innovation management. The Oslo Manual defines innovation management as all systematic activities to plan, govern and control internal and external resources for innovation (OECD/EU, 2018). In the consultations, several NCPs consider this an important element of PSI, particularly as part of monitoring and evaluating innovation projects. Another topic is measuring the capacities for government to use innovation meaningfully. Current efforts typically focus on capacities at the individual or organisational level, but there seem to be no broader efforts to understand the capacity of organisations or the whole public sector to use innovation meaningfully. The OECD's Innovative Capacity Framework (OECD, 2021) and accompanying tools offer one avenue for considering measurement in this area. Another topic suggested in the consultation the role of individuals within an organisational unit. Understanding and managing the impact on innovation of individuals in their roles as employees is a policy priority (OECD, 2018; 2022). Measurement at the individual level could provide policy-relevant data on a range of topics such as the effect of innovation on skills obsolescence, the willingness of individuals to innovate, and factors that support and empower individuals to innovate in their role as employees of a public sector organisational unit. Another emerging topic in measurement is monitoring the composition of public sector innovation portfolios (different types of innovation) and support measures needed to increase their uptake (OECD, 2022).

1.2 Measuring innovation at the system level

Collecting data on system-level innovation can improve the understanding of the characteristics that support the presence and diffusion of public sector innovation activities across OECD countries. These include system-wide enablers, institutional conditions and structures across the whole of government that can influence innovation. Enablers can be either explicit or implicit enablers in the form of policy guidance, incentives, rules and regulations, processes, etc. (OECD, 2017[1]).A better understanding of system-level innovation can help explain the determinants of innovation across the public sector. It could also help to ascertain how deeply innovation is embedded in all facets of the public sector and whether innovation occurs routinely or is instead driven at the organisational level to pursue specific organisational priorities. From a system perspective, this latter kind of innovation can hinder achieving collective aims or needs, as it tends to be a siloed activity.

1.3 Taxonomy of public sector innovation

To be measured, innovation activities and concepts must be defined (Gault, 2018). Defining concepts is also important for harmonisation. An overview of the definitions of concepts relevant for this paper is provided in Annex A

Windrum and Koch (2008) have proposed a taxonomy that can been used to classify types of public sector innovation, an example of which is found in the Australian Public Service Commission report (APSC, 2011 p.210). The taxonomy follows.

1. Services innovation
2. Service delivery innovation
3. Administrative and organisational innovation

4. Conceptual innovation
5. Policy innovation
6. Systemic innovation

Classifications 1–3 align directly with those in the Oslo Manual (Windrum and Koch, 2008 and Gault, 2018), where they would appear as product innovation (1), and business process innovation (2 and 3). From Windrum and Koch (2008), public sector conceptual innovation is defined as "the development of new world views that challenge assumptions that underpin existing service products, processes and organisational forms". The approach known as "government as a platform" represents a conceptual innovation. 'Policy innovation' at the ministerial level comes in two forms: "incremental innovation based on policy learning by government and radical innovation sparked by conceptual innovation." Behavioural insights and service design methods are examples of incremental innovation, whilst AI-powered virtual assistant is an example of radical innovation. Finally, 'systemic innovation' "involves new or improved ways of interacting with other organisations and knowledge bases" Windrum and Koch (2008).

Types 1-3 have been the focus of many surveys on public sector innovation, as discussed in section 2.1 of this paper. These surveys were often also sent to national authorities, but they usually include the same set of questions asked of municipalities or other lower levels of governments. To a limited extent, these measurement tools cover system-level innovation, but there is a need for a dedicated approach to collect data on system- level innovation.

System-level innovation and the Innovative Capacity Framework

The Innovative Capacity Framework (ICF) is a resource developed by the OECD Observatory of Public Sector Innovation (OPSI) to help governments understand and collect data on the factors that enable or hinder their public sector's capacity to innovate (Kaur et. al., 2022) (see also Annex A). The Framework's methodology examines innovation systems and recognises the specific context in which innovation takes place while enhancing the comparability of country experiences (Kaur et. Al., 2022). The Framework identifies drivers and barriers to ensure innovation achieve its goals.

The ICF aligns well with the taxonomy of Windrum and Koch (2008). One of the major advantages of the ICF is that it emphasises the need for a systemic and exploratory approach, recognising the importance of context specificity and not only individual and organisational factors that influence innovation. It also recognises systemic issues related to how government is organised (e.g., budgeting rules, auditing, regulations). Obviously, for each of the 6 types of innovation listed above, some capacity is needed. The ICF framework is therefore ideal for identifying which factors enable or hinder any of these innovations as well as the types and approaches of innovation that are needed to achieve government goals and objectives.

1.4 The possible applications of public sector innovation measurement

Comprehensive measurement of public sector innovation and the use of innovation data in research can support public sector managers and policymakers in (1) assessing the contribution (positive or negative) of innovation to the quality and efficiency of public services; (2) planning adequate resources for PSI; (3) developing capabilities in government to ensure innovative and effective interventions; and (4) tackling barriers to PSI. Public sector measurement and evaluation can serve different purposes, for example understanding, learning, communicating, or informing decisions around:

- the drivers of innovation;
- policymaking and the design of public services;
- strengthening the capacity of an individual/organisation/system to use innovation to achieve goals;
- the impact of innovation;
- the incidence and type of innovation efforts;

- assessing the value of investments;
- process effectiveness or efficiency;
- theoretical development.

Public sector measurement can be conducted and generate learning on different levels including:

- individuals;
- organisational units (e.g., teams), organisations or groups of organisations;
- the public sector system;
- a specific policy domain, policymaking system etc.

Finally, measuring innovative capacity allows international benchmarking and comparison, and gives a platform for learning through the sharing of good practices. Several of these applications can be complementary. However, there is not one measurement tool that can collect information on all these applications. Consequently, some strategic choices must be made which are discussed in this paper.

2. Measurement activities on PSI

- Surveys of public servants are the most frequently applied approach to PSI measurement. These are often not comparable across countries, as surveys may be designed differently.
- Case studies have been the first main sources of information on public sector innovation.
- Case-studies and interviews are used to gain in-depth understanding of causal relationships. They have been used to provide additional insights on top of traditional indicators.
- Use of Big Data to produce indicators will increase given its timeliness advantages, but innovation is highly heterogeneous and difficult to identify using web-scraping methods.
- Recent measurement activities based on the OECD Innovative Capacity Framework contribute to understanding PSI.

Evidence-based policy requires accurate indicators to monitor public sector innovation activities. Several efforts have been made to track progress on public sector innovations using very different approaches at different measurement levels: individual (i.e. individual public servants), organisational, systemic, for a definition of each level see (Kaur et al., 2022). Such efforts have been summarised below against the types of measurement tools that have been utilised.

This section discusses the three main methods which have been used to measure or examine innovation in the public sector:

1. Questionnaire-based surveys
2. Case studies and interviews
3. Big data approaches

Questionnaire based surveys refer to the technique for gathering statistical information about the attributes, attitudes, or actions of a population by a structured set of questions (Preston, 2009). Public sector questionnaire surveys are usually administered by postal mail or through the Internet. The case study approach allows in-depth, multi-faceted explorations of complex issues in their real-life settings (Crowe et al. 2011) and were the first methods used to study public sector innovation. Case study research can involve systematic data collection and analysis procedures. Moreover, case study findings can be generalised to other situations through analytic (not statistical) generalisation (Yin, 2011).

They are not that useful for producing indicators because the sample sizes are too small and unrepresentative. However, case studies result in qualitative data that can provide suggestions for possible

survey questions and are a useful tool to evaluate public sector innovation. Big data approaches refer to digitised data sources that have been generated for various purposes and contain information (usually unstructured) about some aspects of government innovation activities (Rammer and Es-Sadki, 2022).

Each measurement method will be discussed separately by providing a brief overview of current activities, and the objectives and usage of the data resulting from these activities. In total for 15 out of the 39 OECD countries, information has been found on the public sector measurement activities. Eleven out of these 15 countries have used structured-questionnaire surveys to collect information on public sector innovation in their respective countries. Table 1.1 below provides a summary overview of the different methods and their methodologies. Sections 2.1 to 2.3 discuss the different measurement methods in more detail.

Table 1.1. Overview of the different models to measure PSI and methodological issues

Criteria/Models	Questionnaire survey	Case studies and interviews	Big data approaches
Objectives	Benchmarking and international comparison of innovation performance and activities Promote and increase engagement on public sector innovation Identifying barriers and drivers of public sector innovation Identifying what kind of innovation is being conducted in the public sector	In-depth knowledge on innovation How do innovation drivers lead to a selection of innovation activities How do organisations learn to innovate How do they build innovation capacity	Measuring public sector innovation with novel techniques
Usage	Discussions with national authorities Feeds into policymaking Monitoring aspects of public sector innovation (Capacity of individuals, organisations or systems to innovate meaningfully, identifying the drivers for innovation, innovation process effectiveness or efficiency, types of innovations)	In-depth knowledge on a particular topic Impact of innovations Theory development Innovation process effectiveness or efficiency Demonstrating the value of investments Identifying the drivers for innovation	Timely information on the incidence of public sector innovation activities or outputs
Level of focus	Individual, Organisation, System	Individual, Organisation, System	Organisation
Advantages	Generalised to target population DataM to analyse relationship between factors and outcomes Sub-population analysis possible (really useful to use eg. municipal data only when communicating with municipalities	In-depth insights	More timely and frequent Lower costs Census-like data (depending on source) Open data (accessibility) Flexibility
Disadvantages	No insights from respondents Difficult to establish causality	Not representative of the population No comparison group	Biased information (self-reporting + focus on product innovation) Lack of accuracy and consistency (definitions) Lack of examples of how it works in the public sector

Criteria/Models	Questionnaire survey	Case studies and interviews	Big data approaches
Operational costs (material, travel, telephone)	Moderate if online High if postal	High	Moderate
Innovative Capacity Framework	Purpose, Potential and Capacity	Purpose, Potential, Capacity and Impact	Purpose
Micro-Data Linkage (administrative data)	Yes	Yes, but with barriers	Yes
Examples	Innobarometer (European Commission) 2011 Innovation Barometer (CZ, DK, FI, EL, IC, NL, NZ, NO, SI and SE. DE and AT are preparing to conduct a survey) 2015 to date) MEPIN (2011) Surveys for learning (PT, CA, FI)	Bason (2018) Bartlett and Dibben (2002) Fuglsang (2010) Several case studies are reported in the summary report of the Nordic IB report (2019), link Case studies in New-Zealand	Eurostat STARPIN (Bianchi et al., 2019), Denmark (innovation units), Canada (social network analysis). Private sector leading examples: Kinne and Lenz (2021) and Daas and van der Doef (2020, 2021)

Note: This table draws on consultations with National Contact Points (OECD stakeholders) see Annex A., Arundel (2023), Rammer and Es-Sadki (2022) and authors own expertise.
Source: OECD.

2.1 Questionnaire-based Surveys

- *Surveys of persons working in the public sector have been the main source of indicators on PSI. Their objectives include international comparisons, increasing engagement, identifying drivers and barriers. Results have been used in interactions with stakeholders, policymaking and (self) evaluation.*
- *More recently object-based[5] approaches are being used in subject-based surveys to reply to increasing demand to use surveys for analysis instead of producing indicators of phenomena.*

Surveys of public servants, or persons working in public sector organisations, are the main source of data on public sector innovation. The first large-scale survey of innovation in the public sector was the 2008-2009 MEPIN survey of public sector organisations in the Nordic countries. The research project developed a measurement framework which that to a large extent followed the Oslo Manual's (third edition) definitions of innovation (Bugge et al, 2011). Based on this work, a pilot study was conducted among public sector organisations in Denmark, Finland, Iceland, Norway and Sweden. The survey was conducted with 363 work units across central, regional and local government within the Nordic countries. Other surveys followed (see Arundel et al. (2019) or Kattel et al. (2018) for an overview).

The surveys discussed in this section are answered by multiple different respondents, selected through a sampling process. All of the surveys conducted to date have been at the organisational level, that is, they asked respondents to provide information on how they have experienced innovation operating within the organisation they work for. These surveys are answered by multiple different respondents in a country or

[5] Object-based studies focus on a phenomena of interest. For instance collecting data on specific innovations identified in journals or reported by an organisation. Subject-based studies focus on the organisation or the actors responsible for the innovations.

sector. Respondents provide answers on the innovation activities of their work unit. Most of the studies select respondents through some form of random sampling, in order to ensure that their responses, when aggregated, are representative of the situation across their sector, or across the country as a whole. Countries differ substantially in the type of organisations they have been targeted. These include municipalities, regional public agencies, national public agencies, government departments, hospitals, libraries and more, for an initial overview by country see Table A in Annex B. A more detailed data collection on existing innovation surveys is needed to draw meaningful comparisons in terms of scope, survey respondents and questions asked.

2.1.1 Objectives and use of surveys

Most of the countries included in this research report have used a structured questionnaire survey, of which a large majority follow the Innovation Barometer (IB) framework. IB surveys are answered by persons heading work units within public sector bodies. They ask them for details of their most important recent innovation (usually within the last 12 months), about how this innovation came about, and about their perceptions of supports and constraints for innovation within their government. Within OECD's terminology, these surveys are completed at the organisational level. Depending on the country, different public sector bodies are included, such as national agencies, ministries, municipalities and other public sector organisations.

Usage of the results of these structured questionnaire surveys is more diverse across countries, but most of them use the results in discussions with national authorities on the topic of public sector innovation and, in some instances, it directly feeds into policymaking. Other usages include dissemination of the results and (academic) research and specific analysis for dedicated purposes. For example, several interviewees (NCPs) mentioned that in preparing for a meeting on the topic of public sector innovation, the survey data is used as background information to start the discussion and provide insights. In several countries such as Denmark and Sweden the results have been used to develop a self-evaluation tool for participants of the survey[6]. Austria, Germany and Switzerland have also built such a tool, but results are not yet available[7].

2.1.2 The Innovation Barometer

The National Centre for Public-Private Sector Innovation (CO-PI) conducted a representative survey of innovation in 2015 in collaboration with the official national statistical office and obtained 1,255 responses from work units in municipal, regional, and state bodies (CO-PI, 2019). With this Denmark, published the world's first official statistics on public sector innovation by a national organisation. The survey also included kindergartens, nursing homes, hospitals, and educational institutions. Other Nordic countries followed such as Norway in 2017.

To date Czech Republic, Denmark, Finland, Greece, Iceland, the Netherlands, New Zealand, Norway, Slovenia and Sweden, have all conducted one or more national surveys, utilising a similar methodology and definitions as the Innovation Barometer, though adapted somewhat to better serve national agendas. Box 1.2 provides more detail on the Innovation Barometer.Denmark and other Nordic countries have worked together to develop guidance (codified in a manual known as the Copenhagen Manual) to practitioners interested in conducting a public sector innovation survey in line with the Innovation Barometer approach. The Copenhagen Manual was co-created with decision makers, civil servants, innovation consultants, survey experts, statisticians, communications specialists and academic scholars

[6]Sveriges Kommuner och Regioner. https://innovationstestet.se/ . Denmark https://innovationbarometer.org/innovation-test/

[7] Innovations Compass, https://www.innovationskompass.net/hintergrund.html (October 16, 2022).

from 20 countries. Portugal has also conducted a public sector innovation survey, and Austria and Germany (non-government organisation) are preparing an innovation survey.

Box 1.2. The Innovation Barometer

In 2014, the Danish National Centre for Public Sector Innovation (now the National Centre for Public-Private Sector Innovation (CO-PI), in association with Statistics Denmark and the University of Aarhus, started work on designing a survey questionnaire to collect information on public sector innovation.

The work built on the Measuring Public Innovation in the Nordic Countries (MEPIN) work, to which project participants from all three organisations had contributed. The ambition was to design a survey that worked optimally on the public sector's own terms. The objective was to develop a survey tool that collect useful information for survey respondents on the prevalence of public sector innovation. CO-PI and Statistics Denmark publish survey results at such disaggregated levels, while protecting confidentiality, that allows public sector managers from specific sectors to gain insights on the public sector innovation activities from their peers. The result was the Innovation Barometer, the world's first official statistics on public sector innovation. The measurement was based on a nationwide web-based survey addressed to managers of public sector workplaces of all kinds - kindergartens, schools, hospitals, police stations etc. Publicly owned enterprises were not included. More details on survey methodology are available for the second round with reference period 2015-2016 and survey implementation in the spring of 2017. CO-PI and Statistics Denmark identified 15,102 public sector workplaces relevant for the survey. After drawing a sample, the survey was sent to 4,766 workplaces stratified by number of employees, geographical location and service area (e.g. hospitals, kindergartens, schools, road maintenance etc.). In total 2,363 workplaces answered resulting in a response rate of 50%. Survey protocols included sending the survey to the manager of each workplace personally and telephone follow-up calls in strata with too few responses. The data presented is weighted to represent the population by geographical location, service area and size of the workplace.

CO-PI made well use of the results in national publications and agenda setting however there was a need for additional insight from national comparisons. By 2018, Norway, Sweden, Iceland, and Finland had all conducted one or more national surveys, utilising similar methodologies and definitions as the Danish Innovation Barometer but adapting the survey to their national contexts. The ongoing efforts of these Nordic countries have contributed to methodological adjustments and improving the original survey design. Most of this work formed the basis of the Copenhagen Manual (CO-PI, 2021) which was a result of a collaboration of 20 countries in total.

The Copenhagen Manual includes guidance on several aspects of conducting an Innovation Barometer with examples of use, suggestions, and general warnings. The manual discusses setting strategic goals, communication, reaching respondents, adapting the questionnaire, and defining public sector innovation. Moreover, the manual offers an opportunity to mirror public sector innovation capacity by way of internationally comparable data.

The Copenhagen Manual (CO-PI, 2021) recommends covering at least the following core questions as part of an Innovation Barometer type survey:

- Innovation status
- Type of innovation (product/services/processes/external communication)
- Description of the most recent innovation
- Type of innovation for the most recent innovation
- Novelty for the most recent innovation (world first, adapted, copied)
- Initiation of the most recent innovation
- Collaboration with other organisations on developing the most recent innovation
- Financing of the most recent innovation

- Diffusion/sharing results of the most recent innovation
- Outcomes of the most recent innovation
- Evaluation of the most recent innovation
- Barriers and drivers for the most recent innovation
- Ongoing innovation
- Failed innovations

The survey results from the Innovation Barometer are widely used by different organisations and for individual research purposes, e.g., inspiration, policymaking, strategizing, HR development, teaching, research and consultancy services. The initial objectives of CO-PI have been achieved as the Innovation Barometers are being put to use as the public good they were intended to be.

Source: *CO-PI* *innovationbarometer.org* *and* *Statistics* *Denmark* *https://www.dst.dk/en/Statistik/dokumentation/documentationofstatistics/public-sector-innovation*!Add the source here. If you do not need a source, please delete this line.

2.1.3 Surveys for learning purposes

Several countries have conducted surveys or other measurement activities with different purposes to the traditional priorities of benchmarking and producing indicators. The aim of these kind of measurement activities are to focus on the needs of public sector organisations and their managers. The results are aimed at supporting public authorities and providing insights into activities such as identifying drivers, innovation strategies and which innovative methods lead to better outcomes. These activities are referred to as "surveys for learning purposes" in this paper.

Several of these activities were conducted using Innovation Barometer type surveys, with (regression) analysis using results from the object-method section of such surveys (see also section 2.1.3). For example, researchers have conducted factor analysis[8] using Innovation Barometer data from the Netherlands. Drawing on statements of the climate for innovation in the organisations the researchers found that the statements are highly interconnected and can be combined into a measurement scale that expresses the innovation climate in organisations in one number. Controlling for type of organisation (central government, municipality, judiciary etc.) showed that scores do not differ that widely. Using cluster analysis, the researchers have grouped organisations according to their innovation climate. Public sector organisations within a cluster are more similar to each other compared to other organisations. The results showed clusters that score higher in terms of innovation climate, innovate more frequently and have more different types of innovations (products, services, processes, interaction) (Dutch Government, 2021).

A measurement activity that stood out was the experimental project titled 'Innovation Panel for the Public Sector[9]' conducted by a team from the Portuguese Administrative Modernization Agency. This project aimed to develop an instrument for monitoring and adapting innovation strategies. This instrument is to be used by Portuguese public sector managers as an evidence-based decision-making navigation panel. One of its possible usages are consolidated organisational level reports on innovation practices for each of the participants and an innovation dashboard to help identify strategic options.

[8] Factor analysis is a statistical technique that can be used to find out if statements are interconnected and contain one or more 'underlying' latent constructs.

[9] Portuguese Administrative Modernization Agency (2021). Report: https://www.ama.gov.pt/documents/24077/228618/ama_micro_relatorioInovX_EN_20201007.pdf/86bb9892-9dc7-41c4-a44a-5ae403536deb

Canada has also been using surveys for analysis and evaluation of the Impact Canada Challenge Program[10]. The results from the survey indicated that the Challenge model was an effective policy approach for delivering government priorities, and Challenges are delivering on their intended outcomes and are closely meeting the needs of Canadians. Challenges mobilise new talent and engage non-traditional actors with above-average proportions of youth, women and minorities applying to Challenges (Impact Canada, 2022a).

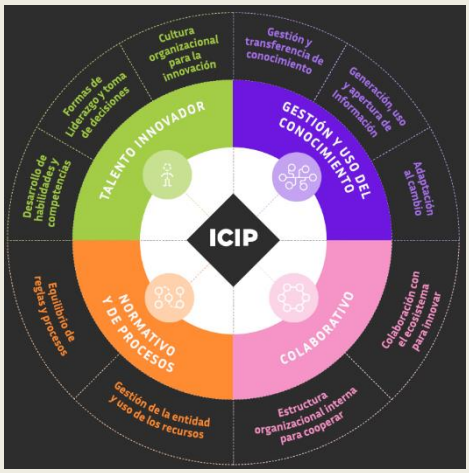
Other surveys for learning were conducted in Colombia, Chile, and Finland (see table 1.1). Colombia developed a model of ´Public Innovation Principles' which attempts to measure the value generated through public sector innovation projects, taking into account both the results achieved and the processes that lead to such results (DNP, 2021; OECD interview). Moreover, Colombia developed a capacity index which is build based on four pillars such as innovation, talent, knowledge management and collaboration. The capacity index, which is constructed through dedicated surveys as well as additional data from different sources, develops recommendations for each participant in the survey. The aim of the capacity index is, together with foresight analysis, to support public sector managers in making better informed decisions. More information on the Capacity Index for Public Innovation in Colombia is provided in Box 1.3 below.

[10] Challenges are open innovation approaches that are designed to provide incentives to encourage a broad set of innovators to tackle a problem, where solutions are not always apparent. For more information see Impact Canada https://impact.canada.ca/en/challenges

Box 1.3. Capacity Index for Public Innovation Colombia

In Colombia's National Development Plan 2018-2022 "Pacto por Colombia, pacto por la equidad", a dedicated section was devoted to "Public innovation for a modern country which outlined the strategy and key objective to promote public innovation in Colombia (DNP, 2019, p. 555).

One of the objectives is to strengthen the institutional conditions to promote public innovation and remove barriers to innovation. Within this objective, the development of a Capacity Index for Public Innovation (ICIP) was proposed to provide national and territorial entities with inputs to define and guide strategies that promote public innovation. The ICIP is a commitment by the National Planning Department (DNP) to systematically measure the capacities of Colombian public entities to innovate. The ICIP's objective is to provide evidence-based information to help the public sector make informed decisions that improve policy formulation and services provided to citizens, and help raise performance in service provision.



The first measurement activity was conducted in 2021 and includes 719 public entities, 147 national entities and 572 territorial entities. The unit of measurement of the index are the Colombian public entities of the different administrative levels of the government; that is, it includes national departments, ministries, agencies, governorates, mayors and other institutions that perform an administrative and government function in Colombia. The capacity index provides information on practices, institutional conditions, and compliance as desired capabilities to enable innovation in an entity.

The index seeks to be an instrument that can be used by public entities both at the national and sub-national level in Colombia,

The measurement framework consists of four pillars:

1. Innovative talent
2. Management and knowledge uptake
3. Collaboration
4. Regulations and processes

Note: For each pillar a set of capabilities is identified and defined and each pillar consists of sub-pillars. A detailed overview including a motivation for each of the indicators used for each pillar and sub-pillar of the ICIP is provided in the report.

Source: Índice de capacidades para la innovación pública - ICIP 2021. Departamento Nacional de Planeación. July, 2022.

A major OECD study conducted in 2015-2017 has reviewed Chile's innovation activities in the public sector with a focus on how civil servants in Chile contribute to innovation in the public sector, providing insight into the challenges they face and what can be done to strengthen their capacity to innovate in Chile's public sector (OECD, 2017). Drawing on surveys, focus-groups and workshops the OECD provided tailor made recommendations on the abilities, motivation, opportunities and fostering innovation for Chilean civil servants. In 2019 Chile has developed a Public Innovation Index which measures the capability for innovation as contribution to the improvement of public services. To date, four annual measurements have been made starting in 2020 and are in their last measurement cycle during 2023. More details can be found in Box 1.4.

Box 1.4. OECD review of Chile's innovation activities in the public sector

The Public Innovation Index is one of the services of the Government Laboratory of Chile (LabGob), a state agency that emerged in 2015 with the purpose of accelerating the transformation of the State through the promotion of public innovation. Its activity is oriented to the co-creation of solutions to priority issues and the installation of capacities to innovate in public institutions, in order to contribute to improve public services and their relationship with citizens from a systemic view with a focus on users.

This Index was created in 2019 by LabGob and the Inter-American Development Bank (IDB) in order to measure the "capabilities to generate new or improved ideas, processes, products or services that, through co-creation processes between different actors, positively impact the needs and expectations of people for the transformation of public management" (LabGob and IDB, 2021:12).

The information is collected through a self-applied digital questionnaire, which is answered by different officials depending on their profile and field of knowledge, and which also includes a glossary of concepts for each question. Ministries, presidential delegations and governors' offices are excluded from the measurement, since the unit of measurement of the Index is the public service, understood as institutions that perform administrative and non-governmental functions.

By 2023, the fourth measurement cycle of the Public Innovation Index is underway, with the simultaneous participation of 50 public institutions. In the last measurement, the general average of the Index was 33.81 points, placing close to 42% of the central level services in a "growing" development of their innovation capabilities. Among the findings obtained is the identification of public servants as the main source of the innovations, as well as that the capacities most developed by the services are the capacities of digital resources, human talent and user participation, while those with the lowest level of development are environmental management and inter-institutional co-ordination.

In the first two measurements, 37 institutions participated, and in the third in 2021, 45 institutions participated from a sampling frame of 97 measurable Chilean public services, reaching 46% coverage over the target population, and representing 13 of the 24 ministries.

Reporting is voluntary through a platform where representatives of each institution answer the form and attach the administrative information required in certain cases.

The indicator is composed of three dimensions: Institutional Resources, Practices and Processes and Collaboration and Openness. These dimensions are classified as enabling and conditioning. An enabling dimension is understood as the set of basic capabilities that enable or facilitate innovation, and without which it would be difficult to implement other capabilities. A conditioning dimension, on the other hand, refers to those capabilities that are more closely linked to the innovative task and the achievement of favourable results, which are enhanced if enabling capabilities exist. The index is composed of an enabling dimension called Institutional Resources (basic institutional aspects to be able to develop innovation), and two conditioning dimensions: Practices and processes (which points to the development of innovation initiatives, taking into account their level of formalisation and maturity within the institution), and Collaboration and openness (in relation to citizenship and other public and private institutions).

The measurement range of the index is between 0 and 100 points, and is calculated from the sum of the scores obtained in the ten key capabilities, which have a non-proportional weight in the calculation, giving priority to the capabilities belonging to the conditioning dimensions. The table below shows the details of the capabilities measured, grouped by dimension and the maximum possible score assigned to each one.

Sources:
Laboratorio de Gobierno (2022). Nota Técnica de Resultados 2021: Midiendo las capacidades para innovar en el Estado Chileno. Disponible en: https://indice.lab.gob.cl/
Laboratorio de Gobierno (2021). Otro Ángulo: ¿Cómo hacer transversal la innovación a través de la medición? La experiencia del Índice de Innovación Pública. Laboratorio de Gobierno (2021), Gobierno de Chile.
Laboratorio de Gobierno & BID (2021). Nota Técnica Resultados 2020: Midiendo el Índice de Innovación Pública en los servicios del Estado de Chile. Disponible en https://innovadorespublicos.cl/documentation/publication/73/
Laboratorio de Gobierno (2022). Nota Técnica de Resultados 2021: Midiendo las capacidades para innovar en el Estado Chileno. Disponible en: https://indice.lab.gob.cl/

Lastly, the OECD has also started working with countries on measuring their innovative capacity through a mix of measurement activities and tools, including the use of semi-structured questionnaires as part of the Innovative Capacity Framework (ICF) (OECD, 2022) (see also Annex A). The questionnaires prompt reflection on factors at the individual, organisational and systemic level factors that may help or hinder a public sector's ability to use innovative approaches or produce innovative solutions to achieve better outcomes. The first utilisation was undertaken in the context of the Romania government (OECD, 2022), see Box 1.5 below for a brief recap. A refined and adapted set of questionnaires will be applied to the Latvian context in 2022-2023.

Box 1.5. The OPSI Innovation Capacity Framework in use, the case of Romania

In 2022 OPSI completed an innovative capacity assessment using the Innovation Capacity Framework as guiding tool in Romania[1]. The assessment examined the extent to which the Romanian Government has developed its internal capacity to strategically and systemically use innovation to achieve public outcomes. By applying the Innovation Capacity Framework, the assessment has used several different measurement methods discussed in this paper such as interviews and questionnaires. Moreover, it has relied on desk-research and focus group to answer the four key questions listed below in the context of the Romanian public sector.

The measurement activities feeding into the assessment involved the following methods:

- a comprehensive **literature review** of over 150 documents, including key national government documents, studies from the World Bank and the OECD as well as academic and a range of grey literature;
- a series of 32 **interviews** with actors across different levels and sectors of the Romanian public sector, such as state secretaries, government officials, private sector, civil society and local government;
- in total four **focus groups** involving government officials with different functions (HR, procurement, audit etc) and from different levels of the Romanian public sector;
- a **questionnaire** on the innovative capacity of the Romanian public sector to validate and test observations from interviews and focus groups. The survey led to 180 responses and an additional 35 responses from non-governmental actors;
- a virtual **workshop** to validate detained findings and initial systemic insights mapped using the Innovation Capacity Framework;
- three systemic insights, direction setting and **co-creation workshops** to validate findings and probe for future directions.

Questionnaire on innovative capacity

OPSI developed a questionnaire that serves as input to assess the innovative capacity framework of countries. The survey consists of key questions around the four themes of the Innovative Capacity Framework:

- **Purpose** What is driving the intent to be innovative?
  - Drivers for new or innovative approaches to improve outcomes (political agenda, government priorities, global challenges, trust, reforms)
  - Rewards for pursuing new / improved approaches (recognition, performance assessment, awards, promotion, individual satisfaction)
- **Potential** What elements across the system influence whether innovative efforts are attempted?
  - Methods that enable public sector managers to use new/innovative approaches to improve outcomes (performance management and reviews, team environment/culture, management, risk appetite, political signalling, accountability frameworks, organisational mandate, reform agendas, international exchange of good practices)
  - Factors that promoted or hindered the development of innovative solutions (dealing with errors, collaboration, new technology, financial resources, employee contribution, laws and regulation, organisational changes, citizen and other actors contribution)
  - Statements on workplace (on collaboration, trying new solutions, dealing with mistakes, reuse ideas from elsewhere, public perspective, evaluation)
- **Capacity** What is needed to carry out innovative efforts and integrate them into everyday practice?
  - Resources and capabilities available for new or innovative approaches to improve outcomes (skills, financial resources, regulatory flexibility, digital government tools, safe spaces, workforce panning, engagement with societal actors and opportunity to work across units, data sharing)
  - Centralized support needs (open question)
  - Innovation lab (interaction with innovation lab and public sector)

- **Impact** How is the impact of innovative efforts understood?
  - Evaluation of policies and services
  - User engagement
  - Mechanisms in place to learn from failures
  - Audit and accountability encourages innovation
  - Dissemination of innovation activities and lessons learned
  - Examples of innovative practices or evaluation

Results from the research and measurement activities were mapped to the Innovation Capacity Framework. This assessment has provided a comprehensive understanding for the Romanian public sector to use innovation to improve public sector outcomes. Moreover, it will be followed by an Action Plan and the launch of an innovation lab. With the influx of funding and support the Innovation Capacity Framework has shown to be a supportive tool for the Romanian public sector to redefine its approach to public governance by being more innovative, responsive and impactful.

Source: OPSI (2022) Strengthening the Innovative Capacity of the Government of Romania: Interim Assessment Report. http://oe.cd/ROMINNOVATES; OPSI (2022) Innovative Capacity Framework survey

2.1.4 The use of the object-based method in surveys

- *The object-based method is useful to collect information on enablers(drivers), features and outcomes of public sector innovations*

The Innovation Barometer as well as the survey used in the Portuguese Innovation Panel for Public Sector, use an object-based method approach by asking respondents to focus on the most recent innovation in the Innovation Barometer or on the most important/impactful innovation in the Portuguese example. The object-based method collects data on a single, focal innovation (i.e. the object of the study). The main purpose of the object approach is not to produce aggregate innovation statistics, but to collect data for analytical and research purposes by facilitating information retrieval about enablers, features and outcomes of innovations (OECD/EU, 2018). The object-based approach is therefore particularly useful for public sector innovation analysis as one of its main objectives is to collect and share information on how innovation is being conducted in the public sector. Moreover, this method provides useful information for quality assurance purposes on how respondents interpret questions on innovation and whether they over-, under- or misreport innovation (OECD/EU, 2018). The object-based approach is often used as a separate module within a subject-based survey that collects detailed information on a particular focal innovation.

The Innovation Barometer as well as the Portuguese survey do exactly this. They use the object-based within a subject-based innovation survey. This approach includes using a questionnaire covering all the organisations' innovation activities as well as a module on a single innovation. The advantage of this approach is that it can obtain information on a focal innovation for a representative sample of all public sector organisations. Other methods will be prone to self-selection biases (OECD/EU, 2018) for instance through expert evaluations or innovation announcements by public sector organisations. A second major advantage is the possibility to collect data on all types of innovations. Using experts or announcements to identify innovations will produce a bias towards successful product innovations. Moreover, the object-based method can collect information on innovations that are new to the organisation only or not sufficiently novel to be reported online or in public administration journals.

The Oslo Manual (OECD/EU, 2018) indicates that the inclusion of an object-based method module in an innovation survey can support the use of in-depth, quantitative, and Likert-scale questions that are too difficult for respondents to answer for all their innovations combined. For instance, questions that require respondents to calculate the average importance of user involvement across multiple innovations or innovation activities. In some innovation activities user involvement may have been important while in other innovation activities it may have not. Potentially difficult questions to answer at the organisational level

(subject-based) include expenditures on different innovation activities and the use of specific technical capabilities. With an object-based approach the respondent can answer these types of questions for one single innovation which has shown in practice to be easier for the respondent (OECD/EU, 2018).

Second, the use of questions on a single focal innovation ensures that the set of data collected refer to the same innovation. This is primarily an advantage for analyses on the relationships between innovation inputs, activities and outcomes, as in the research by Arora, Cohen and Walsh (2016) on the economic value of alternative knowledge sources for innovation. It can also assist other types of research particularly relevant for the public sector such as research into blended innovations that span both services and processes (Bloch and Bugge, 2016). A study using Danish Innovation Barometer data by Thøgersen et al. (2020) also conducts such analysis by exploring the factors that affect multiple types of public value that public sector managers have created by innovating.

A good balance has to be found as the Oslo Manual recommends to not only include object-based questions in an innovation survey. Several research and policy questions cannot be addressed through questions on a single focal innovation. Some of which are relevant to the OPSI framework on innovation capacity (discussed in section 4 of this paper). For instance, questions on the organisation internal capabilities and strategies as well as the external environment and questions that are used to create aggregate statistics such as resources spent on innovation activities in the public sector. The object-based method is therefore not that useful for constructing statistics, instead it is often used as headline indicators at the national level as the answers do not fully reflect the innovation activities of the underlying organisations.

The Innovation Barometer asks respondents to focus on the *most recent* innovation whereas the Oslo Manual recommends using the *most important* innovation with respect to its actual or expected contributions. The latter approach is adopted in the Portuguese setting. Both methods use the same reference period, but the most important innovation has some clear advantages as explained in the Oslo Manual (OECD/EU, 2018). First, the most important innovation is well understood by respondents and is memorable. Moreover, the most important innovation is relevant for research such as examining the factors that lead to success. The most recent innovation is useful in cases where you want to make sure that a random sample of all types of innovations are being collected. This approach produces results that can be generalised to public sector innovation overall. As for instance, Innovation Barometer data consistently show that adapting and copying innovation developed elsewhere is far more common than developing public sector innovations from scratch.

For some users of the data, it can be of interest to collect information for innovations with the largest expected or realised benefits. The results of the most important innovation module can also be used to construct aggregate indicators such as the types of innovation that public sector organisations find of greatest benefit to the organisation. Likewise, the most recent innovation can be used to construct aggregate indicators such as the novelty of a random sample of public sector innovations. However, the best survey approach depends on the identified research question.

2.2 Case studies and interviews

- *Case-studies and interviews are useful to gain in-depth knowledge on why a particular PSI was successful or failed. They have been used to provide additional insights on top of traditional indicators.*

The most important benefits of using interviews and case studies are that they can provide in-depth understanding of causal relationships, something which is often not possible in cross-sectional surveys. They can be used as a complementary addition to surveys and provide further depth and probing of certain areas. Topics that have been researched include the effect of different strategies on the types of innovations that are developed (Arundel et al., 2019). The disadvantage of case studies and interviews is

that they often are unrepresentative of all public sector organisations. To the contrary, statistically representative surveys can provide a country-wide overview of public sector innovation activities, possibly broken down by organisation (municipalities, agencies, national ministries etc.).

Annex B provides an overview of the different activities conducted by OECD Member to measure or analyse public sector innovation as collected in the 2022 consultation with NCPs. Some of the examples provided in the consultations can be categorised as case-study work. One example is that of a feasibility study of participants involved in the challenges programme in Canada. Impact Canada has supported several challenges which are run as staged contests and designed to tackle social, environmental, and economic issues. These challenges offer significant prize money to help inspire innovative solutions to these problems. Challenges are open innovation approaches that are designed to provide incentives to encourage a broad set of innovators to tackle a problem, where solutions are not always apparent. The feasibility study linked participants, in this case enterprises, with tax data to evaluate long-term success by examining revenue, wages, employment, R&D expenditures, and labour productivity growth over time.

Another example is an innovation action as part of a large research project in Finland (COSIE)[11]. The objective of that action was to develop practical resources for public service actors to re-define operational processes. The action employed real-life pilots to co-create a set of relational public services with various combinations of stakeholders from the public sector, civil society, and commercial actors. The results of this action have been disseminated in papers and used in discussions with national authorities.

In several of the reports published together with national survey results using surveys, case-studies have been included to help explain how innovation happens and show-case good practices, several examples are for instance included in the Nordic Innovation Barometer report of 2019 (Lykkebo et al., 2019).

2.3 Big Data approaches

- *New measurement approached using big data can address some of the shortcomings of traditional tools.*
- *Its main advantages include timeliness, the ability to collect information on specific topics and produce statistics at a highly disaggregated level.*

Some shortcomings of innovation surveys include costliness and that it takes a significant amount of time (Kinne and Lenz, 2021), resulting in a substantial time lag between the reference year of the data and the time the data is published. Another critique is that (national) innovation surveys are bound to apply general questions on well-known and understandable concepts in order to collect reliable and sufficient results. They therefore lack the possibility to collect information on specific innovations or innovation related to certain newly emerging technologies or market trends. Information on specific or not so well-known concepts can be collected through surveys but surveys tend to be costly and not suitable for collecting information from a potentially very small sample of a population.

Big data sources have the potential to overcome some of these shortcomings of innovation surveys and may offer a more complete picture of innovation (Kinne and Axenbeck 2018, 2020). Key sources of big data that can be used for measuring innovation include websites and social media activities, but also other digital sources such as proprietary data sources, media reports, job offerings or online platforms. While none of these sources is devoted to report on innovation, they may contain information that is related to activities of and events in organisations that are linked to innovation (see Arora et al. 2016). big data analysis aims to identify and extract this information.

Web scraping is one of such big data approaches to collect indicators and is based on data available on the internet. Theoretically it provides a cheaper and timelier source of innovation data in comparison to

[11] Co-creation of Service Innovation in Europe | CoSIE https://cosie.turkuamk.fi/

surveys (Arundel and Es-Sadki, 2019). Building on experiences from the business innovation measurement with big data, other advantages may include the ability to collect information on specific keywords used by public sector organisations and to produce statistics at a highly disaggregated level, e.g. at the departmental unit level of a municipality.

A small number of studies have used web-scraping to develop innovation indicators, but most are of the business sector. Many of these experiments have only tried to produce basic innovation indicators of low value, such as the percentage of firms that report an innovation over a defined time-period (Arundel and Es-Sadki, 2019). Disadvantages of such big data approaches include the likelihood of biased information as a result of self-reporting, limited coverage of the entire business sector, and lack of accuracy and consistency when compared to official statistics (Rammer and Es-Sadki, 2022). Moreover, information on innovation in most big data sources is related to product innovation, while only limited information is offered on process innovation (Rammer and Es-Sadki, 2022). The reason is that most (digitalised) big data sources are based on data drawn from organisations that intend to communicate with others. For instance, through the Internet. The primary target of communication are typically the users of their goods or services who are informed about the offerings of the organisation (see Kinne and Lenz 2021 for firms). There is likely less reason for organisations to inform others about their process innovations.

The Eurostat STARPIN project (Bianchi et.al. 2019) combines administrative data with web-scraping to measure two types of public sector innovation: the use of four methods of waste collection and three home healthcare services. The project essentially measures technology adoption, which may or may not be an innovation for the targeted agencies. The project integrates statistical data, data collected through web scraping, and administrative data, for a pre-defined set of services. Services are associated to specific characteristics that can be ordered according to a hierarchical “ladder” in terms of innovativeness. Institutions involved in their provision can thus be classified as more or less innovative by observing their level in a “ladder” of innovation capacity. According to the authors, the method can be applied to any category of public services. The main result of the research consists of the definition of the phases of the process for collecting data on public service innovation based on web-scraping. Based on the “validation phase and cross-sectional data analysis” the innovativeness level score is obtained and verified against relevant administrative and statistical data. Bianchi et al. (2019) conclude that the richness of micro-level data can be exploited to evaluate patterns of innovation, their determinants, and effects on (public) value creation.

One of the main advantages of big data approaches is that results can be obtained at lower costs compared to surveys and case studies and results are timelier (Kinne and Lenz, 2021, Arundel and Es-Sadki, 2019, Rammer and Es-Sadki, 2022). It can produce headline indicators such as the number of innovative public sector organisations. There are leading examples of this approach for private sector innovation particularly those that corroborate results with official innovation statistics e.g. (Kinne and Lenz (2019, 2021) and Daas and van der Doef (2020, 2021)[12]. The drawback is that these kinds of indicators offer little in-depth knowledge on how and why public sector organisations innovate. There are opportunities to explore these approaches further as part of public sector innovation measurement as there are few studies conducted so far in the public sector. CO-PI (Denmark) for instance has conducted web-scraping research of municipalities, regions and hospitals. Their aim was to identify innovation units with public sector

[12] These studies use a sample of firms that participated in the CIS and for which data on the innovation status is available. This data is used as training data. For all firms in the CIS sample, information from the firms' websites is extracted and transferred into a text data base. Then a model is developed that uses this text database to predict the known innovation status of the firm. The model is designed such that its results show a very high fit with the innovation status of the firms. This model is then applied on the text of websites of firms which did not participate in the CIS to predict the innovation status of these non-CIS firms. This approach is useful as it allows to derive innovation indicators for sectors and size classes not covered by the CIS or from non-respondents to the CIS (Rammer and Es-Sadki, 2022).

organisations, from their work as part of the Innovation Barometer they were aware that there are dedicated innovation units in several public sector organisations, but they wanted to see if through web-scraping they could identify more units. The results were not that successful, a few additional innovation units within public sector organisation were identified but the scraping led to a lot of data that was not relevant for public sector innovation as additional analysis showed that several known innovative public sector organisations did not use the term innovation in any of their webpages.

Another example using big data methods in the area of public sector innovation is work by Impact Canada (Impact Canada, 2022b). As described in section 2.1.3, Impact Canada has supported several challenges with the desire to better understand some of the broader impacts that challenges have had. For this purpose, they conducted a social network analysis using web scraping tools with Twitter as source. The objective of the social network analysis was to see to what extent these challenges have increased or enhanced public awareness of an issue based on social media mentions. The results of this analysis have been used to understand the outcomes of the challenge and to plan future challenges more effectively. The analysis, focussing on one specific challenge (Deep Space Food) was conducted using Gephi and a variety of complex networks were built and explored. The analysis has shown that the conversation network grew over time thereby increasing public awareness around challenges, and the sentiment of tweets related to the Challenge became more positive after the Challenge launched. A lasting result of this exercise was the development of a reproducible data collection, cleaning, and processing pipeline. The reproducible pipeline for creating conversation-based social networks was tested on a second challenge, Afri-Plastics, and was found to be easy and effective to implement.

To summarise, big data analyses such as web scraping show great potential. Their main advantage is that they allow to perform timely up-to-date analysis to research areas of interest. The results of the analysis conducted so far suggest that the usefulness of using webscraping to measure innovation in the public sector is largely restricted to services that are (likely) published on public sector webpages such as the example of Eurostat's STARPIN project (Bianchi et al. 2019). Big data analysis is not well able to capture processes (process innovations), which are just as relevant as services in public sector innovation. It is however likely that public sector organisations have an incentive to publish new or adopted services that are of use to the public on their websites. This would allow to analyse the uptake of innovative methods for public service delivery to be measured with big data approaches. The big data analysis conducted by Impact Canada has shown that by using social media data the public awareness of public services can be analysed.

3. Evidence gaps

- *How innovation is managed within organisations is of interest to a variety of stakeholders.*
- *How different factors at the individual, organisational and systemic level can help or hinder innovations to produce meaningful outcomes.*
- *How learning at the organisation and employee level happens and how capacities for innovation can be improved is of importance to understand how and why innovation happens.*
- *How different individual, organisational and systemic factors contribute to the emergence of different types of innovations and composition of innovation portfolios is unclear.*
- *International comparability is one of the main objectives of traditional survey, harmonisation of survey practices is necessary to produce comparable results.*

During 2023, the OECD held a consultation process with National Contact Points (NCPs) of governments who have held public sector innovation surveys, or are considering doing so in future. about the consultation examined what these administrations have learned from their measurement activities and how

measurement work can be improved in future. The themes mentioned included how innovation is managed within public sector organisations and how learning takes place, innovation measurement at the individual (employee) level, and the need for international comparability of data on PSI. Moreover, OECD's Innovative Capacity Framework and the Innovation Facets have identified measurement needs which have so far been partly covered in current measurement activities.

3.1 Innovation management and innovative capacity

While there is a clear demand to innovate in the public sector some of the innovation activities can conflict with other goals of the public sector leading to an innovation paradox (Meijer & Thaens, 2021; OECD 2022). This innovation paradox can occur in innovative organisations, due to a lack of stability, absence of democratic control, waste of public money, disruption of power balance, undesirability, and unforeseen security risks (Meijer & Thaens, 2021). It is imperative that this innovation paradox or possible conflicts are managed. Moreover, as recognised during the NCP workshop at the OECD in September 2022, there is a need to better understand the capability to innovate amongst civil servants. Moreover, the NCP meeting identified a need to better understand leadership traits of public sector manager that are supportive to an innovative environment. Consequently, public sector managers need to analyse risk aspects regularly, including having potential solutions ready to test when the authorising environment allows it. The decision to innovate then depends on whether the organisational culture, broader practices and public sector systems allows for experimentation, failure and broader implementation of new approaches or novel solutions (OECD, 2022). Organisational learning and capacity building is an integral part in addressing the issues to overcome barriers. Clausen et al. (2019) has shown that organisational innovative capacity has several positive effects on public sector organisation such as identifying demand for innovation in response to external political factors and policies as well as (inefficient) processes within the organisation. However, research has identified several persistent barriers in the public sector that hamper organisational capacity to innovate such as a lack of feedback loops, transparency and working in silos (Daglio et al., 2015; Cinar et al., 2019 and 2021). Increasing transparency and making information on innovation and innovative capacity more broadly available and embedded into the public sector operating system will induce an environment that supports innovation in the public sector (Daglio et al., 2015, OECD, 2022). Measuring public sector innovation can help identify, track, monitor the factors that supports public sector innovation.

The Oslo Manual (2018) recommends collecting the following innovation management capabilities in a (semi) structured questionnaire (wording adapted to the public sector):

- Identifying, generating, assessing, and pursuing ideas for innovation
- Organising innovation activities within the firm (i.e. aligning different innovation activities)
- Allocating resources to innovation activities
- Managing innovation activities conducted in collaboration with external partners
- Integrating external knowledge and other external inputs into a organisations' innovation activities
- Monitoring the results of innovation activities and learning from experience
- Exploiting and managing innovations and other knowledge that has been generated as part of a organisations' innovation activities

Many aspects of innovation management are observable and measurable. Data collection in surveys can for instance collect information on the use or importance of portfolio management, knowledge management systems, idea management, employee suggestion schemes, incentives, delegate decision-making to innovation staff etc. Some PSI surveys have looked at this but there has been little discussion about what has been fundamentally learned for PSI through these measurement efforts, at least in public sector circles. There is a lot of unknowns and assumptions about PSI based on primarily case study information, which does not lend itself to generalisability. Thus, there is a lot that remains unknown around different facets of

PSI, including drivers across levels, capacity conditions and steering different types of innovation, which hinders the ability for support measures (innovation explicit supports or implicit supports) to be developed.

The OECD has two frameworks that could guide further research across these areas:

3.1.1 OPSI Innovative Capacity Framework

The OECD (Kaur et al., 2022) developed an Innovative Capacity Framework for governments to understand what influences the capacity of their public sector to innovate with the aim to achieve its goals and improve public outcomes. The Framework emphasises the need for a systemic and exploratory approach, recognising the importance of context specificity and not only individual and organisational factors that influence innovation (currently measured to some degree), but also systemic issues on how government is organised (e.g., budgeting rules, auditing, regulations). Moreover, the Framework aims to be measurable and hence provides possibilities for future measurement activities.

The Innovative Capacity Framework (OECD, 2022) aims to answer the following research question: What are the factors that may enable or hinder the public sector's capacity to use innovation, or innovative practices, to achieve its goals and improve public outcomes? This high-level research question is explored through the four focus themes within a system at the three levels (individual, organisation and system) that each have their own research questions and hence data needs to answer those questions.

A detailed framework that includes the relevant questions and potential data sources to answer those questions can be found in the OPSI Research protocol: Analysing and synthesising a public sector's innovation capacity (Kaur and Buisman, 2022). A summary with the key elements of this measurement framework can be found in the table below.

Table 1.2. Measurement needs of the Innovative Capacity Framework

Theme/level	Individual	Organisational	System
Purpose What is driving the intent to innovate?	Motivation (intrinsic and extrinsic)	Institutional drivers External to the 30 organisation drivers	National agenda and reforms, Global Challenges
Potential Which system level conditions are needed to create a conducive environment for innovation?	Work environment Job design	Leadership practice Organisational culture Strategy design approach Decision making practices	Political signalling Governance factors and context Normalisation and acceptance of innovation as a driver
Capacity What is needed to carry out innovative efforts and integrate them into everyday practice?	Mindset and practical ability Continuous learning Diversity	Conditions and support Innovation portfolio Project management Workforce strategy	Existing governance frameworks Ecosystems, partnerships (external knowledge sources) Data sharing
Impact How is the impact of innovative efforts understood and informing future practice?	Experience Performance Knowledge of results	Performance monitoring, audit and evaluation Perceived impact Learning impact	Performance, evaluation and legitimacy mechanisms Learning impact System level capacity

Source: Kaur et al. (2022).

3.1.2 OPSI Innovation Facets

The Public Sector Innovation Facets model provides an easy way to consider what innovative approaches and instruments governments can use to respond to emerging challenges in a timely manner. It investigates questions such as: What types of public sector innovation exist? How are innovative ideas generated in the public sector? Which methods are used to support investment in innovative projects? What capacity and resources are required for public sector innovation?

OPSI's facets model identifies four innovation "facets" which can be used to explore the purpose and intent of innovation activities as well as how they work in practice. These include: enhancement-oriented innovation, adaptive innovation, mission-oriented innovation and anticipatory innovation (OECD, 2022).

A summary with the key elements of interest to measure as part of the OPSI Innovation Facets can be found in the table below.

Table 1.3. Measurement needs of the OPSI Innovation Facets

Innovation Facet	Measurement topics
Enhancement-oriented innovation	Public sector constraints on resources and costs Evaluation, auditing and performance measurement systems
Adaptive Innovation	Readiness to respond to change, the ability to innovate at a fast pace Adaptive 31 organisational structures
Mission-oriented Innovation	Achieve ambitious goals Transformative innovation Address complexity and achieve systemic shifts
Anticipatory Innovation	Respond to complex challenges, such as climate change, aging societies and digital transformation How can public sector organisations make futures knowledge actionable

Source: Bleckenwegner (2021) OECD , link

3.2 Public sector employee engagement in innovation

How public managers can motivate employees is a key question in public management that deserves attention from policy and research. In the OECD Innovative Capacity Framework (Kaur et al., 2022) the importance of engagement and building an innovative environment is stressed as in the public sector there are limited financial gains to achieve for individual employees as driver to innovate which may lead to less risk-taking and a lesser innovative mindset compared to the private sector. However, research on motivation has shown that while some individuals are self-interested and motivated by material concerns, many people are motivated by experiences that are "other regarding". That is, individuals are strongly motivated to make a difference in the lives of others or to influence a cause to which they are strongly committed (Paalberg and Lavigna, 2010; Frey and Osterloh 2005). Public management research recognises the unique, other-regarding motivational bases of public service (Perry and Wise 1990). Perry and Hondeghem (2008) define public service motivations as the beliefs, values, and attitudes that go beyond self-interest and organisational interest to energise employees to do good for others and contribute to the well-being of organisations and society. Research on public service motivation has moreover confirmed relationships between public service motivation and positive outcomes such as job satisfaction, commitment, and performance (Ritz et al, 2016).

Results of a recent survey on public sector innovation has shown that the likelihood of innovating is higher in organisations where senior management gives high priority to new ideas or new ways of working, i.e., promoting a conducive environment for innovation (Arundel and Es-Sadki, 2021) and as stated above identifying factors that influence the willingness to innovate amongst civil servants. Furthermore, several crucial factors to innovation success may reside in team / work unit characteristics (composition, workplace creativity, size, collaboration practices, available networks etc. (e.g., Torgasa and Arundel, 2016)).

Collecting information at the individual employee level in their role in the public sector organisation and the role of teams is also mentioned by NCP stakeholders. From the NCP meeting in September 2022, a need for measuring and assessing skills was identified as a remaining research gap. This can answer research questions such as how learning takes place and how and why innovation happens. Furthermore, this may help with understanding employee motivations in the public sector to undertake innovation projects which can provide practical guidance to public sector managers on how to build innovative teams.

4.3 International comparability

Integration of societies and globalisation have increased demands and importance of cross-national comparisons next to comparisons over time. Decisions of (supra)national bodies and political planning need information that encompasses all involved nations (Hackl, 2011)[13]. Moreover, of relevance for public sector innovation, international comparability can facilitate learning and knowledge transfer. International regulatory co-operation has played a role in helping countries better understand the regulatory barriers to the development of public sector innovation,

Results of the different measurement activities discussed in this paper are sensitive to the choice of measurement methods. To obtain international comparability some uniformity in data collection and reporting practices is necessary. Practices that somewhat mirror the Innovation Barometer have several differences in the methodology depending on the country[14]. Greater harmonisation in methods and core-questions in structured surveys are necessary in facilitating international comparability. the OECD can play a significant role in ensuring comparable, standardised international data collection. Uniformity alone, however, is not the aim. Given the different public sector structures and administrative context across OECD countries, the task of defining and identifying workplaces for instance is a time-consuming and challenging one. Countries should continue pursuing their own areas of interest and measurement methodologies and research questions suitable to their context, but greater consensus on harmonisation in methods should be possible and aimed to enhance comparability.

4.4 Other gaps

Other possibilities for future research include impact and outcome measurement and future-oriented needs assessment (areas where innovation in the public sector is potentially most needed). Recent methodological improvements – such as the use of an object-based method in a survey - have shown possibilities to improve impact measurement. Furthermore, current measurement tools are not precise enough to identify differences between drivers and barriers to different types of innovation (missions, anticipation etc.) and the complexity involved. Measures of efficiency of production or services delivered have been lacking in public sector innovation analysis (Kattel et al., 2018). Productivity is a crucial key-performance indicator in the private sector and increasingly as well in the public sector, given sophisticated public demand and new challenges due to fiscal pressures. The impact of innovation on service productivity is especially difficult to measure for public services that are intangible and characterised by simultaneous consumption and production (OECD, 2018). Analysis of public sector productivity and the relationship it has with public sector innovation can contribute to a more efficient public sector.

[13] "In the cross-national context, the responsibility for harmonising cross-national concepts, definitions, and methodological aspects must be assigned to an authority with supra-national competence. Organisations like the UN, OECD, and Eurostat are engaged in the compilation of standards and the editing of recommendations, guidelines, handbooks, and training manuals, important means to harmonise statistical products and improve their comparability" (Hackl, 2011).

[14] Examples include, differences in survey samples, data treatment, questions and response rates (e.g. depending on the country from 12% to 50% (Lykkebo et al., 2019).

4. Conclusion

Public sector innovation is a critical capability in the public sector. The increasingly complex external environment in which governments must operate places requires them to find new ways to solve problems, as well as delivering on traditional priorities as effectively and efficiently as possible. Substantial progress has been made in understanding the drivers of public sector innovation since the turn of the century. However, there are significant shortfalls in the extent to which governments are able to observe the scale and effectiveness of innovation within public sector bodies. Data coverage is incomplete. Moreover, diverging survey standards often mean data is not directly comparable across countries, hindering benchmarking and cross-learning between governments. It is important that OECD countries work together to define common standards for questionnaires and other data collection tools to observe and measure public sector innovation.

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2 Options for measuring public sector innovation

Chapter 2 presents a 3-axes proposal on survey options and measurement approaches, highlighting what approaches respond to identified demand from countries. It draws on the preceding chapter on the state of play for measuring innovation in the public sector, and provides a deep dive into measuring public sector innovation capacity at the individual, organisational and system levels. The chapter further proposes three options to operationalise innovation measurement of PSI: (1) a survey of the National Contact Points, (2) a survey of government agencies at the national government level, and (3) an Innovation Barometer type of survey.

1. Introduction

The previous chapter showed that several OECD Members are active in the measurement of public sector innovation and that most measurement activities are survey-based. The chapter also shows that only a few are conducting systematic measurement activities and with different purposes (e.g. benchmarking, planning, internal learning, etc). The purposes of this chapter are:

1. To map the needs of countries to make progress on international comparison of public sector innovation
2. To propose different options to operationalise international measurement of public sector innovation which respond to the above needs and leverages on existing initiatives
3. To showcase potential results for each of the options

2. Needs and purposes for international PSI measurement

This section provides a synthetic overview of the identified purposes and needs that an international approach to measuring public sector measurement could support, derived from research as well as interviews and workshops with the NCPs. The OECD has identified four high-level objectives which could be attained by improving measurement of public sector innovation:

- Conducting cross-country comparisons of innovation performance, activities, and outputs
- Evaluating the capacity of governments to innovate: including the barriers and enablers to effective public sector innovation
- Identifying the types and supporting approaches of innovation being conducted across public sectors
- Promoting and increasing legitimacy, engagement and value of public sector innovation

Systematic monitoring of the type of innovation being conducted in the public sector is a relevant dimension to consider for international comparability as it allows to identify what types of innovation activities respond to what needs. This in turn could inform national authorities where policy should be headed and where support is needed. For example, service innovation or service delivery innovation usually serve short-term or ad-hoc needs of the organisational unit itself whereas systemic innovation may change the way public sector organisation work and how they interact with other organisations. The Innovation Barometer and other similar questionnaire systematically collect information on service or service delivery innovation. However, they are limited in capturing systemic innovation, some of it may be captured through the collaboration questions but these are not able to inform whether these collaborations have led to new ways of interacting with others.

The factors that enable or hinder the public sector (capacity) to use innovation to achieve their goals or improve outcomes is also as a core element in most of the measurement activities reviewed during the research. While factors related to the capacity of innovation are highly contextual and depend on the administrative system in which they are rooted, they can provide useful comparative information on the actual levers that underpins innovative efforts and prompts consideration for their inclusion in an international measurement framework.

3. Measuring public sector innovation capacity at different levels

Understanding the factors that enable or hinder PSI, and to what extent innovation occurs and, in turn, how those forces may be influenced is an important need for which information should be collected on different levels. The OECD Innovation Capacity Framework (Kaur et. Al., 2022). distinguishes between innovation activity at three different levels: the individual, the organisation, and the system. This section discusses what aspects of the innovation capacity are more significant for each level of the framework and how they have been considered for measurement.

The individual level

At the level of individual public servants, the key aspects of innovation which might be examined and measured via survey tools are:

- Factors influencing individual motivations and willingness to innovate.
- Identifying and supporting the skills and capabilities to innovate.
- The extent to which there is a conducive work environment for innovation.

Individuals, in their role as public sector employees, can on their own or with others, undertake innovation activities. These individuals are often better aware of changes in the environment or new possibilities or issues arising where innovation may be needed. They are better able to shift their perspectives than organisations. Innovation at this level will likely be personally driven and requires individuals to draw upon their own time and resources. Such innovation will often focus on specific projects.

NCPs supported the need for collecting more information on innovation activities at the individual level. There are several research gaps or needs which a measurement tool targeted at the individual can serve. These include identifying the factors that lead individuals to start innovation activities, what motivates them and what enables them to innovate. What are the elements of a conducive environment that allows individuals to innovate? Collecting such information can inform policy and research on the skills and capabilities needed for individual level innovation activities.

The organisation

At the level of individual public sector organisations based on the existing tools as well as literature on organisational dimensions (see stocktake paper for further information), the key aspects of innovation which might be examined and measured via survey tools are:

- Civil servants' attitudes towards innovation
- Factors that enable the organisation to innovate
- The extent to which there is organisational learning of innovation activities
- The extent to which there is a dedicated strategy for innovation
- The extent to which there is balanced portfolio of innovation activities
- Monitoring the outcomes of innovation
- Understanding the impact of innovation (and measured)
- Institutional factors that enable or hinder innovation

Existing measurement activities of civil service attitudes towards innovation focus mainly on the organisational level. For example, the Civil Service People survey in the UK15 collect information of civil servants' attitudes to, and experience of working in government departments. It includes some relevant questions for PSI on individual learning and development. A similar type of survey is conducted in the US where federal workforce are asked how they view their current work environment, including management, policies, and new initiatives. The 2022 UK Civil Service people survey includes a section on innovation and to what extent leadership encourages and supports new ideas and innovative approaches. The survey results show that 64 percent of employees consistently look for new ways to improve work and 56 percent note that management encourages innovation. Furthermore, the OECD is currently undertaking some work on individual employee level skills and competencies, which could include aspects around innovation.

Organisations often have an innovation portfolio or a range of innovative initiatives ongoing simultaneously. They are generally centred around specific purposes, depending on the public sector service mandate e.g. education, health, social welfare. Innovation at this level includes several innovative approaches across multiple people and groups. Innovation portfolios are devices that help capture the diversity, purposefulness, and intentionality of innovations in a given organisation. How innovation portfolios are organised can provide useful information whether or not organisational efforts are directed where they are mostly needed.

Most of the current measurement activities on public sector innovation collect information at the organisational level. Several efforts have been made to compare results internationally. For instance, both the Nordic Innovation Barometer (CO-PI, 2019) and the Dutch Innovation Barometer (Dutch Government, 2021). compare international data on public sector innovation across a set of similar topics. These include how an innovation is developed, how and what collaboration for innovation occurs, and what drives innovation.

The main purpose of measurement at the organisational level has been to grow an understanding on the type of innovations that occur rather than how organisations develop and manage innovation and how it drives organisational learning. The research conducted by the OECD to develop the Innovation Capacity Framework suggest the usefulness of combining information on innovation typologies with that on institutional drivers, organisational strategy, as well as conditions and support for innovation within individual organisations.

The system

At the level of the whole public sector (i.e. the system), the key aspects of innovation which might be examined and measured via survey tools are:

- The extent to which innovation provides solutions to societal needs
- The extent to which innovation contributes to achieving the goals and priorities set out
- The extent to which learning, and evaluation is incorporated throughout innovation activities
- The identifications of system-level barriers that impede progress on public sector innovation

[15] UK Civil Service people surveys https://www.gov.uk/government/collections/civil-service-people-surveys

The public sector encompasses multiple government agencies that interact with citizens, community groups, businesses, and other actors in society. Innovation at this level relates to meeting collective aims and needs. These collective aims require diverse activity involving different parts of the public sector ecosystem. Activity at the system level is usually not directing activity to specific aims, but rather ensuring that the overall impact of the innovation activity addresses societal needs. Innovation at this level relates to collective needs and ambitions.

The research has shown that few measurement activities address public sector system level innovation activities. There is a need to collect more data and information at this level. This would serve different purposes such as public sector innovation legitimacy, trust in government and showcasing impact of innovation activities. Measurement activities at this level can serve as an input to national agendas and reform. These kinds of activities aim at building a public sector that can consistently and reliably develops and delivers innovative solutions that contribute to the achievement of the goals and priorities of the government and the public.

Data on system level innovation

The previous chapter has shown that several OECD Members have developed measurement tools to measure PSI at the organisation level, which are often aggregated to national level statistics. However, there is still a lack of a measurement tool for innovation capacity on the system level, to assess institutional factors, structures and conditions supporting the whole public sector. Although system level innovation is mostly driven by national authorities and agencies, the existing measurement tools are limited in reporting on system level innovation. Questionnaires targeted to national authorities usually include the same set of questions asked to municipalities or regional offices. To a limited extent, these measurement tools cover system level innovation which requires a different approach as it intends to report on conceptual innovations, which are defined by Windrum and Koch (2008) as “the development of new world views that challenge assumptions that underpin existing service products, processes and organisational forms”, or on policy innovation at ministerial levels that reports on policy learning by government and radical innovation sparked by conceptual innovation (Gault, 2018).

4. Options to operationalise international measurement of PSI

While measurement tools for innovation in the public sector exist, there is a lack of harmonisation of guidelines at the international level. The harmonisation of measurement tools together with guidelines can facilitate the collection of data and the development of indicators on public sector innovation in a more internationally consistent and comparable way. A necessary step in developing such guidelines is developing approaches for measurement that will facilitate cross-country data collection and comparisons. International measurement can provide a valuable tool towards gaining a better understanding of public sector innovation. Monitoring its development in a cross-country setting can provide further legitimacy to many of the findings of existing studies on a larger scale. It will further support a common understanding of what is being measured and why.

Drawing on the analysis included in the previous chapter and discussion with NCPs on measurement needs, this working paper proposes three types of measurement approaches. Moreover, these options are characterised by different operational aspects and costs which can vary depending on each national administrative context. The following sections further outline the three different approaches:

1. A questionnaire that aims to collect data directly on the system level; based on the Innovative Capacity Framework.
2. An opinion survey focusing on government agencies at the national level that aims to collect data at the organisational and system level.
3. An organisational level survey that collects data at the unit and organisational level and can potentially lead to data on system level innovation; based on the Innovation Barometer.

These options can be used separately, or preferably in combination with each other. Table 2.1 below **summarises** the three approaches. A more detailed description of the different options including an overview of the advantages and disadvantages is outlined below. The options are not necessarily exclusive and could potentially be combined to yield a richer set of information. However, it should also be noted that the cost and complexity of surveys, both for OECD and for respondent governments, increases with each option. This is because the number of responding agencies increases with each option. Sending surveys and collecting data from more responding agencies requires more resources. NCPs should consider which (combination of) options yield the best trade-off between their learning needs and the available resources.

Table 2.1. Options to operationalise international measurement of PSI

Type of measurement tool	Aim	Statistical /Reporting unit	Target users /Needs served	Pros/cons
National Survey (OECD countries)	To collect information on the system level of public sector innovation	**Statistical unit** • National or federal government **Reporting unit** • NCP representative	**Target users** • OECD • National authorities **Needs** • High-level • System	**Pros** • Relatively easy to operationalise, • General overview of PSI, • Similar to OECD approach to other topics, • Allows analysis of drivers and blockers at system level **Cons** • Data representativeness is limited. Does not monitor individual innovations • Does not gather "bottom up" data • Requires more efforts to develop questionnaire compared to option 3, but less than option 2
National Authorities Survey (National ministries or agencies)	To collect information on the system level of public sector innovation	**Statistical unit** • Several workplaces within the National ministry or national agency **Reporting Unit** • Lowest level of senior management	**Target users** • OECD • National authorities • National ministries and agencies **Needs** • High-level • System	**Pros** • Accurate representation of national authorities (agencies or ministries) **Cons** • Need to invest in identifying the survey population • Requires more efforts to develop questionnaire compared to option 3
IB type survey (Public sector organisations at different levels within countries)	Collect information on PSI from different PS levels	**Statistical unit** Workplaces within • National ministries • National agencies • Regions • Municipalities	**Target users**	**Pros** • Build on existing work from NCPs (e.g. Innobarometer-type of survey) More suited for knowledge sharing **Cons**

			• Public sector managers • National level (ministries and municipalities) • OECD **Needs** • Organisational • High-level	• Cross-government innovation support elements are not captured

Note: A **statistical unit** is an entity about which information is sought and for which statistics are ultimately compiled; in other words, it is the institutional unit of interest for the intended purpose of collecting innovation statistics. The **reporting unit** (i.e. the "level" within the organisation from which the required data are collected) will vary from country to country (and potentially within a country), depending on institutional structures, the legal framework for data collection, traditions, national priorities, survey resources and agreements with the public sector organisations surveyed. As such, the reporting unit may differ from the required statistical unit.

Option 1: National Survey

The National survey is a high-level survey on public sector innovation at the system level. It is aimed at collecting data on key factors that support the presence of innovation in the public sector. The survey would ask governments to describe different aspects of their government's system and policies for promoting innovation in the public sector. These would be drawn primarily from OECD research including on enablers of innovation (see OECD, 2017 and Kaur et al. 2022). Concrete topics which such a survey might cover could include, among others, national innovation strategies and plans, operation of innovation labs and funding for innovation. The primary use of the survey data would be to allow benchmarking of national systems for promoting public sector innovation across countries. In turn, this would allow for the identification of best practices, cross-country learning, definition standards and the ability to evaluate innovation strategies. The work would be analogous to a range of similar OECD surveys which benchmark aspects of public governance across countries.

Table 2.2. Overview of an National Survey

User	OECD and national authorities
Respondents	• National governments
Potential topics	• Innovation contribution to government goals and priorities • Innovation strategy & plans • Support systems for innovation (funding, structures, policies, etc) • Relation of innovation with its structural counterweights (e.g. risk management, audit, procurement) • Organisation and monitoring of innovation activities • High level steering and stewardship of innovation
Potential outputs	• Report on system level innovation activities • Report on capacity to innovate including enablers and hindering elements • Report on policy innovation and policy learning
Advantages	• Lower burden on both respondents and OECD compared to other options • OECD highly experience with similar surveys (Government at a Glance)
Limitations	• It requires internal co-ordination by NCPs in assembling the information • Limited insight into individual and organisational level drivers of innovation • Does not identify specific innovations • Does not examine how organisational learning takes place

	• Data representativeness from a statistical perspective • Need to develop and test a new survey • No insights in the municipalities or local level

Option 2. National authorities survey

A survey of national authorities (government agencies at the national/federal government level) would to a large extent have similar aims as the National survey (Option 1) as it intends to collect information on the system level. The main difference are the respondents. However, Option 2 is a larger scale survey targeting a set of departments or work units within national ministries or agencies asking for their perceptions (i.e., the statistical units). The respondents would be high-level managers of departments or work units within these ministries or agencies.

The aspects covered in the survey would draw primarily from the OECD's Innovation Capacity Framework, with similar topics as the National survey (Option 1). In addition, a possibility is to include a few specific questions, using the object-based approach, to identify interesting case-studies focussing on organisational learning or building capacity to innovate. The primary use of the survey data would be to allow benchmarking of national systems for promoting public sector innovation across countries. In turn, this would allow for the identification of best practices, cross-country learning, definition of standards and the ability to evaluate innovation strategies.

One issue that must be investigated is finding out if such a survey suits the majority of OECD Members as there might be substantial differences on the extent to which innovation is happening at ministries or agencies and to what extent they are involved in public service delivery. It might be for instance that in some countries, ministries are mostly responsible for decision and policymaking and to a lesser extent involved with public service delivery.

Table 2.3. Overview of a survey of national authorities

User	OECD and national authorities
Respondents	• A range of ministries and agencies
Potential topics	• Innovation contribution to government goals and priorities • Innovation strategy & plans • Support systems for innovation (funding, structures, policies, etc) • Capacity to innovate • Monitoring of innovation at a high-level • Innovation portfolios
Potential outputs	• Report on system level innovation activities • Report on capacity to innovate including enablers and hindering elements • Report on policy innovation and policy learning • Case-studies on the above topics
Advantages	• It can identify specific innovations • It can provide insights on how organisational learning takes place or how capacity for innovation is built • Better data representativeness from a statistical perspective • Outputs suitable for Government at a Glance
Limitations	• Limited insight into individual and organisational level drivers of innovation • Constructing an overall view of system level innovation is more challenging compared to the NCP survey given number of units surveyed • Need to develop and test a new survey • Need to identify potential respondents from each national government agency No insights in the

User	OECD and national authorities
	municipalities or local level

Option 3: Innovation Barometer type of survey

This 'state of play' study has shown that 11 out of the 15 countries which were included in the study have used a similar structured questionnaire survey as the Innovation Barometer (IB) to collect information on public sector innovations. There are some differences in terms of target population and methodology, but it is the measurement tool many are familiar with.

This tool is administered to a wide range of organisations and units within a government. The statistical unit would be workplaces / work units / departments within municipalities, regional authorities, ministries, or agencies. The foreseen respondents would be the lowest level of senior managers of these workplaces / work units / departments, and they would be asked about the most recent or most important innovation they have implemented over a defined recall period (e.g. last 2 years). They are also asked about how the innovation came about, where the ideas and design came from, what resources were required, and what helped or hindered progress.

This approach allows the most recent or most important innovations which have occurred across government to be identified and tracked. This can be suitable for lesson-learning among practitioners about how to enable individual innovations. However, the "bottom up" information about what has driven or inhibited these innovations, is from the point of view of individuals actually involved in delivering specific projects. It is not necessarily straightforward to use this data to triangulate up to identify systems level drivers and blockers of innovation. Exploring this would require a study of the micro-data and see if insights can be drawn that can provide evidence to report on the system or high-level needs.

Table 2.4. Advantages and disadvantages of an IB type survey

User	OECD and national authorities
Respondents	• Work unit managers across public sector (e.g. lowest level of senior management)
Frequency	• Every 2-3 years
Potential topics	• Most important or most recent innovation in each reporting unit • Factors enabling or hindering individual innovations • Source of ideas • Outcomes and results of innovations
Potential outputs	• Report on factors enabling or hindering innovation, as perceived at project level • Report on most important results of individual innovations
Advantages	• Build on the existing experience of NCPs • Draws on existing technical guidance (Copenhagen Manual, Innovation Barometer) • Monitor innovation happening at workplaces more closely and with more insights • Covers all levels of the public sector, not just national level • Most suitable for enabling learning and knowledge sharing among practitioners • Micro-data better suited for quantitative / academic research
Limitations	• Does not directly identify system issues or individual level needs • Needs investment ahead of each survey to identify large numbers of respondents • Higher reporting burden & likely higher financial cost than other options
Other notes	• Would need to scope and manage any data governance issues around sharing of micro-data with OECD for research and analysis purposes

5. Using the different options in a national context

The different options proposed in this paper are not intended to replace national level measurement activities currently ongoing but to explore options on how to integrate or align current activities with a desire for greater international comparability of measures in this area. The OECD and NCPs should collaborative seek to preserve existing useful activities to extent possible while considering how activities could be complemented by the international activities or be adapted / refined into the greater international comparability of measures.

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3 Conclusions

In their 2022 and 2023 meetings, the National Contact Points of the OECD Observatory of Public Sector Innovation reaffirmed the importance of public sector innovation measurement as an area to make progress on and call on the OECD to assist in enhancing international comparability through developing guidance, ensuring harmonisation of approaches, and sharing of initiatives.

The research conducted so far and views expressed by country experts indicate research gaps in a number of areas including systems-level institutional conditions, organisational level innovation capacity and conditions, innovation drivers at the national level and potentially innovation outputs. Such dimensions and the resulting guidance can draw off existing work, including NESTI's prior work on measuring public sector innovation, and the Copenhagen Manual which is currently being used extensively by different countries.

Further, the recent diagnostic study of public sector innovation in Romania (using the OECD Innovation Capacity Framework) have shown the importance and usefulness of measuring innovative capacity. Work in this field could support policymakers and public sector managers with advice to guide transformative strategies to build innovative capacity in the public sector at different levels. This study and the research leading to the development of the OECD Innovation Capacity Framework has shown that it is necessary to develop a coherent understanding of the (multiple) roles that individual public sector managers, organisations, systems, and policymakers play in developing value in public services.

This working paper has provided an overview of different measurement activities across several OECD countries. It has showed that the most used measurement tool has been surveys, both for constructing indicators but in addition to use for analysis of specific topics of interests at national level. Other methods covered in this working paper include case-study work and big data exercises. The working paper has also examined measurement needs and demands from countries and offered three options to take concrete steps to advance international efforts around measuring public sector innovation.

As a result of this research and discussions with NCP, the following action points have been raised to take concrete steps toward enhancing measurement of public sector innovation:

1. **Identification of the preferred option** based on the discussion undertaken at the meeting of the National Contact Points in May 2023. The results showed a broad convergence around the option of surveying national government agencies as a preferred pragmatic approach. This option provided a compromise between the feasibility of operationalising the survey with the granularity and value of the data produced. Some countries felt that an NCP-type of survey could be useful as a lead-in or in combination with more detailed surveys. The third and most granular option of an IB-type survey measuring all levels of public sector was highlighted as a preferred option for several countries, but was also flagged operationally challenging or infeasible by a substantial share of participants.

2. **The development of guidance for the preferred option**. In 2014, the OECD drafted a report (unpublished) with key findings from the NESTI project to develop a framework and guidelines for measuring public sector innovation. The Copenhagen Manual is another building block that includes guidelines on measurement which should be leveraged for this purpose. This work should increase harmonisation on important topics such as definitions and survey methodology. Survey questions based on the Innovation Capacity Framework that can be included in an international comparative tool and guidance. This work shall explore the possibility to combine elements of the Innovation Capacity Framework with the Innovation Barometer, and potentially other inputs, into one survey questionnaire.
3. **The development of a standardised measurement tool** to enable international comparability across countries on PSI. The standardised tool should build on existing measurement tools in particular the Innovation Barometer.
4. **The development of key headline indicators** on public sector innovation to be used for international comparability of national approaches. This work should take into account resource implications to drive measurement activities and build legitimacy as a core function of the public sector.
5. **Continuous development of a repository of case-studies, methodologies, tools and practices** in measuring public sector innovation to enable knowledge sharing and feed into guidelines to measure public sector innovation. This could also encompass other measurement activities in a more modular approach outside of surveys that countries could carry out.

Delegates underscored the importance to develop a measurement approach which takes into account both international comparison needs and country interests to cover specific topics; that any measurement tool developed, and subsequent reporting should take into account the different national contexts in regard to government structure and decision making; and that international comparability should primarily enhance mutual learning.

More broadly, to support additional measurement approaches, NCP members may also wish to make use of the Innovation Capacity Framework and the OECD's Facets Model to conduct an assessment to examine the extent a governmental unit has developed its internal capacity to use innovation in creating value through their services and processes at a national level. Other pilot studies to use existing data to measure innovative capacity may be explored as well. For instance, using different profiles of public sector organisations. The innovation profiles can consist of capabilities, strategies, and output.

The OECD stands ready to assist national government in their efforts to support effective measurement of public sector innovation, which strengthens harmonisation of measures in support of better international comparability. A dedicated working group on public sector innovation measurement within the Network of the National Contact Points of the Observatory has been set up to develop this work further and operationalise measurement activities as outlined above. The working group shall explore possible collaborations with other technical groups across the OECD such as NESTI. Additionally, the OPSI team together with the working group will continue to conduct research to identify public sector innovation in OECD countries which should feed into the repository of methodologies, activities, and tools on the measurement of public sector innovation.

Annex A. Definitions

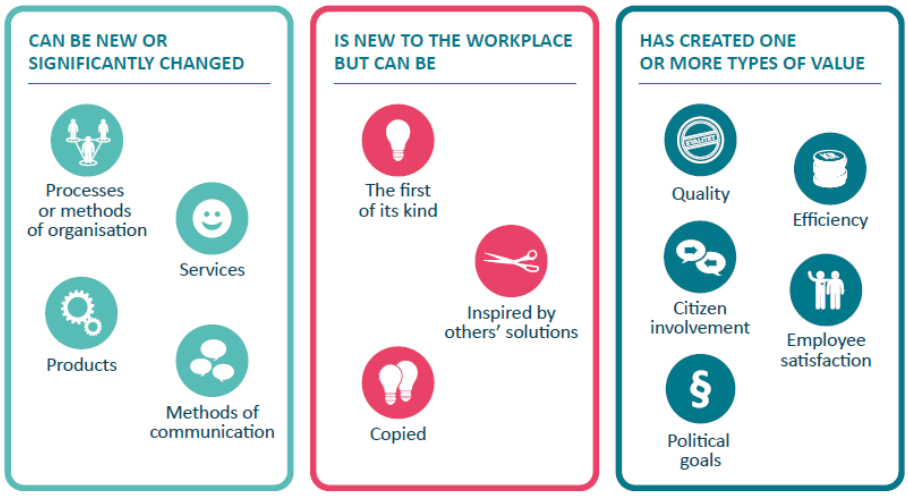
Innovation

There are many definitions of innovation for the public sector, most of which include the concept of novelty (something new) and utility (the innovation is better than what existed before) (Mulgan and Albury, 2003). For constructing indicators of prevalence, a definition of innovation must also refer to a defined time-period in which the innovation occurred (observation period) and an innovation must have been implemented or made available for use, either by the innovative organisation itself, as with process innovations, or offered for use by others, as with service innovations for citizens. The requirement for implementation means that inventions, ideas under development, and prototypes are not innovations.

The OECD's Oslo Manual provides guidelines for measuring private sector innovation and innovation activities and has been used by National Statistical Organisations in 115 countries to measure innovation in the business sector. The fourth edition of the manual (OECD/Eurostat, 2018) includes a universal definition of innovation that is applicable to all sectors, including the public sector. The definition is as follows:

> *An innovation is a new or improved product or process (or combination thereof) that differs significantly from the unit's previous products or processes and that has been made available to potential users (product) or brought into use by the unit (process).*

A 'unit' can be any organisational entity, such as a public sector agency, department, or work group. The definition includes novelty (differs significantly) and implementation (made available to users or brought into use), but it does not include the concept of utility, although this can be added as a restriction (Gault, 2018). The advantage of using a general definition of innovation that is compliant with the Oslo Manual is that it permits comparisons between innovation data for the public sector and data for other sectors, such as the business sector. Many of the existing surveys on innovation in the public sector that were conducted after 2010 use definitions that are largely compliant with the third Oslo edition of the Manual, published in 2005. For example, The Copenhagen Manual (CO-PI,2021) uses the following definition of public sector innovation:



Source: Copenhagen Manual, CO-PI (2021)

Of note, the Oslo Manual uses a broad definition of innovation that is defined in relation to the unit itself (differs significantly from the unit's previous products or processes). This means that 'significance' is defined from the perspective of the unit, instead of in reference to some other yardstick for novelty, and that an innovation can occur through adopting ideas that were originally developed by other organisations. In the latter case, innovation occurs because of diffusion. This can be especially relevant to public sector organisations that innovate through adopting good practices that are already used by other government organisations or by businesses.

Drawing on the Oslo Manual definition of innovation in the private sector, the Observatory of Public Sector Innovation (OPSI) at the OECD has adopted a working definition of public sector innovation as "the process of implementing novel approaches to achieve impact" (OECD, 2017[1]). In the broadest terms, public sector innovation comprises three components: **novelty**, **implementation,** and **impact**. While private sector innovation usually aims to gain competitive advantage, the same metric cannot be applied in the public sector. Most of the public sector innovation measurement analyses capture more incremental rather than transformative change (OECD, 2018; Kattel et al. 2013). This is due to the 'service' nature of public sector activity, but also since transformative change is not analysed in longer observational periods, nor spillover effects of innovation are taken into account; and thus, innovation 'throughout' the public sector is ignored (OECD, 2018). Impact as it is meant in the broadest term rather refers to a shift in public value (OECD, 2019[2]). In general, public value represents a normative consensus of prerogatives, principles, benefits, and rights that can be attributed to both governments and citizens (Jorgensen and Bozeman, 2007[3]), and linked to a variety of values like effectiveness, transparency, participation, integrity and lawfulness. However, since most public sector organisations have different measures of their own impact and often improve their services marginally, impact measures in a public sector innovation framework needs to account for these differences in contexts and degree of impact. Moreover the 'positive' prism of public sector innovation needs review as meaningful measures need to recognise that innovation does not necessarily make things better (OECD, 2018). The Oslo Manual acknowledges this as well as the definition of innovation does not require it to have a positive value for society, or a positive benefit for the organisation (OECD/EU, 2018).

OPSI also delineates innovation in the public sector based on its directionality and level of uncertainty (read further OECD, forthcoming). Based on the OPSI's innovation facet model described four different types of innovation:

4. **Enhancement-oriented innovation**, which upgrades practices, achieves efficiencies and better results (exploitative innovation), and builds on existing structures without directly challenging the current system.
5. **Adaptive innovation**, which tests and tries new approaches to respond to a changing operating environment and citizen needs without a clear pre-determined direction.
6. **Mission-oriented innovation**, which sets a clear outcome and overarching objective – directive – for achieving a specific time-bound and concrete challenge.
7. **Anticipatory innovation**, which explores and engages with emergent issues that might shape future priorities and future commitments and may be highly uncertain in nature.

Innovative capacity

Public sector innovative capacity relates to the elements within and interacting with public sector systems that help or hinder governments to use innovation to achieve their goals. Measuring the features (e.g. presence and intensity) of such factors allow to better understand the individual levers – and their combination - that governments can activate to create environments conducive to innovation. These factors include the overall environment and context related to a public sector system and its organisations, the key governing mechanisms and policymaking and delivery practices in place, rules and regulatory frameworks, explicit strategies, structures and supports for innovation within the system, organisational work environment and culture, and individuals' knowledge and capabilities. These factors may lie on the systems level (e.g., legislation that applies to all, budgeting rules), organisational level (corporate management styles) and individual level (how civil servants are trained), but analysis requires an examination around all levels. Overall, innovative capacity is about steering the overall public sector system to support the use of innovation as a strategic function to help governments achieve outcomes.

Innovation management

Innovation management relates to the explicit supports and professionalism within organisations to manage innovation. While innovative capacity touches on this at a broad level, innovation management provides a deeper dive into the specific supports particularly at the organisational and individual level in producing different types of innovation. The Oslo Manual (OECD/EU, 2018) defines innovation management as all systematic activities to plan, govern and control internal and external resources for innovation. *Innovation management can include establishing an innovation vision, innovation policy and innovation objectives, and innovation strategies, innovation processes, structures, roles and responsibilities and innovation support, to achieve those objectives through innovation planning, innovation operations, performance evaluation, improvement, and other activities* (ISO/TR 56004:2019). Measuring innovation management allows to establish and appreciate factors which can inform strategic decisions at organisational level. These include: how resources for innovation are allocated, the organisation of responsibilities and decision-making among employees, the management of collaboration with external partners, the integration of external inputs into a firm's innovation activities, and activities to monitor the results of innovation and to support learning from experience. Innovation management includes activities for establishing policies, strategies, objectives, processes,

structures, roles, and responsibilities to deal with innovation in the firm, as well as mechanisms to assess and review them.

Innovation management versus innovative capacity

The OECD recognised that public sector organisations are working within existing, imperfect and complex systems and that innovation in the public sector often happens within a larger context (Kaur et al., 2022). In this context, major disruptive innovations happen sporadically but are often driven by the broader public sector system that is influenced by (political) reforms and agendas. Further, a government's innovative capacity is influenced by, and needs to be considered at, all levels of the public sector system from individuals, units, organisations and systems.

From the OECD Innovative Capacity Framework, we learn the following:

> *"The systemic view considers innovation in an integrated and holistic manner. It includes a broad range of structural factors, drivers and multidimensional policy contexts, both within and between levels of government and society (OECD, 2020). Taking a systemics perspective of the public sector can assist countries to analyse how their innovation capacity interacts within existing systems, rather than being an alternative to them. OECD country analyses, for example, seek to improve understanding of the role public organisations and public sector employees play in innovation activity across different levels of the system." (Kaur et al., 2022)*

Innovative capacity examines the overall purpose, potential, capacity and impact of governments in using innovation and innovative approaches to address complex challenges and achieve outcomes. In order for governments to do this, they need to have an understanding of what innovation is, and the difference between their 'run' activities vs those the portfolio of activities that may seek to create a change across several facets (whether it is around taking action today for future trends or opportunities, to achieve grand missions, adapt to changing environments or enhance existing processes and practices).

To be able to undertake, manage and achieve impact from the range of innovation activities, governments need to actively promote and manage innovation, with the necessary explicit innovation supports (such as funding, processes, structures etc). Thus, Innovation management plays a crucial role in this regard as it enables public sector managers to have visibility and influence the process leading up to the innovation. Innovation management practices are relevant across all these levels although the practices can differ between the different levels and contexts. Actors differ in how they navigate in this complex setting where some are able to respond pro-actively and other are laggards that adopt innovative practices.

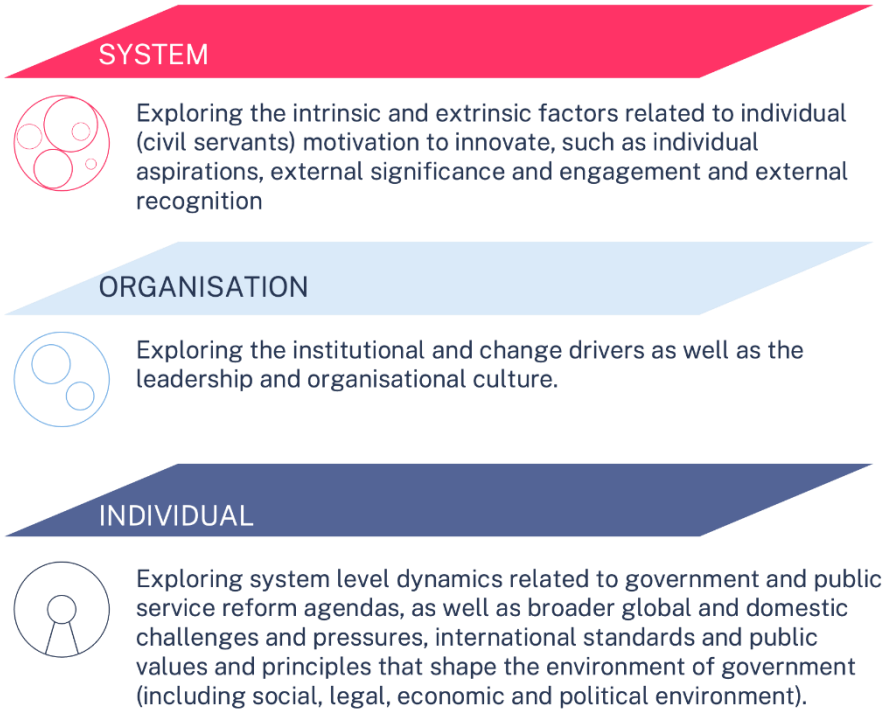
However, the overall operating environment, broader governing mechanisms and practices will influence whether innovation can start, be implemented or take impact. Therefore, it is important to understand how innovation, and innovation supports are embedded and integrated into the broader public sector governing system, including for example, in audit, HR, regulatory, budgetary, project management, and policymaking and evaluation frameworks.

The OPSI Innovative Capacity Framework

The Innovative Capacity Framework is a resource developed by OPSI of the OECD that intends to help government to understand and collect data on the factors that enable or hinder their public sector's capacity to use innovate. The Framework's methodology examines innovation systems and recognises the context-specificity in which innovation takes place while

simultaneously enhancing the comparability of country experiences (Kaur et al., 2022). The Framework further aims to leverage drivers and barriers to ensure innovation achieve their intended goals. The Framework is built on four focus theme, Purpose, Potential, Impact and Capacity that can be explored at three levels of analysis, see the figures below.

The four themes of the OPSI Innovative Capacity Framework (Kaur et al., 2022).



The three levels of analysis identified in the OPSI Innovative Capacity Framework (OECD 2022).

A complete description of the Innovative Capacity Framework and how data can be collected can be found in the OECD publication Kaur, M. et al., (2022) https://dx.doi.org/10.1787/52389006-en

Public sector

The public sector is defined in the System of National Accounts (UN, 2008) as all government entities plus government-owned corporations. In this paper we follow common practice in management research and exclude government-owned corporations from the public sector.

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Annex B. Summary table of consultations with National Contact Points

Table A B.1. Summary consultation table

Country interviews	Year(s)	Measurement model	Target group	Objectives	Usage	Benefits of measurement framework	Challenges of measurement framework	Resources	Unanswered questions	Possibilities for future	Role OECD
Interviews											
Canada	2022	Survey on impact change challenge Link	Public sector Jurors Participants	Survey on challenges programme Are challenges effective? Who participates and why?	Majority found programme appropriate mechanism to address the problem area	Effective policy approach Programme delivers on intended outcome	Self-reporting biases in terms of successfulness of the programme		Investment analysis or a patent analysis to examine the economic or environmental outcomes	Crunchbase investment analysis	
Canada	2022	Social network analysis	Stakeholders of the challenges programme	Assess the public's awareness of an issue Mobilisation of new talent	Understand the outcomes of the challenges To plan future challenges more effectively	Effective in drawing new talent and engaging non-traditional actors	Many organisations don't have social media accounts			Foreseen to repeat social network analysis (pre and post)	
Canada	2022	Feasibility study (participants data linked with BR)	Business participants	Profile participants and assess business performance	Examine growth in employment, salaries and wages, revenue, labour productivity and R&D expenditures	Ability to link to tax and employment data	Early-stage research		Portfolio measurement		
Canada	Behavioural science unit	Rapid online surveys	General public	Understand drivers and barriers to change behaviour	Behavioural insight team	Ability to test interventions and measure their success					
Netherlands	2021	Structured questionnaire survey	Organisational level (Ministry departments and municipalities)	Identification of success factors and barriers to innovation Raise engagement International comparison	Results discussed with senior government officials Improvement of policies Development of index of innovation climate	Questionnaire not too difficult Based on Innovation barometer Ability to link results with other studies	Sufficient respondents Multiple respondents to answer survey	1 FTE (70,000k) distributed over 3 people excluding survey work which was outsourced	Learning and inputs into learning Mechanisms of working together	Surveying individual employees (e.g. in labour survey) Combine information from multiple sources	International comparison of core questions, leave room for national context Organise capacity building activities Flexible approach

Country interviews	Year(s)	Measurement model	Target group	Objectives	Usage	Benefits of measurement framework	Challenges of measurement framework	Resources	Unanswered questions	Possibilities for future	Role OECD
Colombia	Annual survey (8 years)	Structured questionnaire survey	Organisational level (Ministry departments, municipalities, agencies and other institutions)	To produce the Capacity Index To promote PSI , increase capacity to innovate and remove barriers	Foresight analysis Cluster analysis at organisational level Index is in national development plans Benchmarking with Chili, collaboration with IADB	Large questionnaire with 300 questions, mandatory, leads to 120 indicators that are used to construct the capacity index	Data is from secondary source, but the team worked for 3 years on the methodological part to construct the capacity index	2019 – 2 people 7 people part-time for 6 month 2021 – 10 5 for 6 month 1 person full time to make the instrument 2 full-time persons Review and design of the document Launch event	Follow-up with services to public sector organisations	Index will be continued but the 120 indicators will be reviewed	How to measure and evaluate PSI and how to generate public value
Finland	2018 & 2022	Structured questionnaire survey	Organisational level (Ministry departments and municipalities)	PSI measurement Module on experiments in municipalities Sustainable innovations in municipalities	Publish the results together with Ministry of Finance. Website to inform citizens.	Based on the Innobarometer (Denmark). Nordic country representatives meet once a month in innovation hub to discuss PSI.	Classical typology of innovations (service, process, organisational) is not rich enough many innovations are more systemic		How are innovations managed? Is there a separate programme? Part of the strategy or development unit?	Foresight analysis On which topic would the org. like work on in terms of PSI (incubator like)	The Nordic Innovation Hub as a model. Real stakeholders and decision makers should be involved. Evaluation.
Finland	H2020 (2017-2021)	Innovation Action	Public sector, civil society and commercial actors	To develop practical resources Real-life pilots to co-create with various combinations of public sector, civil society and commercial actors	Presentation at national level Tool books Academic papers, white papers			1.83 FTE	Implementation of tools and material developed requires follow-up with public service actors	Importance of implementing and follow-up in an incubator fashion (not evaluation)	COSIE framework; public service innovations can be achieved by creating collaborative partnerships between service providers and service beneficiaries (co-creation)
Denmark	2014, 2016, 2019, 2023, link	Structured questionnaire survey + several specific analysis by using Innovation Barometer (see website)	Organisational level (municipalities and regions)	To inspire workplaces to increase quality and efficiency Provide decision makers with information to develop the public sector	Used in educational institutions, for leadership development and to dispel myths and false assumptions of the government sector	Well established framework in the Innovation Barometer. Tested extensively. Experience from the surveys led to the development of the Copenhagen Manual	Identifying the correct respondent and getting them to answer	Registry access to database 45k in Euros Data collection and basic results reporting 3 months full time.	Diffusion of innovation Innovation culture and capacity Public procurement	Should see PSI in itself, has similarities with business sector innovation but PSI measurement needs to stand on its own with its own focus	OECD needs to prioritise and focus on what is important. Moreover make use of existing

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						RR (35%, 50%, 50%)					material such as the Innovation Barometer and Copenhagen Manual and build from that.
Czech Republic	2021, link	Structured questionnaire survey	Organisational level (Ministry departments, municipalities, agencies and other institutions)	Mapping PSI Creating an ecosystem to support PSI Explore CZ public administration innovation potential, Drivers, factors of PSI	Data feeds into national policy 'Client-oriented public administration 2030' Recommendations for central bodies in promoting or supporting innovation Analysis presented on several occasions, conferences, workshops etc. Published on ministerial website.	Procedure in line with the recommendations of the Copenhagen manual and the Greek Innovation Barometer survey. 69% Response rate	Some smaller units questioned the need to participate. Were however after explaining the purpose, persuaded by NCPs to complete the survey. Decided not to use too many open-ended questions due to concerns for the response rate	Four people (Head of Analytical department, Ministerial counselor, 1 staff member and 1 external consultant)	Individual level employee surveys Web-application measuring the innovation capacity Portuguese approach	Innovation+ barriers analysis with academia An individual-level survey on the innovative behavior Inventory and Innovation Support Inventory	Inspiration, providing examples of good practice, coordinating work
Written consultations											
Sweden	2018 & 2022	Structured questionnaire survey	Organisational level (Ministry departments and municipalities)	Achieve a better understanding of innovation and innovation activities in the public sector in a broad sense	Basis for decision-making, debate and research supporting PSI Self-evaluation tool for participants (SALAR) Swedish Agency for Public Management wants to track governmental agencies on innovation	First survey based on Innovation Barometer but adapted to Swedish context Second survey more in collaboration with Statistics Sweden using knowledge of private sector survey	Some differences in RR. Suspect that the concepts of innovation might be an obstacle to respondents Non-response analysis by Statistics Sweden	0.6 FTE @ Vinnova during 2 years	Innovation procurement Innovation management	Holistic approach (inputs, outputs and outcomes) at different levels unit and whole organisation. Individual level through interviews and case studies Systemic through accumulating lower level measurement data	OECD can engage discussions to make PSI part of official statistics (possibility to collaborate with private sector innovation survey)
Sweden	2022	Structured questionnaire survey	Organisational level (Ministry departments and municipalities)	Extend CIS to private sector to have a more complete picture for innovation policies Aligning questionnaire with OM		Questionnaire well understood but RR was low (29%) likely due to voluntary nature of the survey. By conducting the survey engagement	No major challenges except the general issue with the concept of innovation in innovation surveys Non-response survey showed no differences in	1 FTE (different people/responsibilities)		Make survey part of Sweden's official statistics alongside CIS (mandatory) Comparability with the CIS needs to be further improved and the	More involvement of NSIs: OPSI and NESTI work together on PSI to build a common

Country interviews	Year(s)	Measurement model	Target group	Objectives	Usage	Benefits of measurement framework	Challenges of measurement framework	Resources	Unanswered questions	Possibilities for future	Role OECD
						was raised on the topic of PSI	propensity to respond to the survey between innovators and non-innovators			questionnaire itself aligned with updated practices	base for measuring PSI to harmonise collection and ensure comparability
Iceland	2 rounds	Structured questionnaire survey	Organisational level	Gathering information on what kind of innovation is going on in PS Direct initiatives better and build these around facts	Raise engagement on the topic of PSI Currently low demand for data, only a ministry has used it	Information from the description of innovative projects was very useful	In the first round the questionnaire was rather long, in the second round the questionnaire was shortened The survey is a self-evaluation and this has its disadvantages in terms of subjectivity	1st round spent more time on methodology etc 2nd round 1 FTE for 1 month	Target individuals (employees) asking them to describe the innovation	Collect information at different levels (not only at executive level)	Other types of measurement
Norway	2018 & 2020	Structured questionnaire survey	Organisational level (municipalities and regions)	International comparison Create another image of PS i.e. its innovative	Use results in discussions with state authorities Concrete projects with municipalities and regions identifying strengths and weaknesses Academic research	Build upon Innovation Barometer work and able to collaborate with CO-PI of DK			Drivers of innovation	Cross-sector innovations Collect more information on why innovations happen (drivers)	
Desk research											
New Zealand	2020	Structured questionnaire survey	Public sector organisations	Identification of success factors and barriers to innovation Raise engagement International comparison	Provide senior leaders interactive data highlighting strengths and areas for improvement and recommendations	Data collection on Collaboration, Leadership, People Empowerment, Rules & Systems and Innovative Outputs				The Innovation Barometer is to be offered to another set of public sector agencies. The goal is to scale across a larger portion of the public sector each year	
New Zealand		Case-studies		Support public sector managers to build capacity and share knowledge	How innovation has happened in New Zealand link						
Portugal	2020	Innovation Panel for the Public Sector	Organisational level	Develop instrument for monitoring and adapting innovation strategies	Consolidated organisational level report on innovation practices for each of the participants Innovation dashboard to identify strategic	Experimental configuration Focus on needs of users	Stabilise measurement process		Case-studies to analyse innovation strategies at micro-level Thematic dossiers with guidance and information Modulation of data to	Explore advantages of using existing administrative data	Promotion of measurement and evaluation in a sustained manner

Country interviews	Year(s)	Measurement model	Target group	Objectives	Usage	Benefits of measurement framework	Challenges of measurement framework	Resources	Unanswered questions	Possibilities for future	Role OECD
					options				present to different actors in PSI		
Slovenia	2020 and 2021, link	Structured questionnaire survey, link	Government Administration and bodies within Research organisations	Without effective public administration, the development of other spheres (private sector and research organisations) is limited To evaluate impact of innovative programme Inovativen.si To analyse the state and progress of innovation maturity Insight into areas need to be strengthened	Development of new and better solutions Identification of enablers and barriers Raise awareness and spread results of good practice Training civil servants Adjustments/upgrade of activities inovativen.si Participation in challenges	Use CPH Manual Able to distribute survey through network Response rate 83% Raising awareness	Up-to-date network of potential respondents Picking the right time slot Guaranteeing anonymity Persuading organisations to participate		the "flexibility" of regulations, legislations and rules actual implementation of agile processes & innovative approaches	Establish a Transition policy lab, which will address the systemic level of innovation (change in policymaking).	
Greece	2020 and 2022, link	Structured questionnaire survey, link	Organisational level (Ministries, Independent Authorities, Regions and Municipalities)	Innovation state of play Perceptions and Knowledge Drivers and barriers System level support	To implement the OECD Innovation Declaration for the Public Sector in Greece. Reporting on the factors hindering innovation ecosystem. Analysis of public sector innovation state of play. Recommendations for fostering public sector innovation, including roadmap and guidelines on dissemination of relevant recommendations	Support for respondents with a guide and before or during measurement process	No difficulties in reporting in PSI. It was however a snapshot of the 2020 situation	Involvement from: Project Design, actions, and timelines, Creation of the methodological framework and tools Design of the online tool of the survey, Provision of support of public officials on queries, Collection and data analysis, Reporting A team of four (4) persons worked for about 4 months.	Distinction between organisational capacity and individual capacity Fostering innovation on a systemic level To learn from pioneers on how they maximise outcomes without overspending their resources.	PSI measurement is planned to be implemented every two years. For 2023 focus more on the innovation capacity of public organisations to measure quality of innovation system as well the skills of public servants. Case-studies	OPSI OECD could support the sharing knowledge in two fields a) Work on a common PSI capacity measurement tool with possible modules for the interested countries. This could be achieved through an expert group and a possible TSI project. Maybe wotking on a common PSI measurement tool could be a goal for the next years so that we can get data on an international

Country interviews	Year(s)	Measurement model	Target group	Objectives	Usage	Benefits of measurement framework	Challenges of measurement framework	Resources	Unanswered questions	Possibilities for future	Role OECD
											level b) Provide in depth analysis and country specific recommendations on the innovation systems based on the findings of the common PSI measurement.
Chile	2019-2021	Public Innovation Index	In the first two measurements, 37 institutions participated, and in the third in 2021, 45 institutions participated from a sampling frame of 97 measurable Chilean public services, reaching 46% coverage over the target population, and representing 13 of the 24 ministries.	to measure the capabilities to generate new or improved ideas, processes, products or services that, through co-creation processes between different actors, positively impact the needs and expectations of people for the transformation of public management	The index looks at basic capabilities (enabling dimensions) that enable or facilitate innovation,and those that are more closely linked to the innovative task and the achievement of favourable results (conditioning dimensions), which are enhanced if enabling capabilities exist.						

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Azerbaijan	2021	National Corporate Innovation Index (NCII)	350 employees of 15 structural units of the State Agency participated in the Innovation IQ survey. 250 employees participated in hackathons.	The Index methodology was developed in order to measure the innovation intelligence quotient of the employees working in government organisations, and to evaluate the creative and innovation-oriented activities	- Evaluation of innovation skills and performance of the organisation - Determining the degree of application of efficiency mechanisms in the work of employees - Identification of factors supporting innovation - Studying the rate of adding creativity to the routine work of structural units	Innovation maturity assessment is calculated based on Rao and Weintraub methodology and European Innovation Management standards during the preparation of the Innovation IQ survey and interview questions.				How PS manage innovation. A mechanism is developed that acts as a bridge between management and employees and a guide for employees to innovate in the PS.	

Source: OECD.

Annex C. The Innovative Capacity Framework

The table below provides an overview of the measurement topics included in the Innovation Capacity Framework.

Themes	Topics	Question
Purpose	Institutional drivers	A. The extent to which there is a clear narrative, understood by staff, including missions, of how innovation can solve problems or help deliver on organisational and societal goals
	External to the organisation drivers	B. The extent to which there is a dedicated innovation strategy/strategic direction that informs decisions/priorities and steers innovation (this can also be tailored towards a certain innovative capacity type)
		C. The extent to which leadership communicates the need and permission to innovate and learn from failure
		D. The extent to which the organisation uses innovation to adapt to and anticipate evolving internal and external pressures, change drivers and future trends and needs
		E. The extent to which external pressures from citizens needs, organisations or other countries is present and provides motivation for innovation
Potential	Leadership practice	A. The extent to which employees are encouraged to work across silos in order to find innovative solutions
	Organisational culture	B. The extent to which there is a culture of mutual trust and collaboration
	Strategy design approach	C. The extent to which change is welcomed, supported and communicated across the organisation
	Decision making practices	D. The extent to which innovation strategies support a balanced innovation portfolio targeted towards goals
		E. The extent to which institutional settings are conducive to innovation and deliberate efforts are made to reduce inhibitors (ex. position in political cycle, audits, PM, funding stability)
		F. The extent to which risk is tolerated and embraced, and approval and decision-making processes allow for creativity and experimentation
		G. Innovation does not depend on key individuals nor do key individuals consistently act as barriers to innovation.
		H. Organisations are clear on the division of roles and responsibilities (ie. No turf fights)
Capacity	Conditions and support	A. The extent to which the 6 core skills for public sector innovation are present among staff: iteration, data literacy, user-centricity, curiosity, storytelling, insurgency
	Innovation portfolio	B. The extent to which diverse demographics, professional skills and experiences are present and leveraged among staff and within (project) teams
	Project management	C. The extent to which staff have knowledge of and experience with common innovation methods
	Workforce strategy	D. The extent to which staff are able to leverage appropriate and meaningful technology for innovation
		E. The extent to which staff have access to dedicated time, space, and tools for experimentation and learning
		F. The extent to which staff are encouraged to access new trainings and continuously learn
		G. The extent to which sexism, racism, age discrimination, homophobia and other structural forms of discrimination and marginalisation are present within the public sector
		H. The extent to which individual voice and participation are determined by hierarchy or other power dynamics

Themes	Topics	Question
Impact	Performance monitoring, audit and evaluation	A. The extent to which evaluation and learning around innovative initiatives is incorporated into strategy
	Perceived impact	B. The extent to which knowledge is transferred between teams/departments and knowledge platforms/databanks/ and repositories are available to promote sharing and scaling
	Learning impact	C. The extent to which the impact and value of innovations (including unintended consequences) is understood and measured (output)
		D. The extent to which there is evidence that evaluative information feeds into future decision-making
		E. The extent to which old or outdated processes or practices are stopped
		F. The extent to which innovation projects are able to deliver on stakeholder expectations
		G. The extent to which citizens and stakeholders are engaged in planning, development and understanding impact.
		H. The extent to which instruments for assessing the value of innovating are used within the organisation.