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Co-VAL [770356] "Understanding value co-creation in public services for transforming European public administrations"

D2.1: Mapping and instruments providing data on the co-creation of public services

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Document description	The document assesses available data on the use of collaboration and co-creation by governments. The only available data are from one-off surveys that cover the involvement of users as a source of information for innovation. The results are mostly useful for identifying data collection needs for the WP2 survey.

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Table of Contents

List of Figures

List of Tables

1 Introduction

Over the past decade, there has been increasing interest in how innovation occurs in the public sector[1] and how it can be promoted. In part, this is due to Borins (2001) research that found that the ideas for award-winning innovations in the United States and Commonwealth countries were more likely to come from middle managers and front-line public sector workers than from politicians. Similarly, Torfing and Ansell (2017) note that most decisions on innovation in the US are taken by civil servants and not by politicians. In part, this is probably due to a division between the roles of politicians and civil servants, with the latter responsible for developing innovative methods of implementing policy decisions (Arundel and Huber, 2013). Together, this and other research finds that innovation in the public sector is often due to activities within the civil service, instead of being dependent on 'top down' decisions taken by politicians or the heads of ministries. The implication is that public sector innovation is likely to be improved by giving civil servants the tools and competences to innovate.

The Co-Val project focuses on how public sector organisations can improve the value of services to citizens and other users through the co-creation of value, whereby both the public sector organisation and users are jointly involved in value creation. This assumes an active role on the part of the public sector organisation in innovation and an active role of the user of service innovations, either during the development of an innovation (co-creation) or during the creation of value during the consumption of a service innovation as part of a 'service dominant logic'.

WP2 focuses on collecting and analysing data on co-creation during the development of an innovation. This supplements case study and other research methods used by other Co-Val WPs that evaluate both the co-creation of innovations and the co-creation of value during service use.

An important competence on the part of public sector organisations is the effective use of collaboration and co-creation to develop and implement public sector innovations. Collaboration with other government entities, businesses, and non-profit organisations appears to be a defining characteristic of public sector innovation that has been reported in multiple innovation surveys (EC, 2010; Torugsa and Arundel, 2017) and other research (Kattel et al, 2014; de Vries et al, 2018). Surveys show that approximately 80% of innovative public sector entities use collaboration to innovate. However, we know considerably less about collaboration with individual citizens to develop service innovations that directly affect them, such as health, transportation, education, and other services. Collaboration with citizens, at its best, involves co-creation where the citizen, as a potential user of a service, is actively involved in one or more stages of the innovation process. Interview-based research

[1] 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.

on citizen co-creation, often based on case studies, has investigated how co-creation occurs, but there is a general lack of quantitative estimates of the prevalence of co-creation, the intensity with which co-creation is used, the drivers and barriers that influence its use, and the effects of co-creation on innovation outcomes (Torfing et al, 2016). Research on prevalence requires statistically representative surveys, but a literature review found that very few studies on co-creation used survey methods (Voorberg et al, 2015) and most focused on value co-creation (the creation of value by users during the consumption of a service) instead of co-creation for innovation (95 of 122 studies).

In this report, we identify existing data on the use of collaboration and co-creation to innovate by public sector entities. The focus is on studies that have obtained data for multiple public sector entities (instead of a small number, as in case studies) and which provide data that can be used to estimate frequencies for the use of collaboration and co-creation. We conducted a preliminary search for studies from any country, which was then followed by more detailed searches for studies from the six countries participating in WP2: France, Hungary the Netherlands, Norway, Spain, and the UK. The goal of this research is three-fold: first to identify if existing data sources can be used to produce indicators for collaboration and co-creation, second to identify questions that have been used to collect such data and which can be used in the WP2 survey, and third to identify data collection needs for the WP2 survey.

The results summarized below show that available data are sparse. Some indicators can be produced for the use of collaboration, but the data are either dated or only available for a small number of studies. There is very little representative data available for the use of co-creation, suggesting that the WP2 survey needs to fill this gap. Of note, this deliverable will be updated as new data are found or become available.

2 Definitions

To be measured, innovation activities and concepts must be defined (Gault, 2018). Definitions are required for innovation, collaboration and co-creation.

2.1 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; NAO, 2006). 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 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.

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 as a result 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.

2.2 Collaboration

Collaboration is defined in the Oslo Manual (OECD/Eurostat, 2018) as requiring "coordinated activity across different parties to address a jointly defined problem, with all partners contributing." The requirement for all parties to contribute differentiates collaboration from cooperation, where "two or more participants agree to take responsibility for a task or series of tasks and information is shared between the parties to facilitate the agreement." Cooperation can be based on a contractual arrangement where one party supplies another party with ideas or inputs, without active engagement in developing these ideas or inputs into an innovation.

2.3 Co-creation

There are several definitions of co-creation in common use that overlap with other concepts such as 'co-production' and 'co-design'. Figure 1, derived from Osborne et al (2016), shows different interpretations of co-creation. Osborne et al divide definitions into those that apply to the actions of individuals or to the service itself and by whether or not the participation of the individual in co-creation is involuntary (the individual is not aware of their role) or voluntary. The top left quadrant covers *co-creation of value*, whereby the use of a service creates value for the user through the act of consuming the service. This is also referred to in the literature as *co-production*. The quadrant below is defined as co-design, whereby individuals partially customize a service for their own use. The top right quadrant of co-construction is when an individual unknowingly helps to construct a service (for instance by using an internet site), while the quadrant below it is when an individual is actively involved in the development of a service innovation.

The definition in this paper excludes the co-creation of value and co-design for own use. Instead, we follow Voorberg et al's (2017) definition of co-creation as "the involvement of citizens in the initiation and/or design of public services", which is covered in the lower-right quadrant in Figure 1, labelled by Osborne et al as 'co-innovation'. We exclude the co-creation of value because this occurs during the consumption of a service and does not cover the process of developing an innovation.

Figure 1. Definitions of co-creation for service innovations		
	Target	
	Individuals	**The service itself**
Involuntary (occurs during the use of a service)	**Co-production** (*co-produced experience of a service, or* ***co-creation of value****, value-in-use*)	**Co-construction**
Voluntary	**Co-design** *(customization of a service for their own use)*	**Co-innovation** *Customer engagement*

Source: Osborne et al, 2016.

Voorberg et al's definition of co-creation is similar, but not identical to, definitions in the literature of co-creation or co-production. Sangiorgi (2015) uses of the term 'co-production' to cover activities such as ethnographic methods to understand user experiences and co-design methods to "engage people in the design and transformation processes'. Menguc et al (2014) define co-creation as 'activities where customers participate in firm-initiated practices that result in customers providing feedback, information and knowledge to firms about how to improve design".

Torfing et al (2016) define co-creation as a "process through which two or more public and private actors attempt to solve a shared problem, challenge or task through a constructive exchange of different kinds of knowledge, resources, competences and ideas that enhance the production of public value in terms of visions, plans, policies, strategies, regulatory frameworks, or services, either through a continuous improvement of outputs or outcomes or through innovative step changes" (p 8). This definition includes collaboration with businesses and is applied not only to service innovations but also to higher level policies and strategies.

Prahalad (2004) lists five activities of co-creation, including customer engagement, self-service, customer experience, problem solving, and co-designing. This definition is much broader than ours. For Prahalad, co-creation, in the sense of customers working with the service provider to design the service, only occurs in the co-design activity.

The existence of multiple definitions of co-creation in terms of breadth of application, the number of stages where it can be used, and the depth of citizen involvement indicate that the term 'co-creation' can't be used in a survey questionnaire because the term will be interpreted differently across respondents. Frow et al (2016) and Hardyman et al (2015) find that the literature on co-creation in the health sector tends to define co-creation as value co-creation, but sectors influenced by industrial

design could be more likely to interpret the term 'co-creation' as defined by Voorberg et al. To avoid differing definitions, co-creation needs to be measured in a survey through questions on the use of specific methods or activities that are part of co-creation. Whether a specific public sector entity uses co-creation or not can then be identified through the analysis of survey responses.

Our working definition of co-creation for public sector service innovations follows the definition of Voorberg et al (the involvement of citizens in the initiation and/or design of public services) but extends the definition to include individual users of process innovations. With rare exceptions, these users will be civil servants, since process innovations are used within an organisation. The involvement of businesses in public sector innovation is assigned to collaboration. The target of many innovations involving business collaboration is not businesses as users, but citizens, as when businesses collaborate through providing internet platforms for innovative services. Innovations that specifically target businesses are usually targeted to all relevant businesses, with the business entity as the target, instead of individuals.

Our definition also excludes user innovations. This can occur when an individual works on a service to make the service 'more efficient, safer or better' for their own use (Svensson, 2018). User innovations can be taken up by a public sector organization and further developed using co-creation, but one or more individuals working to develop an innovation without the involvement of a public sector organization is not part of co-creation. Co-creation for public sector innovation requires both a public sector partner and individuals that are potential users of the innovation.

3 Stages for the use of co-creation with users

Co-creation is often part of design thinking, a methodology for innovating that is particularly relevant to services (OECD/Eurostat, 2018). Design thinking includes multiple consecutive stages, although some can occur simultaneously:

1. Research on customer needs, including ethnographic research on how customers use services.
2. Ideation, where preliminary ideas for an innovative service are developed, drawing on the research results.
3. Development and design activities, resulting in a prototype.
4. Testing and other work to develop a prototype into an innovation.
5. Pilot testing.
6. Post implementation research.

Iteration between stages is possible. For instance, there can be several rounds of research and ideation. The post-implementation stage can include additional research on customer satisfaction with the service, leading to additional research to improve innovation. Furthermore, not all stages are necessary. A public sector organization could decide to skip pilot testing and post implementation research.

User involvement in co-creation can occur in all six stages. The ideation and development stages are often the most intensive and are often discussed as “co-design” when users are actively involved. Trischler and Scott (2016, p 723) define co-design as “a specific form of co-creation in which designers and participants not trained in design [work] together throughout the whole span of a design process”.

The location and intensity of user involvement can vary substantially by the purpose of the innovation and by the entity. The most common involvement of users involves low-level participation where knowledge flows unidirectionally from the citizen to the innovating entity. This includes post-implementation evaluation, such as through surveys, focus groups, or self-reporting of user experiences on websites. Skalen et al (2018) find that front-line staff can provide feedback on user experiences that can be used to provide ‘use’ knowledge on how a service is used and what it should be providing. Another example of minimal user involvement is the use of a crowdsourcing platform to obtain ideas. The US government used crowdsourcing through the Challenge.gov platform to obtain citizen suggestions on public management problems. Mergel et al (2018) interviewed 36 managers that posted problems on Challenge.gov and found that most did so because of top-down mandates to solicit citizen input rather than a strong interest in obtaining citizen perspectives.

Other research has identified the involvement of customers in the early ideation stage (Skalen et al, 2018), design (Verleye, 2015; Dietrich et al, 2017) and in the late testing and selection stages (Gemser and Perks, 2015, Verleye, 2015), or in all stages. However, user involvement can be brief. In the study by Dietrich et al (2017), one hour was allotted to a co-design session in which high school students made suggestions for how to improve a one-day alcohol education program that they had previously attended. Gebauer et al (2010), in a study of how Swiss Railroads involves users in innovation, found that the involvement of users in co-design is considerably less common than their involvement through unidirectional methods of obtaining data on user experiences. It is possible that co-design is relatively rare, with the involvement of users greatest at the research and post-implementation stages.

Service users do not encounter all aspects of a service since services depend on back-office activities that the user of the service does not experience (Trischler and Scott, 2016). Co-creation is, therefore, possible on both the front and back sides of the line of visibility, with citizen users on the front side and civil servant users on the back side.

Torfing et al (2016) suggest that co-creation is a new public service paradigm that replaces “public service monopolies and public-private competition with multi-actor collaboration”. However, without better data on the prevalence and intensity of co-creation, this is an aspirational statement instead of an empirically founded conclusion. Torfing et al, 2016 also identify possible problems with co-creation, such as when it is used to download responsibilities onto local authorities, provide tokenistic cover, or permit capture by vested interests. “Institutional logic” (organizational culture) could also act as a possible barrier to the intensive use of co-creation in the design stages (Vickers et al, 2017; Torfing et al 2016), for instance when managers prefer to retain full control over the innovation process (Vickers et al, 2017).

A major gap in the literature is research on the outcomes from the use of co-creation in the public sector (Torfing et al, 2016; Verleye, 2015). The literature for the use of co-creation by firms mention several positive outcomes that could also be relevant to the public sector, including greater efficiency, reduced development cost, reduced risk of failure, faster speed to market, closer fit with customer needs, and better acceptance. In addition, we don’t know if co-creation is associated with better or different outcomes compared to innovations that were developed without the use of co-creation. Menguc et al (2014), drawing on the experience of the private sector, suggest that the benefits of customer involvement in innovation will depend on the type of innovation. The benefits of customer involvement could be limited to incremental innovations and irrelevant to radical innovations for which customers have no previous, relevant experience.

4 Topics for data collection

The literature points to several topics where better data on the use of co-creation by public sector entities is required:

1. Prevalence of user participation in innovation by agency type, country, etc. Torfing et al (2016) identify this as a data issue.
2. Prevalence of the intensity of use of co-creation for innovation, such as by innovation stage.
3. The factors associated with the use of co-creation, including managerial and organizational characteristics.
4. The outcomes (benefits) of using co-creation to develop innovations.

All of the above topics require data on the use of co-creation by public sector entities.

4.1 Prevalence of user participation

Indicators of the participation of users in innovation provide basic, entry level data on the use of collaboration or co-creation. These indicators can be measured on a nominal scale (yes or no) or on an ordinal importance scale. Examples include whether information was obtained from users (yes or no) and the importance of users as a source of information for innovations.

4.2 Intensity of use of co-creation

Basic prevalence indicators provide little information on the intensity with which users are involved in innovation. Intensity indicators provide information on how users were involved (via surveys, focus groups, participants in ethnographic research, etc.) and their involvement at different stages of the innovation process.

4.3 Factors associated with the use of co-creation

These factors divide into organizational and management factors and the capabilities and tools available to managers.

The governance of an organization determines how and who makes decisions, including for innovation, and is likely to influence the use of co-creation (Torfing et al 2016). Voorberg et al (2017) use case studies from Estonia, Germany, the Netherlands and the UK to examine the effect of governance on the use of co-creation. They identify two relevant aspects of governance: varying levels of consultation versus authoritative governments, and following rules versus acting in the public interest. Although each the four case studies provide different combinations of the two aspects, co-creation was used in all of them. Governance in Germany was based on an authoritarian model with an emphasis on following rules. The use of co-creation required a major break with how

services were traditionally provided. Conversely, a consultative tradition in the Netherlands was supportive of co-creation, although its use developed within a set of clear rules. The authors conclude that national differences in governance can influence the use of co-creation, how it is implemented, and its effectiveness. Another institutional factor that could affect the use of co-creation includes management preference to maintain control over an innovation (Bryson, 2017; Vickers et al, 2017).

Unfortunately, the form of governance is probably very difficult to measure in a survey that uses public sector managers as respondents, in part because a survey only has space for only a small number of questions on governance. The COBRA survey of 1,289 public sector organizations in 11 EU countries collected extensive data on autonomy, steering, and control of relevance to governance, but this required 32 questions (Verhoest, 2010). Case studies are likely to be a better method for evaluating the effects of governance on the use of co-creation for innovation.

Intensive use of co-creation requires public sector managers to have specific in-house capabilities and tools. Among others, these include expertise in:

- Service blueprinting (Radnor et al, 2013) to determine the line of visibility between what is and is not visible to users and the ability to identify the 'touch' points for service users.
- Ethnographic and observational research to identify the subjective experiences of users (Trischler and Scott, 2016).
- Constructing personas by using data obtained from interviews with users to construct a persona for a fictitious user.
- Visualisation and mapping (service blue-printing and customer journey mapping). As for the persona method, this draws on data obtained from interviews and/or observational studies.

An alternative to in-house capabilities is the use of external experts or facilities such as innovation or 'living' labs. An interview study with personnel from 11 innovation labs that were established to support cross disciplinary and citizen driven approaches to innovation in the public sector found that the focus of their work was on rapid prototyping instead of long-term user engagement that might be necessary for systemic social innovation (Pinuret et al, 2017). This suggests that there might be benefits from developing design thinking and co-creation capabilities within public sector entities.

4.4 Outcomes of co-creation

Torfing et al (2016) stress the need for data on measuring the impacts of co-creation. Relevant data include whether a public sector agency evaluates the impacts of its innovations and if yes, the method of evaluation, and data on the outcomes of service and process innovations. Outcomes can be difficult to measure if insufficient time has passed since implementation. In addition, there is a lack of general outcome measures that apply to all services or to all processes. General outcome measures

that have been used in surveys include a reduction in per unit costs and simpler administrative procedures from process innovations, quality improvements, faster delivery of services and improvements in employee working conditions for both process and service innovations, and improved user satisfaction, access to knowledge, ability to target new users, and improvements in user compliance for service innovations.

Frequency data on outcomes can be used to produce indicators (i.e. percent of innovations developed through co-creation that reduced per unit costs), but these indicators are of low value. The primary purpose for collecting outcome data is for use in econometric analyses of the relationships between outcomes and innovation inputs, strategies and activities. If data are collected on different co-creation activities, it is possible to estimate which activities are more strongly correlated with outcomes. For instance, the involvement of users at the development stage might be more strongly correlated with beneficial outcomes than user involvement through focus groups during the research stage.

5 Data availability

Case studies (many of which are cited above) are not useful for producing indicators because the sample sizes are almost always too small and unrepresentative. In respect to indicators, case studies can provide ideas for producing indicators through representative surveys or the analysis of 'big data'. Gemser and Perks (2015) point to the need for large-scale surveys to measure co-creation constructs and the degree of customer involvement at different innovation stages.

5.1 Survey data

The comparability of survey data depends on the use of similar measurement units (the boundaries of the organization for which data are collected), similar respondents by job level within the public sector hierarchy (respondents should only be asked questions about the organization for which they are responsible), and the innovation target (all innovations within a defined time period or a focus on a single innovation).

5.2 Existing surveys of collaboration / co-creation

There are only a small number of surveys in the business or public sector that have included questions on the involvement of users in innovation. The most common questions ask if citizens or users were a source of information for innovation and if user surveys were used to obtain information of relevance to innovation.

Menguc et al (2014) surveyed 1000 firms in high technology manufacturing industries in Canada and obtained 216 responses. Questions asked about the frequency of customer involvement in a) cross-functional design teams, b) design reviews, c) design review teams with customer representatives, and d) customer pilot runs. The response categories were never, seldom (1 to 20% of time), occasionally (21-50% of time), usually (51 – 90% of time), and always or almost always (91-100% of time). The paper analyses the results using factor analysis but does not use the data to construct descriptive indicators.

The 2010 COBRA survey contacted 2,431 public sector agencies in 11 EU countries and obtained responses from 1,289. A single question (E53.1) asked about the use of 'customer surveys', but provided no additional details, such as the purpose of the surveys or if they were oriented to post-implementation customers or to general customer experience. Three response categories were provided: 'not used, used to a small extent, used to a large extent'.

The 2009 MEPIN survey of innovation by approximately 2,000 public sector entities in the five Scandinavian countries included one question on the importance of "user satisfaction surveys (or other user surveys)" as an information channel for innovation activities. The response categories for

importance were high, low and not relevant. The percentage of respondents attributing a high importance to user satisfaction surveys varied from 27% in Norway to 40% in Iceland (Bugge et al, 2011). A second question asks if the organisation measures the impacts of its innovations through user surveys, using "yes, systematically", "yes, ad hoc", and "no" response options. No descriptive results were provided for this question.

The 2010 European Innobarometer survey (EC, 2011) with 3,500 responses from public sector agencies, asked about the importance of "citizens as clients or users" as an information source for developing innovations. Three response options were offered: not important, somewhat important, and very important. For all 27 EU countries, 46% of respondents stated that citizens were a 'very important' information source. There was little variation by the function of the agency, with the lowest reported percentage of 44% observed for general government activities and the highest percentage of 52% for agencies focused on education (EC, 2010). The survey can also be used to estimate the prevalence of collaboration for service and for process innovations. Respondents were asked if any of their services (or processes) 'were developed together' with other government organisations, private businesses, or not-for-profit organisations.

An advantage of the 2010 Innobarometer survey is that the data are publicly available and can, therefore, be used to construct different indicators using the question on the importance of citizens as "clients or users" as an information source. For example, it is possible to use the data to construct indicators for the percentage of municipalities, national and regional public sector organisations that find citizens to be a 'very important' source of information for innovation.

In 2010 NESTA conducted a pilot survey of innovation by local authorities and National Health Service trusts in England, obtaining responses from 64 NHS trusts and 111 local authorities. Possibly influenced by NESTA's ongoing work on design thinking, the survey included more questions on the role of service users in innovation than in the MEPIN and Innobarometer surveys. Relevant questions and response options are as follows:

> Q6. What proportion of the new service development activity has involved service users (*All or almost all of it, Most of it, About half of it, Under half of it, Hardly any of it, None, Don't know*)?
>
> Q21. How important are service users as a source of the ideas and information needed to develop new or improved services or processes? (*Very important, Fairly important, Not very important, Not at all important, Don't Know / Not applicable*).
>
> Q30. How important are service users in the development of new or improved services or processes? (*Very important, Fairly important, Not very important, Not at all important, Don't Know / Not applicable*).

Q38. To what extent do you agree or disagree with the following statement about innovation in your organisation: We involve users in the service development process? (*Strongly agree, Tend to agree, Neither agree nor disagree, Tend to disagree, Strongly disagree*).

Other questions addressed the involvement of users in new service development (Q28), the attentiveness of senior management to the view of users (Q39), and the inclusion of user groups in accountability (43), but these questions combined users with other groups, such as suppliers and partners or front-line staff and middle management. Consequently, it is not possible to differentiate the role of service users from that of other groups. A report on the NESTA results (Hughes et al, 2011) provides a few indicators, showing that service users are found by 66% of local councils to be an important source of ideas for innovation and that 58% of local councils involve service users in the development of innovations. However, most of the data are only used for factor analysis.

The Danish Center for Offentlig Innovation conducted a representative survey of innovation in 2015 that obtained responses from 1,255 municipal, regional and state workplaces (COI, 2016). The study found that 27% of innovations are implemented in collaboration with citizens and/or volunteers. Citizen involvement is greatest in municipal and regional governments. Citizens were infrequently involved in evaluations of innovations, with only 11% of evaluations including citizens or businesses.

A similar survey to the Danish survey of government workplaces was conducted in Norway in 2017[2], although it is not clear if results are available yet. The survey asks about the role of different groups in promoting or inhibiting the most recent innovation by a public sector entity. One of the questions asks about the involvement of citizens. The response scale consists of “promote to a high degree”, “promote somewhat”, “inhibit somewhat”, “inhibit to a high degree”, and not relevant and don’t know options.

Three surveys in Australia collected data on citizen involvement in innovation. First, the Australian Public Service Commission runs an annual survey of national government civil servants on a range of issues. The 2011 survey included a section on innovation. One of the questions asked about the importance of ‘members of the public’ as a source of ideas or information for the most important innovation of the respondent’s workgroup. Second, an Australian pilot survey focused on innovation included questions on the importance of “feedback and comments from citizens” as a source of information for the development of innovations. Another question was limited to the organisation’s most important innovation and asked if it involved collaboration with ‘individual citizens’. Citizens were the most common collaboration partner (reported by 42% of 144 respondents) after ‘other governments’.

[2] KS Innovasjonsbarometer 2017, http://www.ks.no/fagomrader/utvikling/innovasjon/innovasjonsbarometeret/hva-er-innovasjonsbarometeret/.

The third Australian survey focused on managerial and administrative innovations by universities, which includes innovations targeted towards students (Arundel et al, 2016). The questionnaire was sent to middle managers at 39 public universities in Australia and 6 in New Zealand. Responses were obtained from 573 managers. Question E1 asked respondents if they disagreed, were neutral, or agreed with the statement "Students are involved in the design or planning of new or improved services", with 25% agreeing. Question F3 included several sub-questions of relevance to the involvement of students with "yes" or "no" response categories: "Conduct project user or focus groups with potential users of an innovation (67% of respondents replied 'yes'"), "Survey your stakeholders or potential users about an innovation" (62%), "Test the 'ease of use' of a planned innovation on a sample of potential users" (64%), and "Run post-implementation studies to identify or solve problems with an innovation" (59%). The question is ordered to follow stages in design-thinking (although the term 'design thinking' is never used. The results suggest a strong involvement of users at different stages of the development of an innovation.

The LIPSE survey, with 471 municipal workers and politicians in four cities (Copenhagen, Rotterdam, Barcelona, and West Lothian), asked respondents to describe up to five innovations to address socioeconomic development challenges and collected data on networking, but the latter data were not specifically linked to innovation (Lewis et al, 2014).

5.3 Limitations of survey data

With the exception of the NESTA survey, none of the surveys to date are able to produce more than basic prevalence indicators for the use of collaboration or co-innovation. The most frequent data are for the importance of citizens or users as a source of information for innovation. Only the NESTA survey collected data on the involvement of users at different stages of the innovation process or on intensity (share of service innovations that involved users).

A further limitation is that most of the surveys are either out of date (over five years old) or available for only one country or a small number of countries (the Danish and Norwegian surveys).

5.4 Big data

"Big data", often based on data available on the internet, theoretically provides a cheaper and more timely source of innovation data in comparison to surveys. The main methodology is the use of web-scraping bots that use textual analysis to identify innovation activities that are posted on the websites of businesses or public sector organisations.

The reliability of using web-scraping to produce indicators can be reduced by four factors:

1. Self-selection due to businesses and public sector agencies only posting information that they want to make public. For instance, public sector agencies may not post information on innovation failures, or they might give greater visibility to the role of politicians in innovation than the role of front-line staff and users.
2. Incomplete and non-comparable data, whereby different agencies post different kinds of data. One agency might not post information on its use of co-creation, while another agency might provide extensive information.
3. Poor representativeness, whereby some members of a population are more visible than others. For instance, departments within a government ministry may lack separate web pages.
4. Lack of accurate and comprehensive terms in widespread use for innovation activities. For instance, web-scraping cannot use the term 'co-creation' in a search because of large differences in how this term is interpreted. Simple text phrases such as 'user surveys' could also produce misleading results because a web page might use this term in reference to future plans to introduce user surveys.

Web-scraping is most useful when coverage is complete or nearly complete, such as the use of smartphone data to track traffic congestion or analysis of twitter messages (see the discussion of an example for Spain in section 6.4 below).

The use of web-scraping to identify innovation activities is in its infancy, with significant progress expected in the future. In Europe, a small number of studies have used web-scraping to develop innovation indicators in either the business or public sector. However, many of these experiments have either produced inaccurate results in comparison with other verified sources of data, or they have only tried to produce basic innovation indicators of low value.

An example of a low value indicator is the project by PPMI to use web-scraping to estimate 1) the share of firms with 10 to 249 employees with at least one product or process innovation and 2) the share of firms that innovated in-house. The first of these two indicators is an entry level indicator of little value since it provides no information on the intensity of innovation activities or the level of innovation capabilities. The second indicator is slightly more useful in that it excludes adoption, but neither indicator measures the intensity of innovation activities or the innovation capabilities of firms.

NESTA (2018) has explored the use of big data to produce several innovation indicators, some of which can be verified against other data sources. Examples include using web scraping to estimate university spin-offs and start-ups in the UK or the number of accelerators and incubators in the UK. The experiments noted problems with estimating university spin-offs and start-ups due to the proprietary nature of some of this data (and the investment of one source in methods to block web-scraping). In respect to accelerators and incubators, web-scraping only identified approximately half of known incubators and accelerators. The most useful experiments concerned producing data for

which there were no other data sources, such as the number of firms in the UK active in virtual reality technology.

The STARPIN project is using web-scraping to measure two types of public sector innovation: the use of four methods of waste collection and three home healthcare services. No results are yet available, but this project is essentially measuring technology adoption, which may or may not be an innovation for the targeted agencies.

6 National research on co-creation

National experts from six countries participating in WP2 (France, Hungary, the Netherlands, Norway, Spain, and the UK) searched for national sources of data on the use of co-creation. Other than what has already been cited above, no additional data sources were found for the UK. To date, Hungary has not found any studies to report, although data for Hungary could be available in future updates of this report.

6.1 France

Three studies are partly relevant to co-creation in French public services: (i) the Marianne Barometer, (ii) the Complexity Barometer, and (iii) the Public Services Barometer.

The Marianne Barometer

Since 2009, French public administration entities have been surveyed annually on the following five dimensions that measure the relationship between public administration entities and the users of their services: 1) ability to provide information responding to users' needs, 2) welcoming and careful reception of service users, 3) responses to information requests within defined time limits (15 working days for mailed requests, 5 working days for email requests), 4) listening to users in order to improve service provision, and 5) provision of public services while taking care of employees.[3] Although none of these dimensions specifically cover co-creation, they are relevant to obtaining data on user needs that could potentially be used to improve services. These five dimensions are decomposed into 12 "commitments", which were updated in September 2016. In particular, the following new commitments are relevant to assessing user needs:

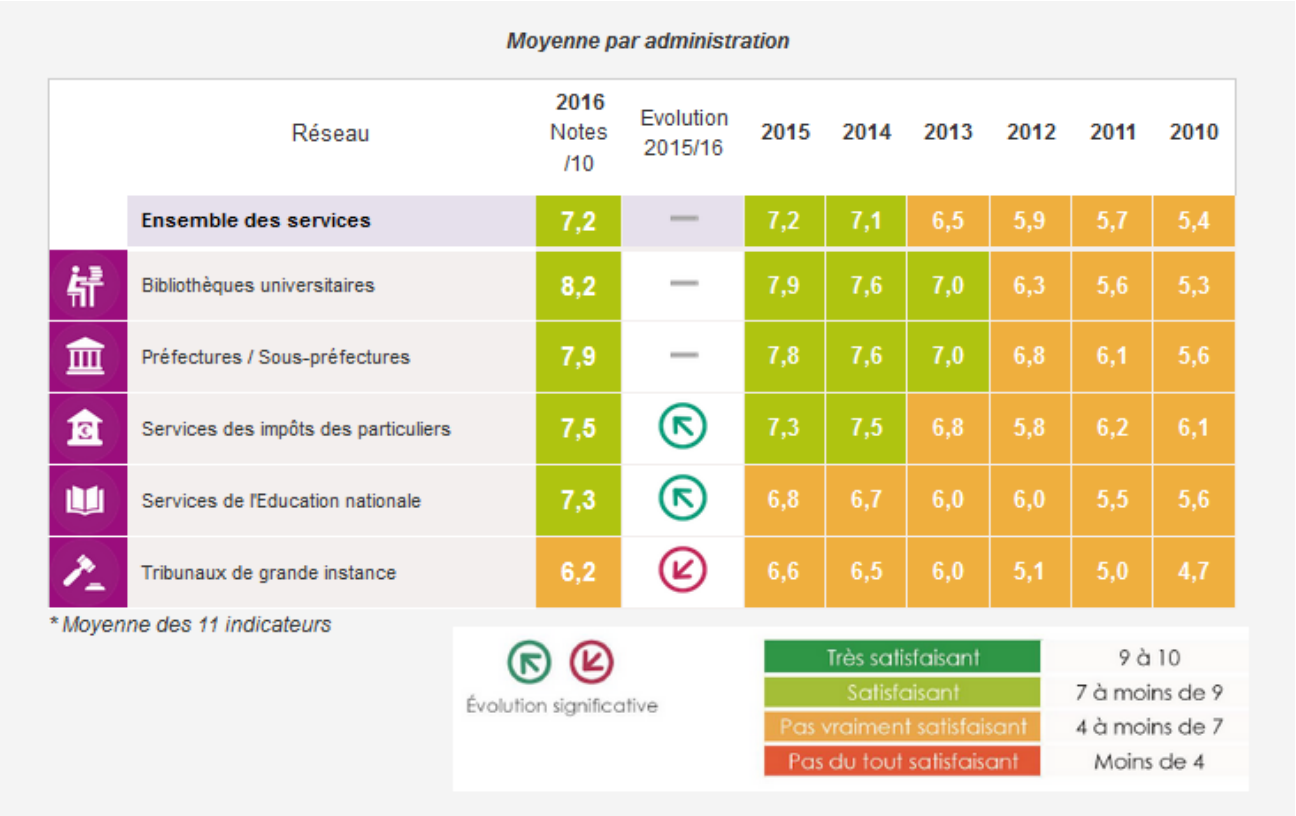
1. "We use your remarks and suggestions to improve our services".
2. "We regularly evaluate your satisfaction and we communicate on the results of these evaluations".
3. "We train our employees and provide them with the appropriate tools to allow them to assist users to follow procedures".
4. "We evaluate our practices, we involve our employees and we take their feedback into account to improve service quality".

Administrations that score well in the annual evaluation receive a "Marianne label" for three years. The evaluation is carried out annually by the French Standardization Association (AFNOR).

[3] http://www.modernisation.gouv.fr/documentation/referentiels/le-referentiel-marianne-nouvelle-version.

In theory, each public administration has received a score since 2009, although only aggregates are communicated to the public. Post 2016 results are not yet available. Aggregate results for five types of administrative agencies (university libraries, prefectures and sub-prefectures, tax services for individuals, national education, and High Courts) are given in Figure 2.

Figure 2: Average marks per type of public administration[4]



The Complexity Barometer

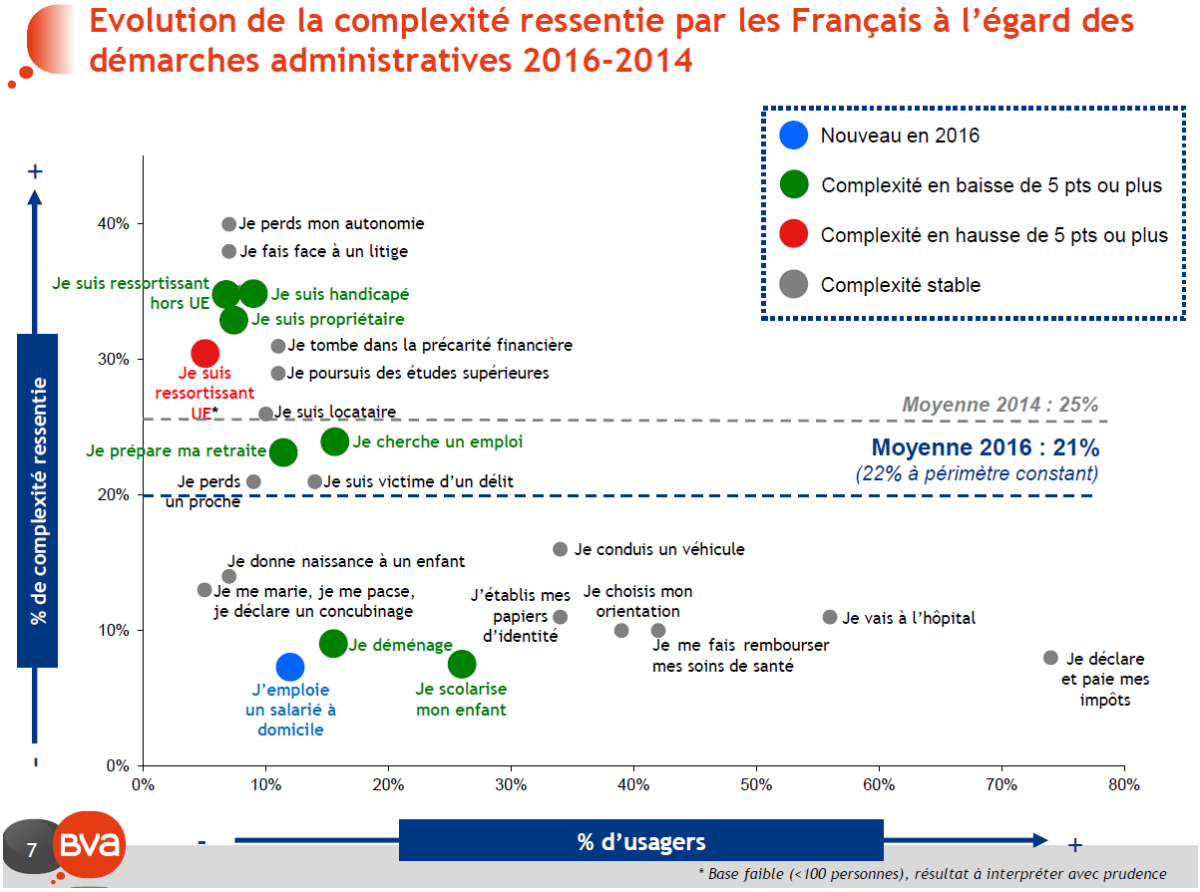
This barometer is based on telephone surveys conducted by private survey agencies (BVA, Kantar) at the request of the Inter-ministry Direction for Public Transformation (DITP). Depending on the survey, the population under study can be companies or individuals. There is no stated periodicity, but in practice, the surveys have been conducted every two years since 2008. The objective is to quantify business and citizen perceptions of the complexity of administrative processes. The results can be used to identify overly complex processes and inspire innovations to reduce their complexity. In this respect, they are surveys to measure citizen or business satisfaction with government services. Changes in the perceived complexity of services are also identified.

The surveys focus on life or business events rather than on specific administrative steps or processes. Examples for individuals include facing court action, victim of a crime, going to a hospital, obtaining

[4] Data Source: http://www.modernisation.gouv.fr/la-qualite-des-services-publics-sameliore/en-fixant-des-referentiels/barometre-2016-de-la-qualite-de-laccueil-dans-les-services-de-letat-la-progression-se-confirme.

identity papers, giving birth, preparing for retirement and obtaining reimbursement for health costs. Examples for businesses include protecting a trademark, recruiting new staff, legal procedures, paying staff, and paying social security. Figure 3 illustrates citizen's perception of administrative complexity for 24 life events in 2014-16,[5] and Figure 4 provides similar information in 2017 for companies for 18 business events.[6]

Figure 3: French Citizen's Perception of Administrative Complexity for Life Events in 2014-16



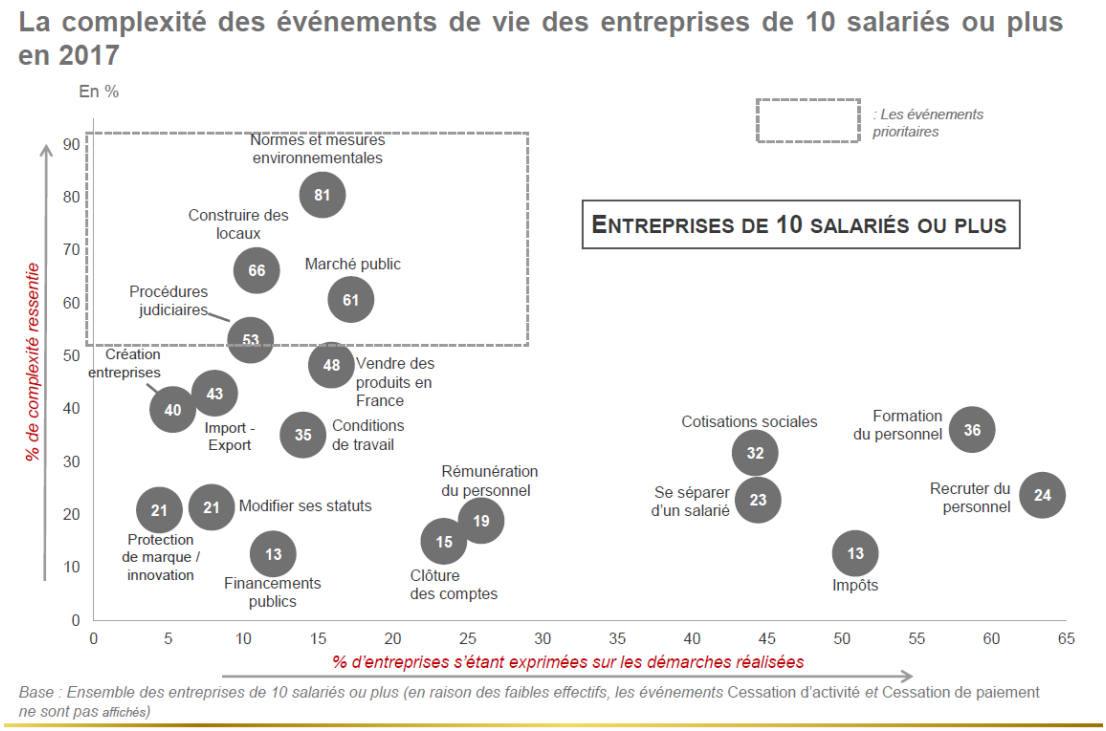
A similar survey on the perceptions of civil servants in public administration of the complexity of administrative processes was added in 2018. As for the surveys of individuals and companies, the survey focuses on life events (getting maternity/ paternity leave, getting promoted or changing responsibilities and functions). Results are provided in Figure 5.[7]

[5] Data Source: http://www.modernisation.gouv.fr/documentation/etudes/la-complexite-administrative-vue-par-les-francais-etude-2016.

[6] Data source: http://www.modernisation.gouv.fr/documentation/etudes/demarches-administratives-baisse-de-la-complexite-ressentie-par-les-entreprises-barometre-2017.

[7] Data Source: http://www.modernisation.gouv.fr/la-qualite-des-services-publics-sameliore/par-la-consultation-et-lecoute/une-premiere-les-agents-de-la-fp-sexpriment-sur-la-complexite-des-demarches-administratives-internes.

Figure 4: Company (more than 10 employees) Perception of Administrative Complexity



KANTAR PUBLIC=

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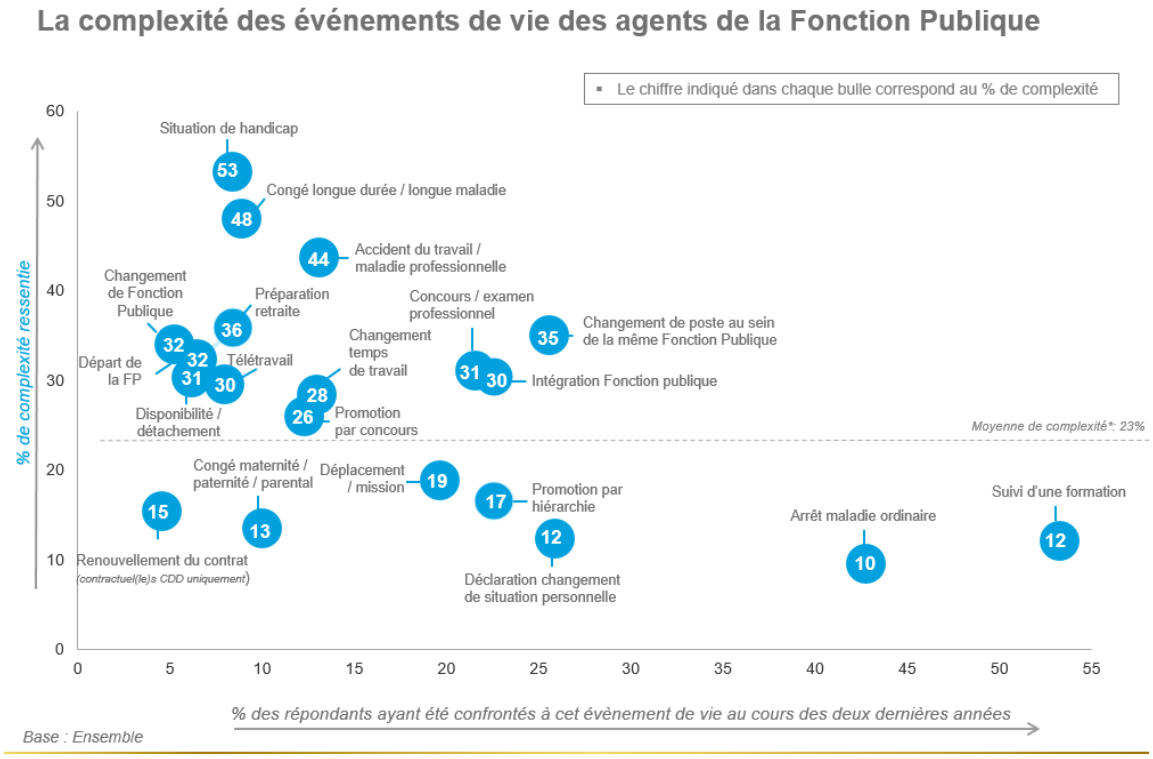
Figure 5: Perception of Administrative complexity by Employees of Public Administrations



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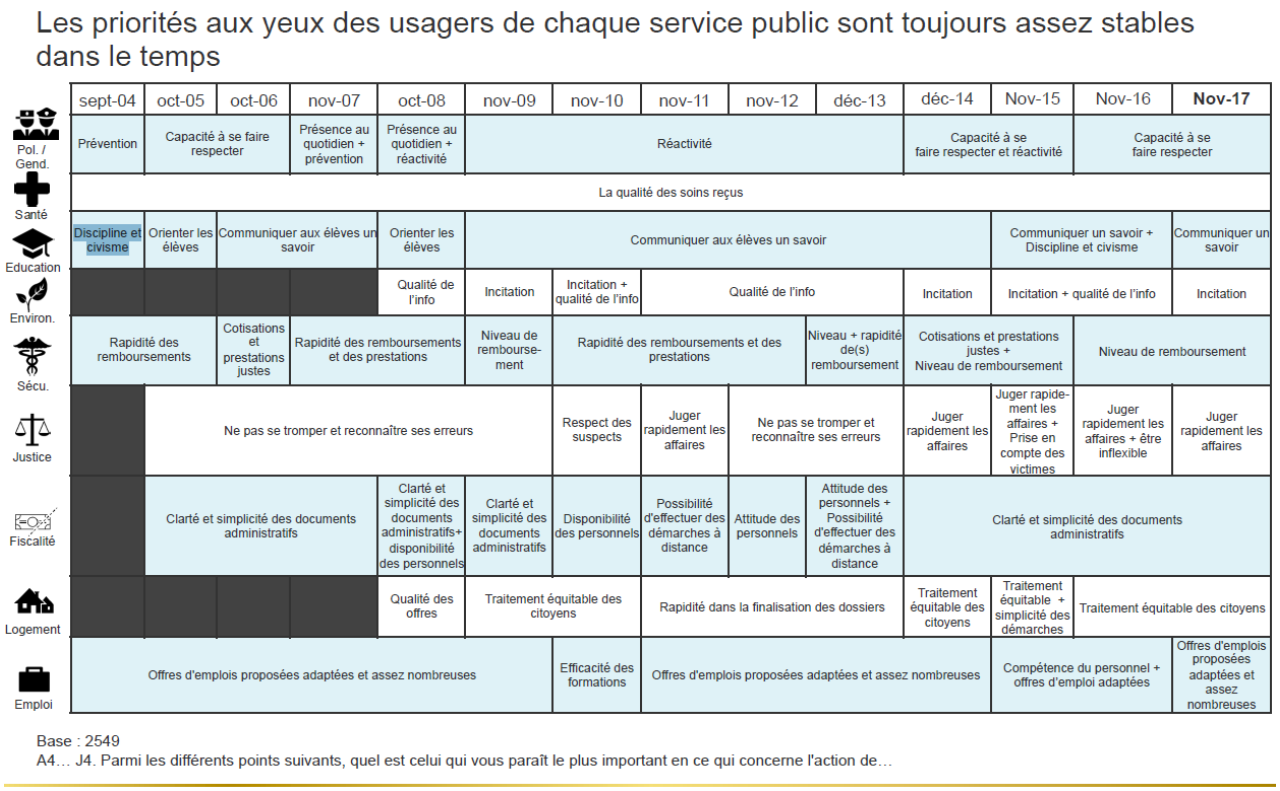
The Public Services Barometer

This is an annual survey conducted since 2004 by the non-profit Paul Delouvrier Institute. It mainly covers user satisfaction with various public administrations (education, justice, healthcare, etc) and therefore complements the complexity survey in that it can provide input into efforts to improve public services. Answers are based on a Likert scale ("very unsatisfied, somewhat unsatisfied, somewhat satisfied, very satisfied").[8]

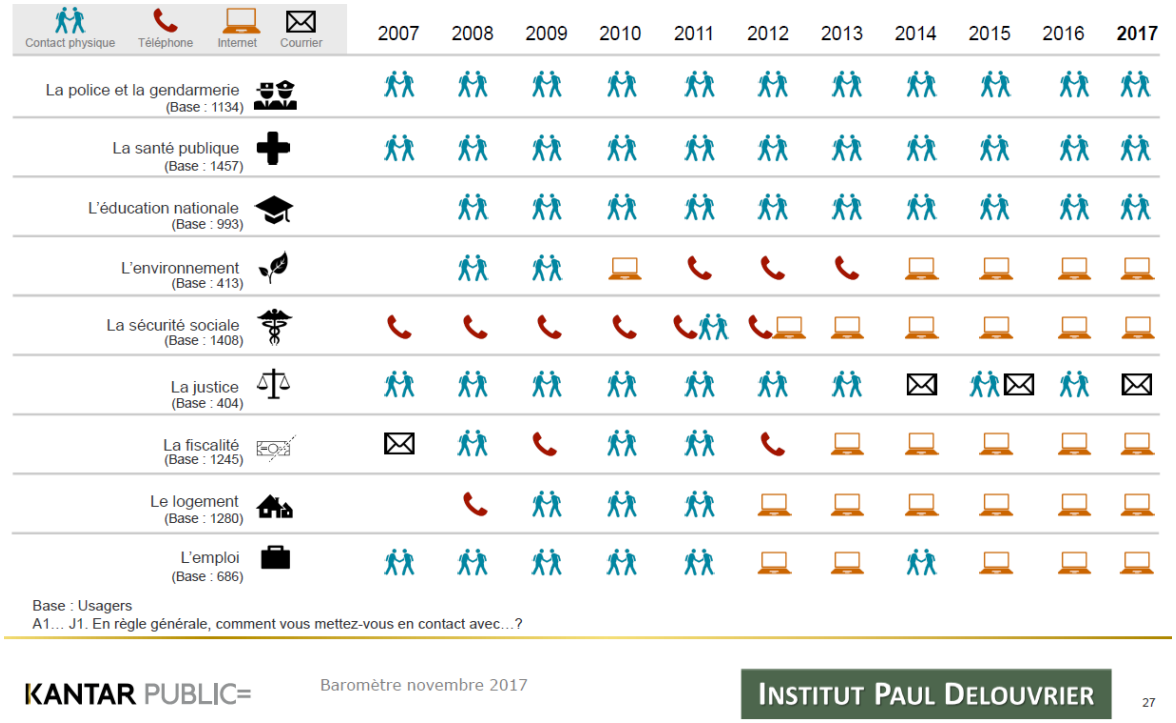
The survey also records people's priorities and preferred method of interaction with public administrations. For instance, users' top priority regarding education in 2004 was "discipline and civics" while it was "communicating knowledge" in 2017 (see Figure 6). In terms of methods of interaction with public administrations, users favoured face-to-face interactions in 2004, while the Internet is dominant in 2017, except for interactions with police, healthcare, education, and justice (see Figure 7).

Figure 6: Users' priorities by year and type of public administration



[8] Data Source: http://www.delouvrier.org/?page_id=43.

Figure 7: Users preferred method of interaction by year and type of public administration



6.2 Netherlands

Co-creation is increasingly used in the Dutch public sector, with five innovation labs providing co-creation services to government entities (MVI North Sea Energy Lab, KR8LAB, Tertium, De Bouwcampus, and Stichting ProtoSpace). Eleven reports, primarily based on case studies, were identified in an internet search (see Table 1), with applications in health, spatial planning and public administration.

Three ongoing projects use co-creation. The project Robuust directly involves residents in the design of neighbourhood-based housing, welfare and social care. Similarly, Space-S plans to involve future residents in the development of a new neighbourhood. User Centraal is a community for professionals who are involved with online government services. The objective is to increase the provision of online services to citizens.

None of the case studies or ongoing projects collect representative statistics that could be used to produce indicators on the use of collaboration and co-creation.

Table 1. Case studies on the use of co-creation in the Netherlands

Topic	Source
Cross-border learning and training in care and welfare in the digital age (includes several references to case studies).	Zorginstituut Nederland (Health Care institute of the Netherlands) https://www.rijksoverheid.nl/binaries/rijksoverheid/documenten/rapporten/2016/11/17/anders-kijken-anders-leren-anders-doen/anders-kijken-anders-leren-anders-doen.pdf.
Research on the use of co-creation in the province of North Brabant with regard to environment, water, traffic and transport and spatial planning.	Van Rijsingen, Radboud University https://theses.ubn.ru.nl/bitstream/handle/123456789/1020/Rijsingen%2C_Ilse_van_1.pdf?sequence=1.
Central government: from reorientation to large-scale transformation.	GovLab https://www2.deloitte.com/content/dam/Deloitte/nl/Documents/public-sector/deloitte-nl-ps-een-wendb-are-en-verbindende-rijksoverheid-in-2025.pdf. GovLab is the innovation branch of Deloitte Public Sector and advises the government and municipalities about innovative solutions to societal issues.
Research on the quality of government services in terms of satisfaction of citizens and entrepreneurs when in contact with government organisations.	I&O Research https://kennisopenbaarbestuur.nl/media/250505/ABZKKTO15_rapport.pdf.
e-Government from the perspective of the citizen.	Deloitte https://kennisopenbaarbestuur.nl/media/53911/deloitte-nl-whitepaper-e-overheid-gebruikersperspectief-1.pdf.
The book uses examples to provide insights into the implementation of public tasks through co-creation and network collaboration. The goal is to assist public professionals in using these tools to improve services.	http://www.davied.dds.nl/boeken/wijdeoverheid.pdf.
Conditions for co-creation in the municipality Eindhoven.	Municipality of Eindhoven https://www.eindhoven.nl/sites/default/files/2017-09/Rekenkamerrapport%20Condities%20voor%20co-creatie.pdf.
Several case studies of co-creation activities.	Beliedslab https://www.rijksoverheid.nl/documenten/publicaties/2016/02/02/beleidslab.
Co-creation in government: experiment with policy.	TNO https://publications.tno.nl/publication/102839/qToVBS/ koning-2010-co-creatie.pdf.
Role of co-creation within the service strategies	Eline Uvin, Ghent University

Table 1. Case studies on the use of co-creation in the Netherlands

Topic	Source
of a governmental organization.	https://lib.ugent.be/fulltxt/RUG01/001/788/437/ RUG01-001788437_2012_0001_AC.pdf.
Research into the functioning of co-creation within the practice of area development.	Sjoerd Oomen, Nijmegen University https://theses.ubn.ru.nl/bitstream/handle/123456789/5480/Oomen%2C_Sjoerd_1.pdf?sequence=1.

6.3 Norway

The only representative studies from Norway of the use of collaboration or co-creation to develop service innovations in the public sector are the MEPIN 2010 survey that included a question on collaboration and the 2017 Norwegian "Innovasjonsbarometer". Both are discussed above in section 5.2. Otherwise, a few interviews or case studies cover co-creation and provide a source of ideas for questions on measuring co-creation.

Teigen et al (2010) examine innovation in Norwegian municipalities, including the different actors that affect innovation activities. Innovation is divided into product/service innovation, process innovation, organisational innovation and innovation related to communication and information. One of the findings is that cooperation with other actors on public innovation is common, with 40% of the respondents reporting that cooperation with "*other municipalities*", "u*sers/consumers*" and "*the county council*" is very important for their innovation work.

Følstad (2004) reports on interviews with 16 project managers in public IT development projects. The relevance of this study is due to the questions that were used to identify different forms of user involvement. The questions asked if the project manager used the following activities:

1. User representatives in project group;
2. Reference group;
3. User meetings;
4. Consultation with users;
5. User target group analysis;
6. Mapping through interviews with users;
7. Workshop for needs-mapping;
8. Involvement of external user organizations;
9. Steering group with user representatives;
10. Information activity / marketing;
11. Pilot testing on user representatives;
12. Usability testing;
13. Evaluation with user representatives;

14. Expert evaluation;
15. Systematic training plan;
16. Evaluation / survey with web-based questionnaire;
17. User participation in the preparation of training.

Many of these questions are directly relevant to co-creation, such as questions 1 and 9 (user involvement throughout an innovation process), 3 and 4 (information gathering from users), 6 and 7 (input into service blueprinting), 11 and 12 (testing), and 13 and 16 (evaluation).

Andersen et al (2018) apply case study methods to investigate the use of co-creation for social innovations in the public sector. The study includes six Norwegian and one Danish case. The study also surveyed multiple actors involved in the seven cases. The survey charts the experience and perceptions of participants on the opportunities, challenges and barriers to co-creation and identifies different forms of co-creation. However, the survey focuses on cooperation between partners from different organizations and municipalities working on the same social innovation and not current or potential users. A relevant question for cooperation is as follows:

> For each statement, please select one of the following options: disagree completely (1), partly disagree (2), partially agree (4) or totally agree (5).
>
> 1. All case (innovation) parties/actors have the same influence on the cooperation and take all important decisions together.
> 2. We have an impact on each part of the cooperation in a sensible manner.
> 3. We have a suitable level of influence on the work.
> 4. We each work on a different part of the case, with little common practice.
> 5. We work closely together to plan the casework.

6.4 Spain

Internet searches using keywords such as “value co-creation”, “Spain”, “public sector”, “survey”, “index”, and “innovation” identified many items on the use of co-creation to transform public administration and services in the Spanish public sector, but there is very little on its measurement or surveys that produced possible indicators. Government web pages refer to co-creation practices and programs, specialized sources discuss the design and implementation of co-creation and a few publications review one or a few cases of co-creation initiatives. Antonio Sánchez (ICT head in *Aguas de Alicante* and smart cities expert), states that there is much talk about co-creation, but very little experience on its use in Spain (https://analiticapublica.es/co-creacion-servicios-publicos/).

Nonetheless, a few data sources of relevance to the use of co-creation by Spanish public administrations were identified.

The Spanish platform for public administration transformation (NovaGob: https://novagob.org/) began as an initiative of the Autonomous University of Madrid (UAM). It works as a network for connecting public administration agents from Spain and Latin-America. It includes a library of publications on subjects related to innovation and public administration (https://lab.novagob.org/publicaciones). One of their most recent publications is a big-data analysis from thousands of citizens' twitter accounts mentioning their local governments. The purpose, method and main results are described in the abstract[9]:

> "The rapid adoption of social media by public administrations deserves attention from the side of institutional information and communication. One of the points recently identified is the tone used by public sector organizations to deliver their messages, as it may encourage citizen collaboration and participation. This paper explores the tone that Spanish city councils with more than 50,000 inhabitants are using in their social media profiles. This paper is based in two research questions: (a) What is the general tone used by the city councils in their use of social media?; (b) What explanatory factors are behind the adoption of one tone or another? Studying twitter through big data techniques and statistical analysis, this study finds a positive general communicative tone. Traditional organizational, institutional and environmental factors do not seem to have a statistically significant influence over the tone. This article concludes with proposals for improvement on future research derived from the research results."

Another data source is provided by a wiki tool that allows users to upload, edit and comment on documents about public innovation. There are 300 posted documents since October 2015 that could be useful for a meta-analysis (https://novagob.org/wikigobs/). Additionally, the network awards every year a handful of outstanding initiatives and actions from public administrations. The description of all awarded initiatives is in their web portal (https://lab.novagob.org/premios-novagob-2).

Studies and case studies on collaboration or co-creation

The study *New tendencies in public sector's service*, [10] published by Novagob.lab and the University of Valencia (*Universitat Politécnica de Valencia*), is based on a survey, a focus group and a panel of experts. The survey obtained responses from public administration staffers on four topics: 1) attitude towards innovation and intra-entrepreneurship, 2) competences, 3) new tendencies, and 4) smart government and open innovation.

[9] See https://lab.novagob.org/wp-content/uploads/2018/07/articuloVillodre_Criado.pdf.

[10] See https://lab.novagob.org/wp-content/uploads/2017/05/5-2017-INnovagob-Nuevas-tendencias-en-estrategia-de-servicio-UPV-NovaGob.pdf.

The results cover the factors driving innovation processes and the development of smart government and open innovation tools, a profile of attitudes towards innovation and intra-entrepreneurship, how many organizations (and of what type) have introduced new services, how important are implemented changes, how well developed are digital competences, and what are the general and specific competences needed for new service strategies.

The questions do not specifically refer to co-creation or collaboration, but these activities could fall under new management techniques or specific competences. The questions include:

1. Do you have an intra-entrepreneur spirit? (i.e. actively promote new services inside your organization, assuming risks.)
2. Do you seek to build public value from improving processes, technology, marketing, services and networks?
3. Do you try to learn and apply innovative management techniques that replace traditional methods?
4. Have new services been introduced to your organization in the last three years?
5. What generic competences do you think are needed to develop and implement new service strategies in Horizon 2032 public administration?
6. What specific competences do you think are needed to develop and implement new service strategies in Horizon 2032 public administration?
7. What factors do you think could help to start innovation processes in public organizations?
8. What factors do you think can determine the development of tools for smart governance and open innovation in public organizations?

Sanchez (2017) and Pastor (2017) provide case studies on the use of co-innovation in the Spanish public sector. Pastor (2017) examines the use of co-creation in personal assistance services for people with severe disabilities in Madrid and discusses the challenges for implementing co-creation in the public sector. The study refers to data on the conditions and level of satisfaction of people in the program, obtained from the organization in charge of the program (Independent Life Office (*Oficina de Vida Independiente*).

Cossío-Silva et al (2015) apply Yi and Gong's (2013) scale for client behavior on value co-creation to Spain. The authors use a sample of 374 users of personal care services. Although the study is developed using private business data, the method could work as a starting point for developing measures for co-creation in public sector organizations.

6.5 WP 9 of Co-Val

WP 9 of the Co-Val project on sustainable policy impacts is a future source of comparable indicators on the use of co-creation. The WP will collect data on the actions taken by national and municipal governments to implement co-creation policies, using 28 country experts and national and local policy documents. Dashboards will be constructed for member states and for about 10 major municipalities. The project should collect data on the involvement of users in the creation and design of services, the acquisition of relevant skills by civil servants, the acquisition of skills from private companies, and the use of KPIs for user co-creation.

7 Conclusions

This report has three goals: 1) identify existing data sources that can be used to create indicators for the use of collaboration and co-creation by European public sector entities, 2) identify questions that can be used to collect such data, and 3) identify data collection needs for the WP2 survey.

The research for this report has failed to find any recent and comparable data for multiple European countries on the use of co-creation methods by public sector organisations to innovate. The best available data are from the 2010 MEPIN survey for five Scandinavian countries and the 2010 Innobarometer survey for 27 EU member states, but both of these surveys only collect data on the importance to innovation of information obtained from citizens or users. This information may not have been collected as part of a co-creation innovation project, for instance if it was derived from a post-implementation satisfaction survey. Given the rapid increase in interest in co-creation since 2010, these two surveys are also seriously out of date.

The available data for individual countries also focus on users as an information source. Most of this data is obtained through case studies and consequently is not suitable for constructing indicators. An exception is the 2017 survey of public sector organisations in Denmark and Norway.

Existing research is more useful for identifying questions that can be used in a survey to collect data on the use of co-creation, although many of the examples focus on the involvement of users without specifying how users were involved, the intensity of involvement, or the stage of the innovation process where users were involved. An exception is the interview study by Folstad (2004), which included questions on the stage of user involvement in innovation.

The research has been considerably more useful for identifying data collection ‘gaps’ that should be met through a new survey, though this is largely because the gap is on a “gorges du Verdun” scale. The main requirements for a survey are to identify 1) the prevalence of users in different stages of the innovation development process, 2) the intensity with which users are involved in innovation, 3) the skills, competences and strategies that managers use to innovate, including those that are not linked to co-innovation, the benefits of involving users in innovation development, and collaboration with different partners, 4) obstacles to innovation, including those linked to co-creation, and 5) the outcomes of innovation.

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