



Can we measure public sector innovation? A literature review

LIPSE Project paper

WP 6 Social innovation indicators

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1-9-2013

Version 0.1, preliminary draft, to be presented at EGPA 2013 conference

LIPSE or "Learning from Innovation in Public Sector Environments" is a research consortium of 12 institutions in 11 countries, studying the drivers and barriers of successful social innovation in the public sector. It is funded by the 7th Framework Programme of the European Union (N. 320090).

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Introduction

A ghost is making rounds in European capitals – a slow realization that austerity may perhaps not be the answer to European crisis. (Wolf 2013) Arguably more than anything else, this realization has made public sector innovation¹ seem like a panacea to European ills. This is understandable in times when public sector's fiscal capabilities are constrained (either by ideology, high levels of debt and borrowing costs, European agreements, or, as is mostly the case, by all of the above) and private sector growth is not enough to haul European economies out of the slow-burning recession. Public sector innovation promises to deliver more with less. However, scholarly literature on public sector innovation has been tormented since its inception in management and organization theory writings few decades ago by recurring bangs of consciousness: is there such a thing as public sector innovation to begin with?² If we cannot delineate and define public sector innovation then the concept would denote any good idea or positive change in the public sector organizations as innovations and “will lose credibility because it has no meaning.” (Lynn 1997, 98) As Pollitt put it, “the sad truth is that many of today's management seminars on innovation are filled with a promiscuous litter of buzz words and woolly concepts whilst being almost entirely bereft of any specific, empirically grounded propositions.” (Pollitt 2011) Thus, it is not surprising that recent years have brought increasing interest in conceptualizing and measuring public sector innovation in ways that are both scholarly sound and useful in policy making and evaluation contexts. That is not an easy task, as Mintzberg has succinctly summarized problems with measuring public sector performance in general: “Many activities are in the public sector precisely because of measurement problem: If everything was crystal clear and every benefit so easily attributable, those activities would have been in the private sector long ago.” (1996)

The aim of this article is to give an overview of scholarly state-of-the-art in terms of both conceptualizing and measuring public sector innovations. In order to do so, the article consists of following sections: first, we give a brief overview of prevailing attempts to conceptualize (define) public sector innovation and contrast it with older literature (Tocqueville, Weber, Schumpeter); second, we briefly summarize private sector innovation performance measurements and indicators; third, we discuss state of the art in discussion of measuring public sector performance in general; fourth, we look at recent discussions of public sector productivity, what and how can be measured; fifth, we discuss recent projects and literature on measuring public sector innovation; and finally we conclude by drawing these various discussions together by detailing what and how can we measure in public sector innovation with good scholarly conscious.

1. Defining public sector innovation

By and large we can divide scholarly efforts to delineate and conceptualize public sector innovation into three periods: 1) *Schumpeterian period*: innovations and public sector are related to a larger theory of how evolutionary change takes place in societies, mainly associated with Schumpeter (1912&1939); 2) *organizational theory period*: innovations in the public sector are similar to innovations in private companies, mostly associated with early organizational theory and with Wilson (1989); 3) *autochthonous theory period* is the most recent trend to disassociate public and private sector innovations.

¹ In the current draft version, we use public sector innovation to include also social innovation, that is, we do not delineate between these concepts and discuss social innovation only tentatively; this will change in later drafts.

² Lynn (1997) gives an overview of early literature on the topic.

Schumpeterian period is characterized by Schumpeter's theory of innovation which in fact is an application in economics and business of his wider theory of how evolutionary change takes place in societies. Alas, Schumpeter never really developed his wider theory of social change (see also Andersen 2009). In his 1939 *Business Cycles*, Schumpeter states, in a footnote, that he "believes, although he cannot stay to show, that theory [of innovation] here expounded is but a special case, adapted to the economic sphere, of a much larger theory which applies to change in all spheres of social life, science and art included." (1939, 97) His 1912 *Theorie der wirtschaftlichen Entwicklung / The Theory of Economic Development*³ assumes apparently a similar theory, without going into greater details either. We can deduce that what Schumpeter meant by this larger theory of change in social life is that change is driven by entrepreneurial, creative persons, or "new men" as he called them in 1939, that look for "new combinations", that is innovative solutions and thus bring forth evolutionary changes, entirely new ways of doing things (in business, politics, art, science, etc) that will spread, in some cases more than others, throughout the given sphere of life.⁴ Some of these changes will change value systems and disrupt incumbent hierarchies.⁵

In economic sphere, such individuals drive innovations and, thus, economic growth. The role of the public sector in entrepreneurial innovation is twofold: first, public sector can take on the role of the entrepreneur (in fact, Schumpeter argues that in socialism, as there is no private ownership, the state will be the sole innovator; 1912, 173); second, innovations in businesses can also be "called forth" by governments (1939, 84).

In sum, what we can take from Schumpeter is that since early theories of innovation, public sector has had dual character vis-à-vis innovation: it itself can be changed by innovators and the state can play a crucial role for business innovations as well (either by directly leading or indirectly supporting entrepreneurial activity). As we will see below, this foreshadows rather closely emerging conceptual dichotomy between innovations *in* public sector and innovations *through* public sector. (European Commission 2013; EU Expert Group on Public Sector Innovation 2013)

Organizational theory period. Research explicitly dealing with innovation in the public sector goes back at least to 1960s; however its inception seems somewhat accidental in nature. Researchers in organization theory dealing with innovation and how organizational structure supports creative work and novel ideas often did not differentiate between public and private sector organizations (this non-differentiation goes, in fact, back to Taylor's *Principles of Scientific Management* as well as to Weber's bureaucracy as an ideal type for both public and private organizations). For instance, Thompson talks explicitly about business and government organizations and their "capacity to innovate" (1965, 1), and defines innovation as the "generation, acceptance, and implementation of new ideas, processes, products or services. Innovation therefore implies the capacity to change or adapt." (1965, 2; see also, e.g., Mohr 1969) Much of the subsequent management and organization theory literature

³ We use here the German original first edition as in later editions (that served as the basis for English translation as well), these discussions were cut by Schumpeter; so, e.g., the second chapter of the original edition runs to almost 100 pages, the English translations carries only half as many. In this chapter, Schumpeter discusses his theory of innovation.

⁴ "Das erste Moment, die Freude am Neugestalten, am Schaffen neuer Formen der wirtschaftlichen Dinge ruht auf ganz denselben Grundlagen wie das schöpferische Tun des Künstlers, des Denkers oder des Staatsmannes." (1912, 142)

⁵ "Sie werden Neues schaffen und Altes zerstören, kühne Pläne irgendwelcher Art konzipieren und durchführen, deren Originalität aller Erfassung zu spotten scheint, ihre Mitbürger ihrer Herrschaft unterwerfen, vielleicht die nationale Politik und Organisation beeinflussen, den 'natürlichen' Gang der Wirtschaft durch gesetzliche und ungesetzliche Mittel und jedenfalls anders als durch 'Tausch' abändern uws." (1912, 157)

dealing with innovation moves effortlessly from private to public sector and back, and deals in fact mostly with the paradox of managers calling for innovative ideas that end up meeting resistance in implementation often from the same managers or organizational structures (Lynn 1997). This strand of research dealt mostly with diversity of tasks and incentives in an organization (Becker and Whisler 1967 is a good overview). One of the key figures in this tradition is James Q. Wilson, who's definition of (public sector) organizational innovation remained largely the same from 1960s to 1980s: "real innovations are those that alter core tasks; most changes add to or alter peripheral tasks" (1989, 225) Wilson, without referring to Schumpeter, understood these alternations in core tasks to be evolutionary in nature and in impact: "Government agencies change all the time, but the most common changes are additions; new program is added on to existing tasks without changing the core tasks or altering the organizational culture". (Ibid.) Thus, there is a rather extensive literature that emerged from organization theory that incidentally or purposefully deals with public sector innovation and where the latter is defined more or less similarly through 1960s to 1990s. This literature uses more or less varied Schumpeterian notion of innovation, but it does not differentiate almost at all between private and public sectors and thus innovations in any organization can be defined as significant and enduring changes in core tasks. This way innovation should be different from incremental changes in organizations (public or private) and in fact are similar to (technological) breakthroughs familiar from the private sector evolutionary literature (see, e.g., Lynn 1997 who explicitly uses the concept of breakthrough).⁶

Autochthonous theory period. In 2000s, literature dealing with public sector innovation tries to move away both from private sector Schumpeterian approaches emphasizing novelty in action and from organizational level changes towards innovation genuinely attributable to public sector and towards discussing innovations in public services and governance. (See, e.g., Hartley 2005; Moore and Hartley 2008; also Verhoest et al 2006; Pollitt 2011) However, while there is a distinct attempt to discuss public sector phenomena (i.e. decentralization of agencies or regions) and move away from the private sector categorization and concepts (such as product, service etc innovations, life cycles and trajectories), there is hardly any substantial change in terms of conceptually differentiating public sector innovations from the private sector ones. The main tenets are still changes that are new to the organization and that are large and durable enough (e.g., Hartley 2005, 27; Moore and Hartley 2008, 5). Hartley, for instance, delivers a useful discussion of the difference between public sector innovations in traditional, new public management and network-based paradigms of public administration (2005, 28-30). Yet, her conceptual framework is hardly different from Wilson. Similarly to organization theory literature, also the most recent literature on public sector innovation sees in the end innovations in public sector as something different from incremental improvements and that can also fail and not lead to better public service. Thus, e-voting would constitute for most public sector researchers a real innovation and yet some would argue that this innovation did not really bring any improvement or at least that the jury is still out. However, in most cases the line between innovation or not, improvement or not, is not only tenuous at best, often it seems plain arbitrary. Moore and Hartley 2008, for instance, use as examples

⁶ Ironically, while this is indeed important for the early Schumpeterian literature, from 1970s and 1980s onwards, evolutionary economics develops complex theoretical frameworks that show how routine-based individual skills and company level behaviour leads towards a higher level of complexity and helps to explain how Schumpeterian creative destruction shapes economies and competitive environments. (See Dosi 1984; Nelson and Winter 1982) This leads to learning economies and national systems of innovation approach that seek to explain innovations not only as breakthroughs but indeed as incremental everyday changes in company routines, learning, and various levels of interactions (e.g., user-producer). (See Freeman 1982 and 1987; Lundvall 1992) Thus, the evolutionary economics dealing with private sector innovations moves during 1980s almost exactly in the opposite direction as the emerging public sector literature.

contracting out and private public partnerships, in other words, public sector innovation is another term for NPM-style reform practices.⁷

In Table 1 we summarize this most recent period in defining public sector innovations.

Table 1. Public sector innovation definitions – scope and substance

Source	Definition	Scope
Lynn (1997)	<i>“Innovation [in government] is properly defined as an original, disruptive and fundamental transformation of an organization’s core tasks. Innovation changes deep structures and changes them permanently.”</i>	The definition echoes Wilson’s 1989 use of the concept and is aimed at differentiating any change in the public sector from deeper transformations that can be called innovations.
Moore et al. (1997)	<i>“Changes worth recognizing as innovation should be...new to the organisation, be large enough and durable enough to appreciably affect the operations or character of the organisation”</i>	General definition involving novelty and change in relation to the organisation and its overall operations. This means widespread improvements in both governance and service performance to increase public value (Moore, 1995).
Newman et al. (2001)	<i>PSI can be constituted as a “discontinuous or step change, as something which was completely new to a particular local authority (though which may have previously been applied elsewhere), and a change which had already been implemented rather than just an aspiration or planned initiative.”</i>	Change-based definition that accentuates also incremental innovation and puts the focus on implementation.
Green et al. (2001)	<i>“/.../ doing something new i.e. introducing a new practice or process, creating a new product (good or service), or adopting a new pattern of intra- or inter-organisational relationships (including the delivery of goods and services).”</i>	Emphasises that simple organisational change does not equate innovation. Definition originally concentrates on service innovation.
Mulgan and Albury (2003)	<i>“New ideas that work /.../ successful innovation is the creation and implementation of new processes, products, services and methods of delivery which result in significant improvements in outcomes efficiency, effectiveness or quality”</i>	Emphasis put on implementation and successful innovations that have a significant impact in the public sector (this implies radical change).

⁷ See Drechsler 2005 on the role academic and policy talk fashion plays in such relabeling practices.

Hartley (2005)	The definitions starts from the fact that innovation is not always <i>“a physical artefact at all, but a change in the relationships between service providers and their users./.. / Consequently the public sector innovations “consider innovations, particular radical or complex ones, to be multidimensional, specifying the dimensions (and the size of the innovation in those dimensions) in the interests of systematic comparison.”</i>	Takes note from the definition of Moore (see 1995; 1997) and extends the public value oriented approach to include different forms of innovation: product, service, process, position, strategic, governance and rhetorical innovations. Also diffusion and dissemination – spreading good practice and adopting/adapting existing innovations – is included as a significant part of public innovation.
Osborne and Brown (2005; 2013)	<i>“The introduction of newness into a system usually, but not always, in a relative terms and by the application (and occasionally invention) of a new idea. This produces a process of transformation that brings about a discontinuity in terms of the subject itself (such as a product or service) and/or its environment (such as an organisation, market or a community).”</i>	Emphasises ‘newness’ and discontinuity of change in the public sector.
Albury (2005)	<i>Public sector innovation is “the creation and implementation of new processes, products, services and methods of delivery which result in significant improvements in outcomes efficiency, effectiveness or quality.”</i>	Emphasises implementation, significant improvement and creativity.
Koch and Hauknes (2005)	<i>“Innovation is a social entity’s implementation and performance of a new specific form or repertoire of social action that is implemented deliberately by the entity in the context of the objectives and functionalities of the entity’s activities.”</i>	Functional distinction of public sector innovation that is shaped within the context and environment of the agent is activity/agent specific. Deliberate action is emphasized.
Halvorsen et al.(2005)	<i>Public sector innovation as “change in behaviour”.</i>	Very broad definition concentrated on change.
Mulgan (2007)	<i>“The simplest definition is that public sector innovation is about new ideas that work at creating public value. The ideas have to be at least in part new (rather than improvements); they have to be taken up (rather than just being good ideas); and they have to be useful.”</i>	The definition makes an additional requirement implementation – of being ‘taken up’ –, meaning that also in terms of measurement some time lap before change and impact is required.
European Commission 2013; EU Expert Group on Public Sector Innovation 2013	<i>“We therefore structure this inventory along two lines: initiatives that would be readily considered innovations inside the public administrations, such as the shift to ICT tools and HR management (innovation IN); and initiatives that foster innovation elsewhere in society, such as the public procurement of innovation, the unitary</i>	This definition tries to separate different modalities in public sector innovations rather define in detail what innovations are. Differentiating modalities is methodologically helpful.

	<p><i>patent or support to social entrepreneurship (innovation THROUGH).”</i></p>	
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Source: compiled by the authors.

However, in contrast to earlier periods of public sector innovation concepts, and with the exception of Lynn (1997; see also Lynn 2013), the current period of scholarship pays much less attention to evolutionary character of changes described as innovations. This is not to say that there is not an acute awareness that one has to differentiate ordinary change from innovation. For instance, Osborne and Brown 2013 argue, “the management of innovation is an entirely different task from the management of developmental change” (2013, 3); Lynn similarly concurs that all non-transformative change is “‘innovation lite’, which is indistinguishable from ordinary change.” (2013, 32) Yet, how this transformative change in fact works in the public sector – and differs from typical private sector dynamics – remains almost always unpacked. Even the most advanced concepts of public sector innovation do not address in detail how selection mechanisms and other processes take place that would enable us to distinguish innovations from ordinary changes. What makes one reform or new service an innovation, and the other not? Often there seem to be normative connotations involved in distinguishing innovation from change: as innovation is good, a successful reform must be innovative.

On the other hand, *evolutionary* dynamics dominate private sector innovation literature, evident in such concepts as backward and forward linkages, increasing returns to scale, first mover advantage, winner-takes-all markets, imperfect competition, externalities, etc, (most present already in Schumpeter, especially in 1939 *Business Cycles*). In fact, innovation research in the private sector is all about evolutionary change: how and why certain products, services, technologies, technology systems, but also organizational forms and institutional frameworks become dominant over others that in turn become obsolete or vanish altogether. (Nelson and Winter 1982, Perez 2002, etc) The role technology, particularly large-scale shifts following technological revolutions that lead to whole new paradigms, is difficult to underestimate here.

However, such evolutionary practices and processes are simply much less evident or even lacking in the public sector. Moreover, many of these processes would be also not desirable in the context of public organizations, such as monopoly rents garnered by first movers, or undercutting the same first movers by imitation. There is hardly any competition within the public sector for such evolutionary processes to take place. The way innovations diffuse in the market environment, via imperfect competition and imitation, is hardly a way for public sector innovations to emerge and to diffuse. Furthermore, in business innovations, there are lot of failures at innovations and lot of losses through innovations or imitations by competitors. Again, these phenomena seem to no be present in the public sector or present themselves in a different form.

That is not to say there is no evolutionary change in the public sector. As we have seen above, almost all literature on public sector innovation *assumes* there is evolutionary change, but conceptualizing the evolutionary changes in public sector seems to have been lost in private sector terminology. The key lesson from previous literature, accordingly, seems to be that we should not attempt to look for similar processes to take place within public sector; rather we should try to focus on evolutionary processes within public sector that originate from logics of public sector and pertain to such phenomena as power, legitimacy, trust, etc.

This is arguable exactly the topic of perhaps the earliest ‘discussion’ on public sector innovation, namely between Tocqueville and Weber on the state level public administrations in the US.⁸ Tocqueville’s analysis, and admiration, of state level administration is famous, Weber’s counterarguments are much more scattered and less well-known (Tocqueville’s was published in 1835 and 1840;⁹ Weber remarks can be found in *Wirtschaft und Gesellschaft* from 1922 and elsewhere).¹⁰

Tocqueville’s main question in looking at US state and especially township level administration was how can diverse townships in New England, without central administration, still provide relatively uniform public services, especially under an administrative system where most public functions are fulfilled by elected officials. (1876, 92) He explained this with judicial oversight of administrations, and called both – decentralized administration and judicial oversight – innovations (ibid.)¹¹ In Tocqueville’s view, decentralized administration with elected officials and judicial oversight work better than centralized administrations (which, he argues, was an innovation of French revolution; 121): centralized administrations have more resources, are good at regulating business, maintaining social order and security but also keep society equally from improvement and decline (113); centralized administrations are good at mastering resources to combat problems but they are poor at rejuvenating what might be called socio-political resources for change (109).

When we jump two thirds of a century further, we can see that all the ills of centralized administration described by Tocqueville become positives in Weber’s view: in order to keep social order, that is to retain authority and society functioning, centralized bureaucracy is the “technically” better instrument over elected officials. (2002, **) Elected officials and other “‘schöpferische’ Betätigung der Beamten” leads rather to unpredictability and politically corrupt system.

While Tocqueville and Weber had different normative goals – former describing the benefits of active civic life, the latter describing benefits of well-functioning and predictable state apparatus – both discuss eventually how authority, to use Weber’s term, is maintained in society with competitive interests via institutional and administrative innovations (although Weber does not use the term). We can paraphrase Weber: modern state is defined by its authority to use violence to uphold the very same authority. Above all, Tocqueville and Weber show how such innovations lead to differing socio-political relationships and networks, institutional and organizational structures and cultures, in other words: how these innovations drive *different evolutionary change*. But both also show why evolutionary processes in public sector are *punctured* by political, legal, institutional and administrative constraints. (See also Karo and Kattel 2013) In fact, these very constraints are part of these evolutionary processes, forming simultaneously internal factors that are changed and external factors limiting changes. *Constraints are intrinsic to public sector*. Thus, to use Tocqueville’s

⁸ For a longer historical discussion of the concept of innovation, see Godin 2008&2012.

⁹ We refer here to 1848 French edition, available via Project Gutenberg and to 1876 English translation.

¹⁰ In Weber’s case, we use 2002 German edition. For a comparative discussion of Tocqueville’s and Weber’s discussions of America, see Kalberg 1997.

¹¹ “C’est ce qui ne se découvre pas au premier coup d’œil. Les gouvernants regardent comme une première concession de rendre les fonctions électives, et comme une seconde concession de soumettre le magistrat élu aux arrêts des juges. Ils redoutent également ces deux innovations” / “The communities therefore in which the secondary functionaries of the government are elected are perforce obliged to make great use of judicial penalties as a means of administration. This is not evident at first sight; for those in power are apt to look upon the institution of elective functionaries as one concession, and the subjection of the elected magistrate to the judges of the land as another. They are equally averse to both these innovations”.

example, judicial oversight in small townships acted as a constraint on elected officials, yet this same constraint led to better service for the citizens. Weber, on the other hand, writing two thirds of a century later, argued that modern societies have become increasingly more complex and thus require centralized administrations that can act simultaneously as constraints and enablers.

Consequently, following Tocqueville and Weber, we can argue that *instead* of competition as driver and diffuser of evolutionary processes as is the case in private sector, *intrinsic public sector features* act simultaneously as *constraints and enablers* and engender *punctured evolutionary processes* as consequence of public sector innovations. Notice that in both cases the innovations influence organizational level capacities, institutional interactions and, eventually, political authority of a state. Their recommendation, as it were, would be to look at changes in public sector that lead to 1) changes in constraints and enablers, that relate directly to how authority is obtained/retained and 2) engender clearly discernible evolutionary trajectories in their respective ecosystem; such changes could be termed public sector innovations.

It can be argued that a recently emerging literature on social innovation (see Bekkers et al 2013 for an overview) tries fill the gap in public sector innovation literature by looking at values and social relevance and thus moves the discussions towards issues of authority, trust, etc. The concept of social innovation can be construed wholly as value-based: broadly put as democratic commitment to social change (Andersen and Bilfeldt, 2013). This can be described as change towards meeting social needs. However, the concept is also widely applied to the private sector: the effect of corporate social responsibility, business ethics, social businesses and not to mention the development of the civil society (Osburg, 2013; Schöning, 2013). Consequently, it is sometimes used as an opposite to what we perceive as the traditional public sector – the inclusion of market-reliant or philanthropic solutions that are found to be more inclusive and ‘better’ (Moulaert et al., 2013). First and foremost, the engagement of citizens is emphasized in social innovation. Nevertheless, when the positive change in responding to social needs is taken as primary, social innovation can be both bottom-up and top-down, not to mention output or process related, legislative or cultural. The important distinction is that social innovation reveals and responds (better) to social needs by creating new services or expanding equality of access to them (Martinelli, 2013). This can be done in unison with empowering users or specific social groups and thus, modifying social – and also power-relations between service users and providers. Hence, it is hard to distinguish and demarcate the extent of public sector innovation through the concept of social innovation, however, this can be accompanied into the public value based understanding of transformative change within the public sector. In other words, while conceptually social innovations are situated between private and public sector innovations – their origins can be in both sectors –, it is their perceived impact of empowering, of changing power and authority relations that makes this strand of literature interesting also conceptually. Furthermore, social innovation as a concept can legitimize more socially oriented and solidarity based political economy which also creates momentum behind public sector services (see Fraisse, 2013).

Summarizing 150 years of discussion above on conceptualizing public sector innovations and innovations generally, we can, first, conceptualize the relationships within the whole innovation arena in one figure as a taxonomy (Figure 1) and, second, draw following conclusions:

A From the oldest literature discussing public sector innovations (Tocqueville, Weber):

- 1) Public sector innovations are in the most abstract sense related to public authority;
- 2) Innovations lead to evolutionary changes in constraints and enablers that are intrinsic to public sector (rules, relationships, institutions);

B From recent public sector innovation literature:

- 3) These evolutionary processes use different modalities (innovations within and through public sector), agency (public sector proactively initiates changes or reacts to technological, environmental, etc, changes), and morphology (from incremental to discontinuous changes);
- 4) Literature on public sector innovations rarely deals with authority (and related phenomena such as legitimacy, trust, etc.) but rather with relatively specific features of these changes, e.g. with specific modalities (within public sector organizations), agency (reactions to external stimuli such as technology, politics, social challenges) and morphology (incremental changes); most of these changes are in fact not evolutionary or their impact remains difficult to discern;
- 5) Innovation is too often defined from a normative viewpoint (as something leading to significant improvement in public service delivery) rather than a process that explains how profound changes take place in public sector.
- 6) In defining innovation, the literature has focused mostly on organizational or policy levels, but in doing so it has neglected the wider, public-sector-level, constraints and enablers. What is argued here is that there is a need for a systemic perspective that goes beyond single instruments or decisions and that would offer a framework against which the changes in core routines on organizational or policy levels can be measured against.
- 7) Accordingly, disproportionately large areas of public sector activity in relations to innovations are under-researched and, we will argue below, this leads also to relatively simplistic attempts to measure public sector innovations.

Figure 1. Taxonomy of innovations, 150 years of discussion.

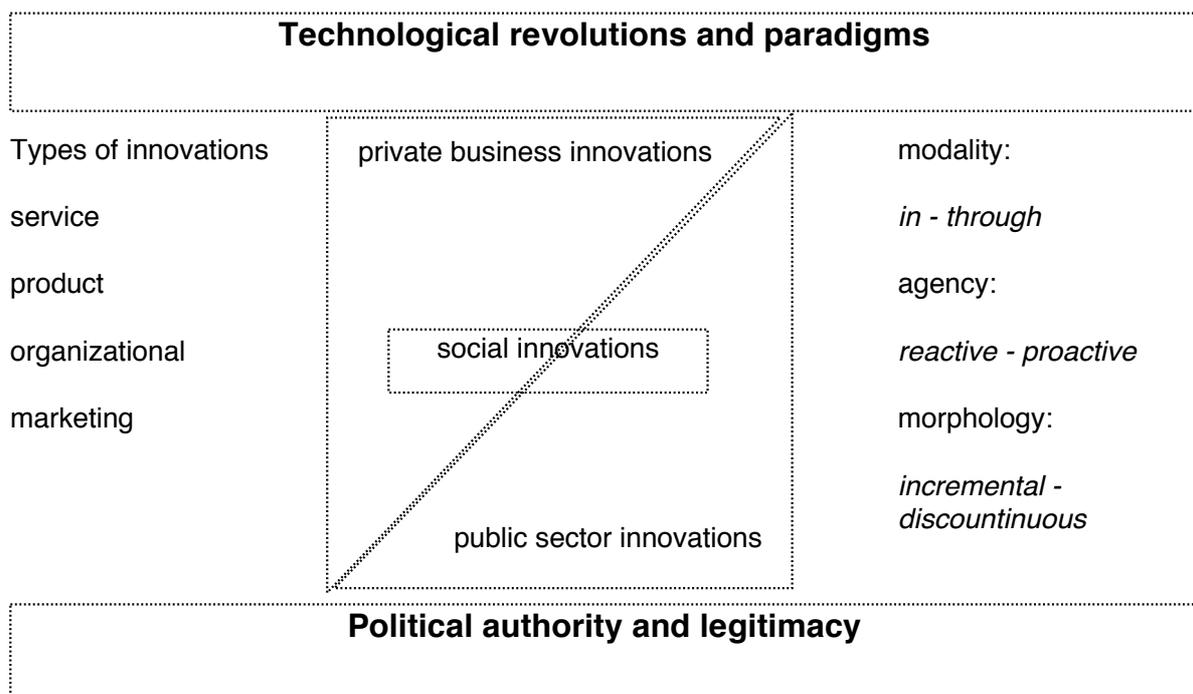


Figure 1 is based on the assumption, derived from our literature review, that innovations in a society take place in two different contexts – technology and authority, to put it very simply – that lead to different and often parallel *evolutionary changes* in the society. While in capitalist economies, technology influences private sector innovations more directly than public sector ones, then authority (and all that follows from this) influences more dramatically public sector innovations than private sector ones. Social innovations can be described in this context as a case of innovations where this parallelism of changing technology and authority comes most clearly to the fore, at least in our current conceptual state of the art.

2. Indicators on private sector innovation

The first well known effort to measure private sector innovation took place in the United States: the National Research Council started to collect statistics that we commonly relate with innovation today (e.g., on the R&D activities and its impact on changes in volumes of sales) in 1933 (see Holland and Spraragen 1933). Such measurement activities became more common in the 1960s when several other organizations – e.g., the Federation of British Industries – carried out related industrial R&D surveys (for an overview, see Godin 2002). The linear approach – overemphasizing R&D based creative activities to develop technical inventions – dominated until the early 1980s when the re-discovery of the Schumpeterian theories took place (Arundel & Hollanders 2008). As of today there are basically two strands of literature that deal with indicators and the measurement of innovation in private sector: first, competitiveness indices and indicators; second innovation and technological dynamics indices and indicators.

The first set, competitiveness measurements do not have a clear-cut theoretical basis, come from management research, and are methodologically mostly survey based. The examples of such approaches include various applications of the Porter's approach to cluster and competitiveness (Porter 1990, 1998) to measuring competitiveness, but also the closely related work of the World Economic Forum (e.g., Porter et al. 2008; Schwab et al. 1999) and the Institute for Management Development (IMD 2012). At the micro (company) level, competitiveness is generally understood to refer to the ability of a firm to increase in size, market share and profitability, and such studies have increasingly paid more attention as non-price factors as being important contributors to competitiveness, including human resource endowments, technical factors as well as managerial and organizational factors (Clark and Guy 1998).

The second approach – science, technology and innovation measurements – has a clearer basis in the Schumpeterian theory and is usually based on empirical measurements and increasingly also on surveys. The following are indicated as the main areas of indicators: (1) R&D data, (2) data on patent applications, grants and citations; and (3) bibliometric data, i.e. data on scientific publication and citation (Smith 2005). While statistical analysis along those indicators is common in innovation research, the specific databases and surveys have generated more insights into the matter, e.g., SPRU database on major technical innovation in the British industry (see Pavitt 1984 for the results) or DISKO surveys on technological collaboration of the University of Aalborg. Most notably OECD, by synthesizing various innovation measurements, has developed the so-called Oslo manual (OECD 1992, OECD 2005) that largely guides the measuring of private sector innovation activities today. The most common application is the Community Innovation Survey (CIS), carried out with biannual frequency by EU member states and number of other countries, and has given basis

for extensive econometric and statistical analysis of innovation (for an overview of such studies, see Arundel and Smith 2013).

What is common to both approaches is that impact of the innovation process on firm performance is expected, and extensive body of econometric research documents the relationship between innovation and productivity (e.g., Mohnen and Hall 2013, Griliches 1995), although the research is largely done on the basis of manufacturing companies. The firm specific indicators – the additional turnover generated, impacts on costs and employment, and on productivity (see OECD 2005 for details) – are commonly known and accepted concepts although there are difficulties in defining and measuring productivity – defined as the ratio of an index of output over an index of input – as firms operate in multi-input and multi-output context. Such a difficulty is especially acknowledged in the case of service sector companies as a wider view on productivity – not only measuring efficiency, but deeper inclusion of the concept effectiveness – is needed (e.g., Grönross and Ojasalo 2004; Johnston and Jones 2004).

Both approaches share more general common problems as well. First, a key challenge is related to what are the most appropriate indicators to include, both generally as well as specifically. This can also be called aggregation problem: firm level management tools and indicators (costs, profit margins) are difficult to aggregate on the national level as sectors and their dynamics differ widely (e.g., while Apple operates with 40% profit margin and Wal-Mart with 7% on, this does not mean Wal-Mart does not innovate). Further, several deficiencies are reported especially regarding the competitiveness indices due to the weak theoretical and empirical foundations (see Lall 2001). Also, widespread problems relate to overemphasizing the role of patents as innovation indicators as well as bibliometric analysis (that actually relates primarily to the dynamics of science rather than innovation). Also, it is becoming increasingly acknowledged that companies and the environments they operate in – the sectors, the national context, etc. – are different, posing difficulties to measure innovation across sectors and countries in a consistent and statistically comparable way.

CIS, more specifically, has been criticized on the basis of definitional restrictions with respect to innovation inputs and outputs and on limitation of applying the survey – that has been developed on the basis of manufacturing companies – to the service sector, as well as weak inclusion of human capital development aspect (Smith 2005). In order to integrate emerging topics in more recent innovation research, the Oslo Manual has undergone revisions. First, by extending innovation surveys to the service sector and then, by acknowledging the importance of non-technological innovation, by adding organizational (the introduction of new systems and management methods and new types of work organization and business models) and marketing innovation (the introduction of new commercial methods, and they include changes in product design, promotional strategies, etc.). Still, both strands of research face difficulties on measuring and relating to innovation intangible assets, such as skills, that have a key place in evolutionary work. OECD (2010), e.g., emphasizes that more attention should be put on measures of education, entrepreneurship, economic, environmental and social outcomes, and the framework conditions that support or inhibit innovation.

As to measure evolutionary dynamics on country and even on sectoral level is relatively complicated tasks, in recent years we can see how productivity (labour productivity, total factor productivity and other derivatives) has become increasingly to be used as simple one data point proxy for evolutionary dynamics. The problems with this are obvious: while productivity changes indicate change with the organization, sector or country, it does not

actually indicate the sources of the changes (massive lay-offs due to a recession can also lead to productivity increases without any innovations or skill upgrading). However, it is politically highly poignant and easy to use such figure as it is seemingly understandable also to non-specialists. As we show below, this logic is also increasingly important in the case of public sector performance measurement efforts.

In sum, innovation measurement in private sector has developed towards more multidisciplinary and interdisciplinary approach, while the expected impacts on firm performance have remained generally uncontested, while technical measurement issues remain. In addition, on the policy making level, we see a tendency to emphasize single high importance figures such as productivity, R&D expenditure in GDP, or rankings in various competitiveness tables.

3. Indicators in the public sector generally

In the last two decades public sector has increasingly imported values from the private sector. It is expected that the first focus more on customers, outputs rather than inputs and more effective and efficient performance (Hoque, 2008). From the early 1990s this process has gathered steam with the introduction of various performance instruments (incl. many performance indicators) to the public sector (see the seminal work by Osborne and Gaebler, 1992). The goals of this process are usually tied to ideas of advancing transparency, learning, appraising, sanctioning and also showing accountability in the public sector. Simply put, “what gets measured, gets done” (Osborne and Gaebler, 1992). While decentralization and responsiveness were deemed central to this reform trajectory, the idea that accountability equals performance does not inherently concur with the former ideas (Kelly, 2005). Consequently, many problems of use of indicators as performance management tools have been brought out for decades and while the critiques are cyclically repeated and sometimes advances (e.g. Ridgeway 1956; Smith, 1995; Thiel and Leeuw, 2002; Miller, 2003; Pidd, 2008), very few solutions have been brought out to tackle these problems. In line with this, the quality of data from various sources is a perennial problem for measurement systems and further, various rationalities can result in even different interpretations of the same data (Townley, 2008).

Many different things can be measured in terms of services provided by the government ranging from inputs/resources, throughputs/processes, outputs, and outcomes/impacts (see e.g. Packard, 2010; Kuhlmann, 2010; Sillanpää, 2013). This has also led to the proliferation of performance indicators, which does not necessarily mean that the quality of indicators themselves has improved (Lonti and Gregory, 2007). This can be a source of government overload (Lewis and Triantafillou, 2012). With the growth of indicators, a high degree of confusion regarding priorities has also been noted (Micheli and Neely, 2010). Thus, a large number of indicators in public organisations nowadays may be irrelevant, but very hard to remove (Fryer et al., 2009). Even when trying to avoid it, usually due to credibility and comparability more technocratic performance measurement is preferred (for public administrators usually department workloads are more important than long-term outcomes or positive changes (Ammons, 2004)). The simpler the representation of results, the easier it is to recall them later (see Hibbard et al., 2002). However, made simple, the measurement system can severely misrepresent result and thus, become useless.¹²

¹² This is the usual problem with single point league table ranking systems and indices (e.g., comparing schools by average exam results (Goldstein and Spiegelhalter, 1996)) that is also present in the private sector (see previous section). When reasonable estimates of statistical variation would be introduced to these comparisons, most differences would disappear (Pidd, 2008). This means that the extremes – top and bottom results – can considerably vary, but for most others there can be very little difference.

Effectiveness in the public sector is seen in theory as value creation to the citizen, which has no real maximum and thus, is very hard to quantify (Tangen, 2005). Various measurement systems have been suggested to the public sector from balanced scorecards to quality management models to deal with measurement (Hasan and Kerr, 2003; Sahay, 2005), but they have been also severely critiqued for simplistic, output-centred approaches or unintended effects. It is very easy to develop ‘tunnel vision,’ myopia, misrepresentation and misinterpretation, gaming and ossification etc (as outlined by Smith, 1995). While the general goal of indicators is to enable comparability (to select the good out of the bad), they can also add to the impetus to ignore local circumstances and tacit knowledge (already brought out by Carnegie and Wolnizer, 1996).

Consequently, the main problems of measurement in the public sector can be summarized as follows:

1. Diverse nature of public sector services, the wide range of users and the difficulties in defining targets (Arnaboldi and Azzone, 2010). Targets do not adhere to singular profit imperatives in the public sector (Van Thiel and Leeuw, 2002). When multidimensional impacts – tangible and intangible, financial and value based, individual and system level – are concerned, prospects on how to measure these effects are largely missing in academic literature.
2. Many economic impact evaluation methods are almost impossible to use in the public sector simply because they require that effects (also intangible, e.g. improved health, quality of life etc) should be monetized. As such, measurement in the public sector is usually limited to the ‘product’ rather than a process, ‘throughput’. Consequently, measures are faced with the problem of ‘product’ definition: for example, how to measure research (by scientific publication?), successful treatment (reoccurrence?) or even deterred crime. For this, tolerance of multiple definitions has been suggested as a possible solution that could capture multiple values (de Bruijn, 2002).
3. At the same time, measurement in general is static, while the processes are clearly dynamic. There are time lags connected to the effects of many policies and also public sector performance. When a long-term view is taken into consideration, present actions can be questioned (Brax, 2007). Welfare services, with traditionally very high number of performance indicators, are found to lack measures to demonstrate the various long-term effects (Sillanpää, 2013). These are problematic to measure, not only because of the unknown, but also most strategic planning cycles are maximally 4-5 years long. However, in many cases, success can only be shown through long-term effectiveness that is usually only possible to describe in qualitative effects (e.g. Porter, 2010).¹³
4. As such, application of quantitative performance measurement usually rests on proper measurement scales decreasing ambiguity and uncertainty (see Pidd, 2008). However, there are in this regard clearly situations where quantitative indicators are not the best measures. This occurs especially when practices in the public sector are in transition, complex issues are faced and when standards in place are contested (see Noordegraaf and Abma, 2003). This usually leads to a value-debate for which quantitative numerical indicators are not useful (they simply represent one limited dimension of value) and expert opinion based on professional agreement is more advanced for evaluation.

¹³ Moreover, in innovation related long-term goals the static outtakes of the current situation may not be that informative and they may even stand in the way of innovation. One of the major lines of critique most pertinent to innovation indicators is the fact that measurement is found to simply block innovation or reproduce the existent (Behn and Kant, 1999).

5. Furthermore, in situations that have been described as ‘wicked problems’ in the public sector (Rittel and Webber, 1973) – i.e. innovative and sometimes conflicting processes that are not routine – conventional control systems (including static measurement) are found to make no sense as a certain level of ambiguity and uncertainty is necessary in the processes (this should not be confused with statistical uncertainty that comes from the measurement system (data derived from indicators being neither reliable nor valid)).¹⁴

In sum, the problem of defining indicators in the public sector is not only technical but also conceptual (Van de Walle 2008). With the rise of the debate around public values, the focus in measurement has moved even more towards outcomes and processes – what value, by whom and how is added to the public sphere (see Benington and Moore, 2011). This cannot be singularly captured in individual satisfaction surveys, as many of the effects may be not directly visible to individual service users. The new public value framework brings out competing priorities in the public sphere based on ‘values’ that also include trade-offs (Benington and Moore, 2011). In measurement systems in the public sector rarely answer questions how trade-offs between different values are mitigated and emerging problems are dealt with.

To sum up, previous research seems to frequently highlight the need for a comprehensive measurement system that cooperates in both aspects of quality and long-term effectiveness. However as discussed above, this may be a very tall order to complete as most problems of measurement are thus far thoroughly discussed, but rarely any real solutions to the aforementioned are proposed. As there are many boundary crossing activities (incl. synergies, shared objectives and measures) in the public sector, recently also system level performance measurement systems are called for (Callender, 2011; Lönnqvist and Laihonon, 2012). Although, as of yet no such tools or measures for this kind of evaluation are advanced. Thus, measurement should also include information on the ability and support to system coordination (see Lönnqvist and Laihonon (2012) on welfare service system productivity).

In 2000s the discussion has moved collectively onward to include also public sector productivity and efficiency frontiers (benchmarking similar organizations in their input/outcome ratio). Challenges that both the private and public sector face – diminishing manpower in an ageing society and less available capital – are confronted with the solution from the private sector: increasing productivity growth (e.g. Waller, 2006). As is the case with private sector, productivity measurements holds to allure to express complex dynamic processes in one number that is equally understandable to experts and lay persons.

4. Public sector productivity

As we argued above, productivity has become one of the main proxy-concepts used in measuring changes in private sector innovation performance and, as was argued above, there exists a rather strong consensus on what private sector productivity measurements on

¹⁴ Eradicating the former from the process by strict, narrowly defined indicators and control system may make also action impossible. Reducing uncertainty and ambiguity is, however, the usual reaction when dealing with public sector control systems. The more autonomy is assigned with more complicated tasks – which innovation related activities surely are – more accountability is of course expected. This is used to evaluate actions of single organisations, but also ‘benchmark’ the former against each other. Thus, increase in reporting can come at an expense in taking risks and being innovative (de Bruijn, 2002). Consequently, the whole process can be subjected to ‘pigeon-holing,’ due to the measurement system thinking and acting in pre-established categories.

company level, less so on how useful it is on country level. This is, however, even more complicated in the case of public sector. Public sector productivity has many different meanings and its significance has changed constantly over time (Andrews and Entwistle 2013, Rutgers and van der Meer 2010, Schachter 2004). It is today mostly regarded as a technical term, which refers to the ratio of outputs to inputs in producing public services (Pollitt and Bouckaert 2011, Andrews and Entwistle 2013, Rutgers and van der Meer 2010, Dunleavy and Carrera 2013). The definition of productivity is often used as a synonym to public sector technical efficiency and in fact the terms of public sector productivity and efficiency tend to be used interchangeably in the literature (see various definitions outlined in Rutgers and van der Meer 2010, but cf. Dunleavy and Carrera 2013). At the same time, a clear distinction is usually made between productivity and related concepts. For example, while productivity (efficiency) refers to the “amount of resources used to produce a unit of output”, effectiveness is mostly understood as “degree to which an organization realizes its goals” (Etzioni 1964 in Lane 1993, 191). This, in turn, implies the need to distinguish productivity from other related concepts (in addition to effectiveness, e.g., economy, cost-effectiveness, value-for-money) when dealing with public sector performance (see also Rutgers and van der Meer 2010, Dunleavy and Carrera 2013).

This technical definition of public sector productivity has become firmly rooted in today’s public administration and management rhetoric (see only Pollitt and Bouckaert 2011). The quest for productivity has for a long time been supported by various theoretical schools from economics and organizational theory to public policy and administration, mostly concluding that public sector is inherently less productive than private sector (Roessner 1977). At the same time, this technical approach to public sector productivity has been repeatedly challenged (see Rutgers and van der Meer 2010 for an overview) and in spite of the simple and eloquent definition of public sector productivity, the concept has proven to be all but unambiguous and uncontested (see Table 2 for an overview of different concepts). The central normative debate has been about the proper place of productivity among other public sector values and whether the technical approach is at all useful for public sector. For example, Gulick (in Rutgers and van der Meer 2010) has claimed that administrative productivity should be seen as a fundamental value in itself, a value which may conflict with other public values. Others (e.g., Waldo) have rejected this idea and insist that productivity cannot be in conflict with other public purposes; productivity has a meaning only if measured in terms of other values; it is part of wider value system and can have only subordinate value for some other (higher) public purposes (ibid.).

For the strongest opponents the general pursuit of productive efficiency should be rejected altogether as public managers need to foremost realize multiple democratic values rather than base their decisions on productive rationality (Andrews and Entwistle 2013, Dunleavy and Carrera 2013). According to this view public administration should be guided by wider public purposes and related democratic values (such as equity, probity, accountability) that are necessarily contested and cannot be reduced to the ratio of inputs and outputs. Moore’s (1994) public value concept, which aims at a shift away from productivity to broader public value creation, is an example of a more recent approach reflecting the general discontent with regard to the market-loaded productivity thesis. According to the public value framework it is the citizens who should decide and express through the democratic process what kind of values are to be created by public sector and how (O’Flynn 2007). And productivity may not even be among the parameters according to which the processes and outcomes of delivery of

public values is evaluated against. In short, it is the responsiveness to citizens that matters the most rather than how to structure for efficiency that the critics insist.¹⁵

In a rather similar vein, Rutgers and van der Meer (2010) argue that technical concept of public sector efficiency is a too narrow one to embrace the true meaning of the term, and it is the substantial efficiency that should be taken as the core value of public administration. For them substantial efficiency refers to the Aristotelian meaning of efficiency as “the ability to get things done” (ibid., 772), or to put in other words, “capacity to produce an effect” (ibid., 772-773). The substantial meaning of efficiency is not related to outputs (which is part of the technical realm of the concept), but rather on force and ability; that is, “efficiency is the potential to pursue desired ends” (ibid., 773).

In order to overcome the normative contradictions, Andrews and Entwistle (2013) argue that instead of abandoning the efficiency concept altogether, one should attempt to incorporate the fundamental democratic values into the concept of efficiency. They stem from the position that “public service efficiency is essentially a product of the proper functioning of democratic institutions and the responsiveness of the state bureaucracy” (2013, 258-259). Building upon mainstream economic theory they delineate four dimensions of public service efficiency: productive efficiency, allocative efficiency, distributive efficiency and dynamic efficiency. Productive efficiency (or productivity) corresponds to the technical approach to public sector productivity; that is the ratio of outputs to inputs. Both strengthening the bureaucracy (via centralization and consolidation) as well as breaking up bureaucracies (via agencification and contracting) may be outlined as central strategies for enhancing public sector productivity. Allocative efficiency refers to the match between the demand for services and their supply. This is a complex dimension of efficiency since the citizens’ demand is always mediated (e.g. through politicians). Main policy options to enhance the allocative efficiency may include electoral reform, fostering more participative forms of democracy, devolution and decentralization, and injecting choice and contestability to public service delivery. Distributive efficiency “refers to the distribution of resources or services between citizens and the relative cost to government (and society) of that distribution” (255). Policy choices here include direct transfers via taxes and welfare payments as well as provision of merit goods (e.g. education). Dynamic efficiency refers to the allocation of resources between current and future consumption (256). In other words, it refers to efficiency over time. It is a question of maintaining a balance between current and capital investments and borrowing and debt repayment. It relates the issue of public sector efficiency to the rate of consumption of non-renewable resources as well as finding a proper balance between investments in social capital and ex post service delivery (e.g. health promotion vs providing acute care). Dynamic efficiency is allegedly directly dependent on institutional design as it needs slack resources for R&D, innovation and improvement.

The normative claims that call for a much broader efficiency definition in the context of public sector makes it obviously very difficult to actually measure public sector productivity and its dynamics. This would require one to considerably widen the scope of measurement and assume that outcomes and processes were incorporated into the efficiency calculations. Thus, further conceptualization is needed before one can really apply this wider framework to study public sector productivity, and its relations with innovation, on operational level.

¹⁵ Schachter (2004) provides an interesting historical overview on early debates on public sector productivity and where this dilemma is of special interest.

But even if restricted to the narrow/technical definition of productivity, problems related to measurability of public sector productivity are still abundant (Pollitt and Bouckaert 2011, van de Walle 2006, Atkinson 2005, Lane 1993, Dunleavy and Carrera 2013). This is mostly so because of lack of adequate data (static as well as over-time) and problems related to output valuation. In private sector, price-weighted outputs are used to overcome complexities related to measuring and aggregating different output volumes and quality. But public services are delivered either for free or are subsidized, thus there are no price-tags attached to public services that would provide easy and comparable indicator to value different outputs (Dunleavy and Carrera 2013). Consequently, even if the technical approach is seemingly widely used in policy and management rhetoric, it has too often been over-inflated by including a wide variety of performance criteria, it has had little to do with systematically measuring productivity change over time (Dunleavy and Carrera 2013) and it has too often been reduced to simple cost reduction campaigns with no apparent success (Hood and Dixon 2012).

All this has direct systemic level consequences. Due to the measurability problems the national accounts usually treat public sector outputs as equal with inputs, meaning that productivity is assumed to be always constant (i.e. the productivity growth is assumed to be constantly zero).¹⁶ In addition, cross-country comparative analyses that use proxy measures have not been able to remedy the measurability problems as most of studies have so far failed to capture the public sector efficiency (productivity) dynamics in meaningful ways (van de Walle 2006).¹⁷

What becomes evident from above is that although the concept of productivity seems to have occupied a highly prominent place in contemporary public policy and administration rhetoric, it has not, for various political, conceptual and analytical reasons, really applied into the study and practice of public administration. Still, there have been some recent attempts at refining the narrow approach of public sector productivity and making it a measurable concept on organizational level (Dunleavy and Carrera 2013, Atkinson 2005). The central idea in Dunleavy and Carrera (2013) is that public productivity as a concept of output-input ratio makes only sense if applied to organizational level and clearly de-linked from other public sector performance indicators (e.g., effectiveness and outcomes) as well as from macro-level innovations and policy-level or political factors. As they insist, “public sector productivity is (and must remain) a single, deliberately limited measure, focusing solely on how many outputs are produced for a given level of inputs” (ibid., 12).¹⁸ They dismiss the idea that policy-level changes could be incorporated into the study of productivity because there is simply no methodology that would differentiate between policy change and genuine innovation. Inspired by the methodologies developed for private sector total factor productivity and labor productivity measurement and earlier works on public sector productivity (e.g., Atkinson 2005), they suggest that unit costs can be used to derive a value

¹⁶ Interestingly, this is often politically rewarding position to have as it inflates GDP and enables to artificially increase GDP figures especially during economic downturns (Dunleavy and Carrera 2013).

¹⁷ Van de Walle (2006) has reviewed four international public sector performance studies (World Bank Governance Indicators, the European Central Bank’s public sector efficiency study, the Global Competitiveness Report and the World Competitiveness Yearbook Moreover) that one way or another attempt to measure the public sector efficiency. As he demonstrates, the aggregate level rankings provide rather unreliable basis for international comparisons as many of the datasets have inherent quality problems, it is difficult to determine what the used indicators actually measure, and the datasets often give a partial and biased view (e.g. inputs are often used as outputs, many important aspects are neglected, efficiency criteria are often assessed only against free trade and government intervention etc.).

¹⁸ This has been also suggested by other authors, e.g., Putnam 2003.

of a public sector organization's output, which then can be divided by the total volume of inputs of that organization.¹⁹

This is, however, far from being an easy and automatic task. Serious efforts are needed in striking a proper balance in choosing over activities that represent the organization best and this assumes collecting good-quality and stable data on government services' inputs, outputs and productivity growth. It also assumes from an organization analytical capacity to calculate unit costs or proxies such as share of administrative costs and evaluate the true impact of part-time staff, outsourcing and capital consumption on the organization's productivity. Moreover, quality adjustments are often needed, especially if dealing with complex services and services with high variations in quality across public sector. (Ibid.)

The recent developments in public productivity measurement may offer a step forward in terms of organizational productivity, but the systemic perspective is still largely missing. If we look at our discussion of public sector innovations above and compare it to productivity debate, we note a latent conflict: while productivity is best measured on organizational bases, innovations are systemic, at least on the level of a sector, that is their impact on concrete organization may be vague and indirect and likely also with serious time lags.

Table 2. Different meanings of productivity and efficiency

Different meanings of productivity	Definition	Sources
Technical efficiency (productive efficiency; productivity)	Ratio of organization's outputs to inputs	Dunleavy and Carrera 2013; Atkinson 2005
Allocative efficiency	Match between the demand for services and their supply (responsiveness)	Andrews and Entwistle 2013
Distributive efficiency	Distribution of resources or services between citizens and the relative cost to government (and society) of that distribution	Andrews and Entwistle 2013
Dynamic efficiency	Allocation of resources between current and future consumption	Andrews and Entwistle 2013

¹⁹ More specifically, Dunleavy and Carrera (2013, 34) use cost-weighted outputs as a proxy value measure for private sector price-weighted outputs. They stress the need to consider the total number of the activities performed by an organization and weigh these activities against each other according to their unit costs (or shares of administrative costs). In some occasions the outputs should be also adjusted to quality factors, which is, however difficult to do. To calculate total factor productivity for a given period of time, one should then aggregate the cost measures and divide these with the total volume of inputs (labor costs, intermediate administration and capital consumption) of that period. If the volume of output is divided by the total number or costs of full time equivalent staff then a labor productivity measure is derived. All costs should be deflated if over-time analysis is carried out. Dunleavy and Carrera also provide an overview on some of the most common techniques to be used for measuring productivity change: index-based, parametric and non-parametric techniques (ibid, 47-55).

Substantial efficiency	Capacity to produce an effect	Rutgers and van der Meer 2010
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Section 5: overview of different approaches to public sector innovation indicators across the world

Quantitative large-scale studies aimed at measuring innovation previously mostly targeted innovation in the private sector (e.g. Community Innovation Survey). Public sector innovation surveys started to appear only during the recent decade. Arundel and Huber (2013) through a literature search have identified 18 studies aimed at evaluating innovation in the public sector using 15 large scale data sets. These studies focused on developed economies, and also excluded service providers for health and education. Most of the studies did not cover all five categories of the public sector, mostly focusing on public administration.

MEPIN (Measuring Public Innovation in the Nordic Countries)

Public sector innovation is high on the policy agenda in the Nordic countries, however until very recently lack of relevant quantitative evidence covering a wider range of public sector organisations and innovations, limited the understanding of innovation processes in the public sector and thus also the possible tools to promote innovation. MEPIN project aimed at covering this gap by devising a conceptual framework and a survey questionnaire. Development of an appropriate conceptual framework and survey questionnaire required understanding of the needs of the potential users of the data, such as industry representatives, national and regional level policy-makers, trade and public sector organisations, as well as research-focused organisations. The framework and questionnaire should also take into account the possible range of potential applications of the gathered data, such as benchmarking, project evaluation, identification of good practices, monitoring and analysis, as well as documentation (Bloch, 2011). The project was divided into a number of stages. At the first stage, a conceptual framework for measuring innovation in the public sector was devised, The conceptual framework is built upon the insights from the Community Innovation Survey (CIS) which is intended for measuring innovation in the private sector, adjusted to suit the needs of the public sector, as well as on the existing work on public sector innovation. The conceptual framework included the definitional aspects of innovation in the public sector²⁰, as well as a set of indicators to evaluate innovation activities, both stimulating and retarding factors, and forms of interaction with external actors. The preliminary conceptual framework was piloted in all five Nordic countries, and concluded that the framework for measuring innovation in the private sector is not directly applicable to the public sector.

One of the issues identified as a result of the pilot study was that quantitative measures for evaluation of innovation activities are often difficult to estimate for the respondent organisations, as the data is often not available in their accounts, thus bearing implications on the accuracy and reliability of the data. While for measuring some indicators, it is enough with rough estimates, when it comes to productivity analysis, more precise data is necessary.

²⁰ Focusing on four types of innovation, i.e. product innovation, process innovation, organisational innovation, and communication innovation (for definitions see Bugge et al., 2011, pp.8–9; Bloch, 2011, pp.14–15). Beside the main four types of innovations, the report also discussed other types of innovations discussed in literature concerned with innovation in the public sector, such as social innovations, policy innovations, strategic innovations and systemic innovations, however, the authors of the report did not find sufficient reason to include these additional types of innovation with an exception to strategic innovation (DIISR, 2011).

Therefore, an approach that takes into account the existing limitations had to be developed, which required the respondents to provide a rough estimate of total innovation expenditure in certain time intervals. This approach made it easier for respondents to provide the data, however, the results gathered were mixed (Bloch, 2011).

One of the parts of the questionnaire focused on linkages between public sector organisations and other actors in their innovation activities. A range of indicators was devised in order to capture these interactions, such as information channels for innovation, innovation cooperation, innovation procurement, actors involved in innovation processes, financial support for innovation, as well as drivers of innovation. The Oslo Manual (OECD and Eurostat, 2005) was used for questions regarding innovation cooperation with some modifications regarding the sources of information and partners for cooperation to fit the needs of the public sector. The following list was used in the project: 1) Enterprises as suppliers (including consultancy services); 2) Enterprises as clients/users; 3) Public sector organisations as suppliers (e.g. universities; government research organisations); 4) Public sector organisations as clients/users; 5) Universities/government research organisations; 6) Other public sector organisations; 7) Citizens as users.

Questions regarding information channels are somewhat distinct from the questions regarding information sources used within the CIS, thus distancing this indicator from indicator on cooperation. The following channels were identified in the project: 1) internet and online discussion forums; 2) user satisfaction surveys; 3) networks, conferences, seminars and other gatherings; 4) hiring special personnel; 4) different evaluations (e.g. efficiency, quality, etc). Questions concerning innovation cooperation also included questions on the source of innovation. While the Oslo Manual distinguishes between innovations developed internally and externally, in relation to the public sector it is important to distinguish whether innovation was created by the public or private sector partner. Therefore the following breakdown has been used: 1) innovation created in your own organisation; 2) innovation created in your organisation in partnership with business; 3) innovation created in an organisation together with another public sector entity; 4) innovations created by external entities (both public and private).

In the recent years public procurement has become an important source of innovation in the public sector, and also public sector has become an important driver of innovation in the private sector, particularly so in the Nordic countries, which employ a more strategic approach to public procurement of innovation. therefore, a number of questions were devised to measure procurement of innovation through a variety of indicators: 1) acquisition of components or software from ICT-suppliers; 2) acquisition of other machinery and equipment; 3) contracting of consultancy services (ICT, management, user studies); 4) outsourcing of service provision; 5) PPPs.

Due to the fact that public sector organisations are often constrained in their decision making, significant share of attention has been paid to different drivers of innovation, which can include people, organisations as well as other factors. Thus, MEPIN project included a wide range of drivers: 1) internal forces (management, staff); 2) political forces (changes in organisation's budget; laws and regulations; changes or innovations implemented in partner organisations; new policy priorities); 3) public organisations; business (both as suppliers and customers); citizens as users.

As part of the range of indicators, MEPIN project also included a range of indicators aimed at measuring the output by looking either at objectives, effects or outputs. It is often difficult to

discern and evaluate the effects of innovation, as some effects can require detailed analysis and evaluation in order to identify the effects that actually took place. In order to provide for a more reliable measure for the outputs, MEPIN project focused on the objectives of innovations, devising the following list: 1) address social challenges (e.g. health, inequality); 2) fulfil new regulations, policies and other politically managed changes; 3) improve the quality of services or goods; 4) increase efficiency of service provision; 5) improve user satisfaction; 6) improve online services; 7) improve working conditions for employees. In contrast to the private sector, where more general measures of output are possible (e.g. revenue, profits), it is often difficult to create such general indicators for the public sector, thus suggesting that output is likely to be reliably measurable on a sectoral basis (e.g. health care, education, elderly care, etc.).

Similarly to the private sector, innovation in the public sector is greatly affected by organisational and innovation culture, including such aspects as attitudes towards risk and change, incentive structures and perceptions of barriers to innovation. The authors of the MEPIN project identified four main elements of innovation process in public sector organisations: 1) positioning of an innovation in the overall strategy of organisation; 2) the role of management in promoting innovation in the organisation; 3) the structuring of innovation process; 4) competences available within the organisation. According to the suggested components of the innovation process, they proposed a list of indicators that includes: **Drivers** 1) innovation strategy and organisation (goals/targets for innovation activities; innovation strategy as part of the overall strategy; development department; project-based innovation activities steered by a dedicated group; regular evaluation activities); 2) innovation management and staff (managers prioritise development of new ideas or new ways of working; top management active in implementation of innovations; members of staff have part of their time devoted to development/innovation; incentives to identify or develop new ideas; demographic or educational diversity of staff); as well as **barriers** 3) political factors (flexibility or lack of it in laws and regulations; lack of incentives for the organisation; lack of funding); 4) organisation and culture (risk-averse behaviour; lack of cooperation within the organisation); 5) other endogenous conditions (lack of time for innovation; lack of incentives for staff); 6) exogenous conditions (contract clauses limit collaboration with suppliers; lack of capabilities among suppliers; resistance to change among users).

Several issues were identified as a result of the pilot study. First, the results gathered using the quantitative measures to evaluate input, such as innovation personnel and expenditures were not particularly encouraging. One of the potential issues to occur in reporting was linking the reported expenditures on innovation for the same unit for which the overall expenditure is reported. As already mentioned, indicators measuring effects and impacts encountered some challenges, therefore suggesting using objectives as an indicator for output. Other challenges included defining the target populations for the questionnaire. Five Nordic countries were involved in the pilot study, which identified a number of differences across the countries in the types of organisations that are registered as enterprises, thus being considered irrelevant. All the limitations described above suggest that a generic questionnaire applicable to different sectors and different countries is possible with some adjustments and supplement questions in order to address the specificities of particular countries or specific range of public sector institutions.

European Public Sector Innovation Scoreboard (EPSIS)

As part of a preliminary work in developing public sector innovation indicators, an Innobarometer survey was conducted in 2010, which consisted of 24 questions. The survey

involved 500 public organisations coming from across public administration, higher education, local authorities and hospitals from all 27 member states. The results of the preliminary study suggested that two thirds of respondent organisations have introduced a new or significantly improved service during the last three years. The results also suggested that the larger organisations were more likely to introduce an innovation than the smaller ones; in larger organisations (over 250 employees) budget cuts were the main driver of innovations. However, the majority of managers of public sector organisations, when asked about the factors that would positively affect innovation, suggested that it would be more money rather than less (EC, 2013). The report on a survey conducted in October 2010 in 27 EU Member States as well as in Norway and Switzerland and published in 2011, studied innovation in public administration in response to changing constraints and opportunities.

EPSIS was developed along the lines of the Innovation Union Scoreboard that targets innovation in business enterprise, distinguishing between three factors – enablers, activities and outcomes. However, in contrast to other studies mentioned here, EPSIS also includes measurements of the impact of public sector innovation on performance of businesses. While the areas of responsibilities on different levels of government differ significantly, due to insufficient data availability, the conceptual framework used in the EPSIS project does not differentiate between different administrative layers of the public sector. Also due to the limited data availability regarding innovation in the public sector, EPSIS project focuses only on public administration and does not include the rest of the public sector organisations.

The indicators are used to create a scorecard showing the relative strengths or weaknesses of a particular country by indicator. Assigning the scores to countries is based on a simple methodology, using the distribution of countries' scores, assigning scores to countries as being below (score is among the lowest 33%) or above (score is among the highest 33%) the average (score among the middle 33%) performance. The scorecard methodology was applied to countries for which data on 21 out of 22 indicators was available. The scorecard provides a possibility to evaluate the relative performance of every country. However, due to a different nature of single indicators, from which some are based on hard (statistical), while others are based on soft (opinion-based) data, the scorecard cannot be used to evaluate and compare the overall relative performance of the responding countries. The scorecard can only be effectively applied for evaluation of individual indicators, thus allowing identifying particular dimensions where performance could potentially be improved. Opinion-based indicators also pose a different challenge, as they would represent not an absolute level for a particular indicator, but relative (i.e. representing change in a level), thus a high level for one indicator can represent not a high level in absolute numbers, but the fact that a particular country have started from a comparatively low level. The Innobarometer 2010 survey that covered 4000 organisations active in public administration faced several methodological constraints. Firstly, country-by-country comparisons were difficult due to sampling issues, as smaller countries would result with a much smaller sample of organisations. Secondly, country comparisons are challenging due to certain structural differences that exist between countries, difficulties with sectoral classification of organisations, as well as inability to construct a sample where countries would represent equal shares due to the absence of accurate information necessary for determining the precise probability weight for each sample.

The Flash Eurobarometer No 343 (Innobarometer 2011) survey measured the importance of public sector innovation for business performance. The survey sample included 9,500 randomly selected companies from 27 EU and several non-EU states, and was carried out using CATI method. The survey inquired firms regarding their opinion on the perceived

impact of improved public services and public sector innovation on business performance. However, both Innobarometer 2010 and 2011 surveys provide only a snapshot view, and they have not been replicated on a yearly basis, thus not allowing evaluating the dynamic in public sector innovation performance. Given the overall quality of data, somewhat weakened by the comparatively small samples in Innobarometer 2010 as well as the opinion-based data of the Innobarometer 2011, the EPSIS 2013 can merely be considered as a pilot exploratory analytical exercise. The value of the public sector innovation scoreboard could be enhanced if the data would be collected on a regular basis. EPSIS 2013 authors suggest that one of the options for collecting such data on a regular basis would be by copying the CIS approach, which is used for measuring innovation in the private sector and which has been adopted by many countries across the world. (EC, 2013) One should, however, be cautious with adopting the CIS approach without the necessary adaptations for the needs of the public sector. As it has been discussed earlier, innovation in the public sector differs significantly from that of the private sector. Another challenge to more comprehensive and precise approach to measuring innovation in the public sector is posed by the fact that a significant share of public services are provided by public sector organisations outside public administration, however, data on innovation in these organisations have not been collected, therefore requiring another set of surveys that would provide a more comprehensive view on innovation in the public sector.

Australian Public Sector Innovation Indicators Project (APSII)

Australian Public Sector Innovation Indicators Project is the latest among the efforts around the world in measuring innovation in public sector; and it incorporates all the lessons learned from earlier efforts of other countries discussed here. In contrast to the methodology applied in the European surveys (mirroring the CIS methodology), the APSII project proposed for a pilot a methodology based on a survey conducted in two modules - an agency and an employee survey. The reasoning for using a twofold survey is that it can provide more comprehensive and detailed data (indicators) on innovation in the public sector, taking into account employee-level innovation activities. A conceptual framework used in the APSII project for measuring innovation in the public sector incorporates five main themes: inputs to innovation, innovation processes, outputs of innovation, outcomes of innovation, and environmental conditions that affect innovation in the public sector (Arundel and Huber, 2013)

The survey method used for agency-level survey included all Commonwealth government departments with more than 20 employees. A random sample of 100 participants were sent an online survey and given six weeks for completion and submission, with agency heads signing off the final questionnaire before sending out. The employee-level survey includes employees of Australian Public Service (APS) identified using APS Employment database. Out of the population a stratified random sample²¹ of 9,000 employees is selected. The survey was delivered via online based survey, as well as in paper form to those APS employees that do not have access to personal e-mail accounts or have limited access to the Internet. One year reference period was also used for employee-level survey.

In order for the innovation indicators to be practical and useful, a range of application criteria were proposed:

- Measurable: able to be reported on by agencies and employees in a consistent manner;

²¹ Stratified by employee level, agency size, agency and location.

- Informative: provides useful information on innovation performance and capability within organisations;
- Developmental: helps improve innovation performance and build capability for innovation;
- Cost-effective: for individual organisations and the taxpayer, in particular relating to data collection and indicators construction;
- Engaging: simple, attractive and the benefits are self-evident;
- Forward-looking: enables changes to current practices;
- Comparable: facilitates cross-organisation and time comparisons.

United Kingdom (NESTA)

In 2008-2009 the National Endowment for Science Technology and Arts (NESTA) commissioned six exploratory studies on public sector innovation with an aim to develop a new Innovation Index. As a basis for the new public sector innovation indicator, NESTA proposed to develop:

- A set of indicators measuring input, output, adoption and outcome that would allow measuring some dimensions of innovation in the public sector;
- A methodology for capturing data on public sector innovation that would be piloted by NESTA and later disseminated across other organisations;
- Analytical framework for evaluation of framework conditions and public sector productivity (DIISR, 2011).

London School of Economics Public Policy Group (LSEPPG) developed its public sector innovation index on the basis of a survey of studies performed previously, thus taking into account the possible shortcomings and benefits of the previous efforts. The approach uses a mix of both published quantitative and qualitative as well as survey-based data, thus providing more comprehensive data than the available studies (e.g., the innovation index developed by Korean Government, see below). The authors do, however, acknowledge that the use of publicly available data might be problematic due to the inconsistencies, instances of misreporting and incomparability across years.

The pilot survey was conducted using telephone interviews. After piloting the survey, a range of limitations and issues were identified. Most importantly, use of telephone interviews limited interviewees' ability to access organisational data, therefore limiting the validity of data, as interviewees had to rely on their personal perceptions. Therefore, it was suggested that the most of potential of the index tool can be realised through an online benchmarking tool. Other issues, such as necessity to carry out the survey repeatedly, survey delivery mechanisms, timing and context for dissemination of questionnaire need to be taken into account in order to ensure maximum participation and response rates.

There were other challenges that NESTA identified as important on the basis of reports of the exploratory studies. Firstly, if the index would mirror the CIS, subjectivity would affect the outcomes of the survey. It was suggested that responding organisations would be reluctant to answer subjective questions due to the scrutiny of the central government. One way to deal with this issue would be to devise questions that are less subjective and can be confirmed using other data sources. Similarly anonymity could potentially help in resolving this issue. If questionnaire methodology would closely resemble the CIS methodology, it is likely to omit open and hidden innovation, which is particularly important in context of public sector

innovation. Thus, NESTA suggested to incorporate questions that will specifically target hidden, process, and open innovation.

Korean Government Innovation Index

Government Innovation Index (GII) is an online innovation measurement tool devised by the Headquarters for Government Innovation under the Ministry of Government Administration and Home Affairs of Korea in 2005. The GII is one of the early efforts aimed at measuring innovation in the public sector thus providing insights for the subsequent innovation indices developed elsewhere. The GII is designed to measure innovation in government agencies, focusing on a set of innovation management components, including: innovation leadership; vision and strategy; personnel capacity; implementation of innovation; improvement of performance; and barriers to innovation (LSEPPG, 2008). Data collection process required three randomly selected representatives of respondent agencies to fill in the online questionnaire. Data on clear outliers was subsequently proofed using government documents, as well as by conducting interviews with relevant officials. In order to avoid subjective interpretations, survey relied heavily on factual data and less on Likert Scale-based questions. The questionnaire also reduced the possibility of perceptual biases and inflation of correlations possible due to the same respondents being sources of data on both dependent and independent variables, through rigorous data filtering. The mandatory requirement for the respondents of the GII questionnaire ensured 100 per cent response rate. (Eun Kim et al., 2007)

While the index was devised to include a comprehensive range of components, the categories suggest a certain focus on inputs to innovation processes, enabling factors as well as impact of innovation, whereas measurement of innovation outputs is somewhat omitted (LSEPPG, 2008). This can also be explained by the previously mentioned reliance on measurable data and an attempt to avoid subjective interpretations. One could assert that the authors of the index favoured outcomes over outputs due to the difficulties related to measurement of the latter. However, as argued widely in the innovation literature covering public sector innovation, public sector organisations (as well as service industries in the private sector) often innovate not only in terms of outputs or outcomes, but in terms of provision of existing or new services (i.e. process innovation), or optimising the effectiveness of the provided services (i.e. maximising the impact/output to the unit of input) (LSEPPG, 2008).

Table 3. Different approaches to public sector innovation measurement adopted in a range of studies

Study/A uthors	Inputs/Enablers	Activities /Processes	Outputs	Outcomes	Impacts/Effects/ other
EPSIS	<p>1. Human Resources</p> <p>Share of ‘creative occupations’;</p> <p>Share of employees with a university degree;</p> <p>2. Quality of public services</p> <p>Government effectiveness;</p> <p>Regulatory quality;</p> <p>Increased efficiency of gov services due to ICT;</p> <p>Online availability of public services;</p> <p>e-government development index.</p>	<p>1. Capacities</p> <p>Share of service innovations in-house;</p> <p>Share of process innovations in-house;</p> <p>2. Drivers and barriers</p> <p>Internal barriers to innov;</p> <p>External barriers to innov;</p> <p>Management involvement in innovation;</p> <p>Importance of external knowledge;</p> <p>Share of employees involved in innovation.</p>	<p>1. Innovators</p> <p>Share of organisations in public administration with different types of innovation;</p> <p>Share of new services out of all services innovations;</p> <p>Public sector productivity;</p> <p>2. Effects on business performance</p> <p>Improvements in public services for business;</p> <p>Impact of innovative public services on business;</p> <p>3. Gov procurement</p> <p>Gov procurement as a driver of business innovation;</p> <p>Gov proc. Of advanced technology products;</p> <p>Importance of innovation in procurement.</p>		
UK NESTA	<p>Innovation capability: leadership and culture; management of innovation; organisational enablers of innovation;</p> <p>Wider sector conditions for innovation: incentives; autonomy; leadership and</p>	<p>Accessing new ideas;</p> <p>Selecting and developing ideas; implementing ideas; diffusing what works.</p>			<p>Improvement in organisational key performance indicators;</p> <p>improvement in service evaluation;</p> <p>improvement in efficiency;</p> <p>improvement context.</p>

	culture; enablers.				
AUSTRALIA	<p>Investment in intangible assets;</p> <p>Innovation expenditures;</p> <p>Human resources devoted to innovation;</p> <p>Staff skills for innovation;</p> <p>Staff attitudes and attributes to innovation;</p> <p>Sources of information;</p> <p>Technological infrastructure for innovation.</p>	<p>Explicit innovation strategy and targets;</p> <p>Systematic, internal measurement and evaluation of innovation;</p> <p>Management practices for innovation;</p> <p>Incentive and reward structures;</p> <p>Practices for learning and diffusing knowledge and innovations;</p> <p>Innovation collaboration and alliances;</p> <p>Perception of enablers and barriers to innovation.</p>	<p>On-going innovation projects;</p> <p>Types of innovations;</p> <p>Degree of novelty and scope of innovations (incremental vs radical innov);</p> <p>Innovation intensity;</p> <p>Related, intangible outputs (patents, trademarks).</p>	<p>Quality and efficiency;</p> <p>Productivity ;</p> <p>User satisfaction;</p> <p>Employee satisfaction;</p> <p>Societal and environmental impacts;</p> <p>Other intangible effects (increased trust, legitimacy);</p> <p>Effects of innovations;</p>	<p>Environmental conditions:</p> <p>User innovation;</p> <p>Supplier innovation;</p> <p>Wider public sector culture and leadership identified as drivers or barriers;</p> <p>External political and legislative factors identified as drivers or barriers;</p> <p>Leadership and culture;</p> <p>Public tolerance of risk.</p>
LSEPPG	<p>R&D activities (e.g. dedicated innovation or R&D unit; dedicated strategy unit; expenditure on consumer or market research; expenditure on development and implementation of innovations);</p> <p>Consultancy and strategic alliances (e.g. No of joint ventures; consulting expenditures; collaboration programmes with universities);</p> <p>Intangible assets (e.g. patents; IPR development activities; unit responsible for IPR; trademarks);</p> <p>ICT infrastructure;</p> <p>Human resources (e.g. staff with grad education; job satisfaction; performance-based</p>	<p>Institutional performance (e.g. percentage of targets met; average time to deliver outputs; change programme in place; prizes and awards for innovations, etc.)</p> <p>e-government, online services (percentage of services that can be requested online; % of serv that can be delivered online);</p> <p>origins of innovation (e.g. how many: innovations as a result of EU regulations; innovations as a result of ministerial/political suggestions; customer suggestions; management suggestions)</p>	<p>Number of innovations developed for delivery of new outputs; number of innovations improving existing outputs; number of innovations altogether;</p> <p>New outcomes;</p>		<p>Number of innovations joining-up across other gov organisations; number of innovations improving performance; Number of people that have been affected by innovations introduced in the government organisation for provision of new or existing outputs.</p>

	promotion system; churn of personnel; etc.)				
MEPIN	<p>Information sources: channels of knowledge transfer; interactions between public organisations and other actors (i.e. enterprises, citizens);</p> <p>Driving forces: people, organisations and other factors that push organisations to innovate (e.g. new policy priorities, regulations, citizen feedback, staff, management)</p> <p>The role of ICT;</p> <p>Barriers: political factors, bureaucracy, other internal conditions such as lack of incentives for staff to innovate; external conditions such as resistance of users to change.</p>	<p>In-house activities: in-house R&D; internal or external training and education of staff for innovation activities; other in-house innovation activities (e.g. planning and design; market research; feasibility studies, testing and other preparatory work for implementation of innovations;</p> <p>External activities: external R&D; other consultancy services; acquisition of external know-how (patents, licenses, etc.); acquisition of equipment/software .</p> <p>Procurement practices - acquisition of services, components or software from ICT suppliers, contracting for management services.</p> <p>Organizing innovation: innovation strategy; the role of management; organizing innovation activities; and organizing competences.</p>			<p>Measuring effects or objectives: efficiency, quality, ICT, organisations and staff, other factors – health and safety.</p>

Source: authors' elaboration on the basis of LSEPPG, 2008; Bloch, 2011; Bugge et al., 2011; DIISR, 2011; Arundel and Huber, 2013; Allman et al., 2011; EC, 2013; Eun Kim et al., 2007.

From these exercises, admittedly preliminary and exploratory in their nature, we can draw following equally preliminary conclusions:

1. All exercises are aimed at comparing innovativeness, either across organizations, sectors, or countries. As we have seen above, performance and productivity

measurement literature tends to more and more critical whether such exercises make sense in the case of public sector.

2. All exercises seek to combine multitude of variables (from funding, to external/internal constraints to impact) and sources (from data to surveys to self-assessment tools).
3. Both these tendencies show that all the exercises are still dominated – despite many efforts to the contrary – by private sector innovations logics, especially in as far as evolutionary changes are concerned. That is, how the exercises envision innovations emerge and especially impact (organizations, businesses), is still dominantly efficiency driven.

6. Discussion: what can we measure in public sector innovations

The state of the art of scholarship on public sector innovations, what it is and how it can be measured, seems to suggest that there are four key tendencies at work and often they cannot be clearly separated from each other:

1. Public sector innovation literature is seemingly at odds how to conceptualize innovations in the public sector. Many researchers, similarly to policy makers and opinion leaders, tend to have strongly normative approach to innovation (it is a good we should aspire towards in any case). This leads to what can be called overuse in labelling any seemingly significant change in public services delivery, organizational setup, etc, as innovation. Such indiscriminate use makes innovation as a powerful rhetorical tool in discussions but at the same time makes it virtually impossible to measure it. Above all, in such rhetorical exercises any evolutionary processes seem to get almost completely lost -- although they are assumed to exist but conceptual incoherence makes it nearly impossible to track evolutionary processes. This also means that often events are discussed as innovations that at closer look are more or less ordinary changes within an organization that just becomes better at what it does.
2. Most public sector innovation research does not relate innovations to public sector logics such as authority, institutional interactions, legitimacy, trust (and related issues such as capacity). Thus public sector innovation conceptualizations remain stuck between implicitly copying private sector concepts while explicitly trying to move away from them. This is most clearly evident in emerging productivity discussion: copying private sector indicators that have also a limited if politically highly visible use in private sector discussions.
3. Measuring performance in the public sector in general is complex and complicated matter where recent research has brought out more problems than solutions. However, there is a clear tendency to use more performance measurements (such as in budgeting) than less; same processes lead to increasing pressures to measure productivity and efficiency (via such things as efficiency frontiers as benchmarks) in order to enforce innovative practices in public organizations. Critical assessments, however, tell us that both performance and productivity measurements tools should be used with cautions and in particularly comparison should be used with extreme caution.
4. All three tendencies come crashing together in measuring public sector innovations. First, all problems prevalent in performance and productivity measurements are compounded by conceptual confusion described above and most of all, the lack of

evolutionary dynamics in most public sector innovation conceptualizations means that what is measured based on these concepts is almost by definition relatively worthless to the organizations, policies makers and to citizens. Most projects that are currently under way as described above, indicate that difficulties increase almost exponentially when we move from organizations (such as agencies, departments, hospitals) to larger units (sectors, countries).

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