Innovations in the Public Sector: A Systematic Review and Future Research Agenda

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Abstract

In the public administration literature there has been increasing attention to innovation, due to for instance New Public Management (NPM), budget constraints of states and societal problems like ageing. However, enquiry is mainly based on conceptual or normative articles and books, thereby lacking an evidence-based approach. Based on a systematic review of the literature in the period 1990-2013 this article synthesizes empirical publications on public sector innovation - linking innovation as a process and innovation as an outcome. The articles are analyzed based on the themes of the definitions of innovations, objectives, types, influential factors to the innovation process (including the adoption and diffusion stage) and outcomes. We further identified whether the studies referred to certain policy fields as well as their employed methods. The research shows that influential factors related to both the organizational, environmental and employee level as well as innovation characteristics should be taken into account. Our findings concentrate on the huge variety in the field, which points to the very fragmented nature of public innovation. We propose an agenda for the study of public sector innovation that address various methodological, theoretical and empirical gaps.

Keywords:

- Systematic review
- Public innovation
- Public sector

1 Introduction

Innovation has become a topic of increasing interest to different people across various sectors, such as business executives, policy makers and public managers (Damanpour et al., 2009). In the private sector the added value of innovation is predominantly legitimized by the fact that innovation enhances profit, thereby contributing to competitor advantage. In the public sector an increasing number of people embraces the idea that innovation can contribute to increase the improvement of service and problem-solving capacity (Damanpour & Schneider, 2009; Walker et al., 2011; Walker & Boyne, 2006). The growing attention for public sector innovation has also been linked to specific reform movements, like the popularity of raise of NPM (Hood, 1991; Politt & Bouckaert, 2004; Windrum & Koch, 2008), electronic government (Bekkers & Homburg, 2005), the change-over from government towards governance (Rhodes,1996) and, most recently, the retreat of governments in relation to the large budget reductions that have taken place. At the same time governments also seek to improve their responsiveness to the needs of citizens, when looking at broader societal developments and problems that often have a 'wicked' character like ageing (Mulgan, 2009). In this, innovation is even considered as 'a magic concept' (cfr. Pollitt & Hupe, 2011) that is used to frame the necessary transformation of the public sector to improve not only its effectiveness and efficiency but also its legitimacy (Bekkers et al., 2011).

Given the popularity of the public innovation concept, it is important to understand what we really know about innovation in the public sector. If we compare the attention that is paid to innovation as independent field and well-established of research and theory-building in the private sector business schools to the public sector, we see that the public sector - despite this increasing attention - is lacking behind. If we look at the public administration, we see on the one hand a small number of (scattered) researchers that have examined the innovativeness of public organizations, the patterns of the innovation process and the consequences of innovation across a range of different types of public agencies in a more empirical way (Berry, 1994; Borins, 2001; Salge & Vera, 2009), often also in combination with examining the learning capacity of these organizations (Walker, 2014). On the other hand there are also a number of publications that try to grasp the meaning and importance of public sector innovation in a more conceptual way (Osborne & Brown, 2011; 2013; Hartley et al., 2013), sometimes combing this with a more normative approach (Bason, 2010). But how evidence based is our understanding about innovation in the public sector?

In this paper we want to explore what the empirical grounding is of the knowledge that has been put forward in the scholarly literature on public sector innovation. Taking stock of this empirical based knowledge helps us to explore what a possible research agenda would be, thereby contributing to the further institutionalization of the innovation theme in public administration studies. In doing so we define public sector innovation as 'the introduction of new elements into a public service - in the form of new knowledge, a new organization, and/or new management or proccessual skills, which represents discontinuity with the past' (Osborne & Brown, 2005: 4). In order to make a relevant inventory of the findings of the selected studies, and being aware of a wide range of meanings of public innovation, we make a distinction between three relevant components: innovation objectives, innovation as a process (including its influential factors which might hamper or stimulate innovation and the innovation types employed) and innovation as an outcome. In doing so we build upon the well-known distinction that innovation consist of both a process and outcome (Schumpeter 1942: 83). The next question is then what do we consider as the innovation process? Damanpour (1991; see also Damanpour & Schneider, 2009; Salge & Vera, 2012) argues that given the messy and multidimensional character of this process, in essence two main innovation processes can be distinguished: innovation generating processes and innovation adopting processes. When discussing possible influential factors later on in this article, we will focus on these two processes as being the main innovation processes.

Our article adds to the literature in various ways. First, our article aims to provide an overview regarding the different components of public innovation. In doing so we try develop a more integral approach on public sector innovation, thereby not sticking to just one component, like for instance the role of leadership. Second, we also looked more closely at the specific influential factors related to the diffusion and adoption stage of the innovation process. In the literature it is assumed that these factors might be quite different than those from the other stages and are centred around innovation attributes (Rogers, 2003; Greenhalgh et al., 2004). This statement might however be questioned, because some scholars argue that adoption can be seen as a process of re-invention and re-innovation, which also emphasise the importance of trial and error, of experimenting, thereby breaking through all kinds of path dependencies (Rogers, 2003; Korteland & Bekkers, 2007). Third, when reporting, we will follow the 'Preferred Reporting Items for Systematic Reviews and Meta-Analyses' (PRISMA) approach (Liberati et al., 2009). Systematic reviews differ from traditional literature reviews in that they are replicable and transparent. They involve several explicit steps such as: identifying all likely relevant publications in a standardized way; extracting data from eligible studies and synthesizing the results. In this way, the article that

we present tries to develop a more evidence-based body of knowledge about the definitions, objectives, types, processes and outcomes of innovation.

Hence, our overall guiding research questions can stated as follows:

- *Which definitions of public sector innovation are used?*
- *What are the objectives of public sector innovation?*
- *Which public sector innovation types can be distinguished?*
- *Which factors influence the public sector innovation process, including the adoption process?*
- *What are the outcomes of the public sector innovation process?*

We begin by describing our research methodology, followed by the review and classification of the results. Based on the systematic review, we develop a detailed research agenda which address various methodological, theoretical and empirical gaps.

2 Method: conducting a systematic review

2.1 Systematic review

Given the broad field of public innovation, it is important to have a methodology that is able to deal with its width. An analytical review schema is necessary for systematically evaluating the contribution of a given body of literature to a specific field of scholarly attention (Ginsberg & Venkatraman, 1985). A systematic review addresses this issue by systematic improving the quality of the review process and outcome by employing a reproducible procedure (Tranfield et al., 2003).

2.2 Eligibility criteria

Eligibility criteria are specific study characteristics used as a criteria for eligibility. Based on Liberati et al. (2009) the following eligibility criteria were used:

- *Type of studies* - Records should deal with innovation in the public sector. We defined the public sector as the 'those parts of the economy that are either in state ownership or under contract to the state, plus those parts that are regulated or subsidized in the public context' (Flynn, 2007, p. 2).
- *Topic* - Records should contain the words 'innovation' in their title and/or abstract, in order to prevent mix-up with related concepts. The word 'public' did not have to be necessary in the title or abstract, because sometimes studies are carried out in a specific policy field (e.g. education) without mentioning the term 'public'. Therefore, when examining our results and founding 'innovation' without 'public' we looked specifically into the specific public sector area of the record studied.
- *Study design* - Only empirical studies are eligible, as we are interested in the empirical evidence on public sector innovation, thereby contributing to a more evidence based body of knowledge (Pawson, 2006). All types of research designs are included (questionnaire, case study, experiment). Case studies which were only illustrative in nature were not included.
- *Year of publication* - Studies were retrieved that were published in the period from 1990-2013. We selected the period from 1990 to 2013 given that two important publications were published shortly after, namely that of Hood (1991) and Osborne & Gaebler (1992). Both authors provided great input to the NPM debate, which in turn stimulated new ways of working in governmental organizations and resulted in a growing attention for public sector innovation.
- *Language* - Only reports and journals written in English were taken into account.

- *Publication status* - Only international peer-reviewed journal articles were included or books from well-established publishers in the field of public administration and innovation.

2.3 Search strategies

Four complementary searching strategies were used to find relevant studies for our systematic review. First, electronic databases (1990-2013) were searched for publications on public innovation. This search was applied to ISI Web of Knowledge and Scopus in the period September 2013 till December 2013. After searching for the studies, the records were assessed based on their eligibility by reading abstracts and full texts. Second, we searched for journal articles published in five top public administration journals, namely *Journal of Public Administration Research and Theory, Public Administration, Public Administration Review, Public Management Review* and *Governance*. Third, we also searched for relevant books on the topic, which have a strong empirical emphasis. Finally, we contacted experts of public innovation for additional publications in order to make sure that no key publications were left out. [1]

Given the plurality of meanings embedded in the term 'innovation' and taking into consideration that researchers may have used this term in a variety of ways, we used the basic keywords 'public innovation', public sector innovation' and derivatives such as 'innovative' and 'innovativeness'. Articles were excluded from the review if they did not deal with public sector innovation, were not empirical or only conceptual in nature. Although suitable, we excluded concepts as reform, change and learning, because these are all umbrella terms with various and distinct meanings which would make the results more diffuse. Hence, we limited ourselves to public innovation.

2.4 Study selection

In total we screened more than 10,000 studies. Examining the articles from the two databases, the public administration journals, the academic books and the consultation of the known experts, ultimately led to the inclusion of 133 studies. Our selection process is presented in figure 1.

[1] This last two steps still have to be conducted.

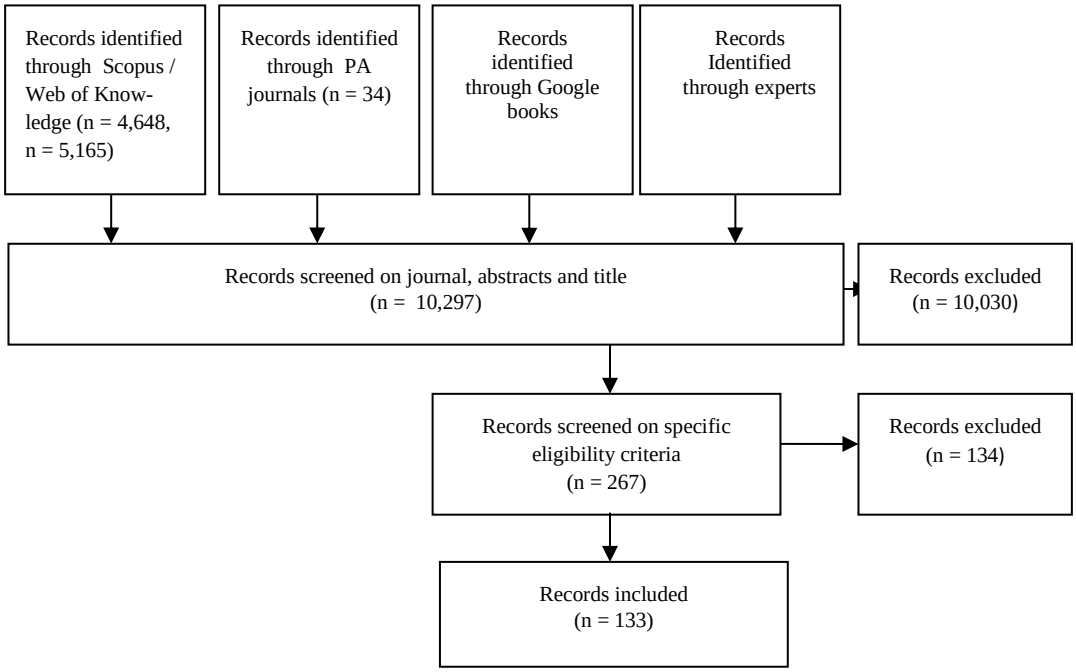

Figure 1: PRISMA flow diagram

3 Study characteristics

3.1 Journals and countries

The articles were published in 75 different peer reviewed international journals. Most were published in *Public Management Review (13),* followed by *Journal of Public Administration Research and Theory (9), Public Administration Review (9)* and *Public Administration (9).* Beside the public administration journals, journals differed to very specific and one area dedicated journals such as *Health Care Management Review* and *Studies in Higher Education.* Furthermore, the synthesized results of all records show that the number of studies has increased rapidly during the last three years: 53% of the articles were published after 2010, while till 2000 only 13 articles (10%) were published. Various authors mention this development also explicitly, stating that detailed innovation research in the public sector have been neglected in the mainstream of innovation studies, but is now reaching more maturity (e.g. Lagreid et al., 2011).

When looking at the countries involved, we found that most studies were conducted in the USA en UK with respectively 33 (25%) en 21 (23%) studies on public innovation. When including studies from Australia, New Zealand and Canada or cross-national studies which involved one of these countries we found this focus even more dominant (75; 56%). This suggests that the USA/Anglo-perspective is central in studying innovation and change (Kuipers et al., 2013), which have important implications, when looking at the institutional bias that is present in many studies. It might also influence the external validity of the findings that have been found, questioning how applicable they are in other western (e.g. Europe) or non-western settings (e.g. China). Furthermore, most records studied (112; 85%) were conducted in one country (e.g. Van Buren & Loorbach; Kim & Lee, 2009), while the remaining studies (21;15%) were cross-national in nature (e.g. Michels, 2011; Vigoda-Gadot et al., 2008).

3.2 Research methods

We also analyzed the research methods employed in the articles. Most studies were qualitative in nature (84; 57%). From these qualitative studies, we found a large focus on case study research (46; 32%), analysing mostly single or multiple cases (e.g. Van Buren & Loorbach, 2009; Novey & Hamer, 2012; Korteland & Bekkers, 2007). Other qualitative studies were predominantly based on interviews or document analysis (e.g. Neo & Calvert, 2012; Perren & Sapsed, 2013).

Quantitative studies (49; 33%) mostly used questionnaires or secondary survey data from datasets (e.g. Nasi et al., 2011; Damanpour et al., 2009; Walker, 2006). A small group of articles (13; 9%) was based on data that were both quantitative (mostly collected through questionnaires) and qualitative in nature. For instance, when studying the influence of gender in Swedish public sector innovation projects, Nählinder (2010) used both quantitative data gathered from an internet database of innovative welfare projects as well as qualitative data from interviews with different stakeholders and group interviews.
Hence, we see that in the existing empirical studies a qualitative bias prevails. The emphasis that is put on qualitative case study research as a dominant research strategy has also consequences for the external validity of findings, given the context nature of the findings that are reported.

3.3 Policy fields

Because of the broad search of our review on public sector innovation studies in general, we were also interested in the specific policy fields in which the innovations took place.

Policy field	**Number**
Local government	39 (27%)
Healthcare sector	25 (18%)
Central government	25 (18%)
Multiple sectors (more than three)	17 (12%)
Educational sector	10 (7%)
Regional government	7 (4%)
Welfare	4 (3%)
Other	17 (12%)
N = 144 (100%) – different studies included more than one policy field	

Table 1: Policy fields

Most innovation studies were conducted on the local government level (39; 27%), followed by healthcare and central government (both 25; 18%), the latter often carried out in the UK (e.g. Turner et al., 2011; Dias & Escoval, 2013; Salge & Vera, 2009). This dominant perspective of both policy fields (healthcare and local government) can be attributed to the UK Labour government program of supporting public management reform, which in turn has led to an large increase of innovation studies. In particular studies of Walker (2006) and Walker et al. (2009; 2011) focus on the local government level in the UK and included some first outcomes of the Labour government's programs. Here the most effective elements were found to consist of planning measures and the organizational flexibility (e.g. combination of innovation and leadership commitment) of local governments. Only a few studies were conducted in welfare or education (e.g. Husig & Man, 2010; Brown, 2010), probably

because our search terms were more broadly directed on public sector innovation in general and did not involve additional search terms for this policy fields. Additional search terms may have yielded more studies.

The category ‘Other’ involved a broad range of different policy fields and subsectors such as public transport (e.g. Ongkittikul & Geerlings, 2006) and housing associations (Walker & Jeanes, 2001). Various studies mentioned the public sector broadly without identifying subsectors (e.g. Kumar & Rose, 2012) or were carried out in multiple sectors (three or more). This included mostly studies which made use of large datasets (e.g. Parna & Von Tunzelman, 2007; Borins, 2000; 2002).

Here again, we may conclude that, when looking at the locus of public innovation sector studies, our empirical knowledge is based on a rather small field of investigation, which also limits the external validity of the findings.

4 Study results

4.1 Defining innovation

When analysing the different definitions of innovation that came across during our systematic review we made a distinction between general definitions of what an innovation is (e.g. new practices that are brought in practice) and specific definitions. The last one describes one innovation type, for instance technological innovation (e.g. Jaskyte, 2011). Following Osborne & Brown (2005: 4) we define innovation as 'the introduction of new elements into a public service - in the form of new knowledge, a new organization, and/or new management or proccessual skills, which represents discontinuity with the past'. We found a total of 40 studies (29%) including a general definition, while in addition 26 studies (19%) define a specific type of innovation.

When looking at these results the most remarkable finding is that most contributions do not define innovation. This could be because innovation was not the main to topic of the study (e.g. Meijer, 2013; Michels, 2011). Except a few studies (e.g. Fugslang, 2008) we also did not found one common element of public innovation as provided in literature, namely the amount of discontinuity with the past (Osborne & Brown, 2005), which is important, because then innovation and improvement can be distinguished.

When comparing the definitions, we found most applied definitions based on Rogers (1995; 2003) who defines innovation as 'an idea, practice, or object that is perceived as new by an individual or other unit of adoption'. Also based on work of Rogers (1995) various authors define innovation as 'the adoption of an existing idea for the first time by a given organization' (e.g. Mack et al., 2008; Borins, 2000; 2001). Other studies used almost the same kind of definition however citing other authors and less recent work (e.g. Daft, 1978). For instance, Damanpour & Schneider (2009: 496) define innovation as 'as the development (generation) and/or use (adoption) of new ideas or behaviors'.

In general two different dimensions are stressed in the general definitions, which are novelty or the perceiving of newness by the entity adopting the innovation (e.g. Young et al., 2001; Vigoda-Gadot et al., 2008) and the adopting of an idea for the first time by a given organization (e.g. Borins, 2001; 2002; Mack et al., 2008). A number of studies also contain both elements (e.g. Salge & Vera, 2009; 2012; Wu et al., 201), which confirms that innovation can both a process, often focused on the adoption and diffusion, and specific characteristics of the innovation such as its newness (Schumpeter, 1942: 83).

4.2 Innovation objectives

Based on the results of our review, the following objectives can be distinguished:

Main objective	Number
Gaining effectiveness	34 (18%)
Gaining efficiency	31 (16%)
Responding to the external environment	23 (12%)
Gaining customer satisfaction	15 (8%
Involving citizens	12 (6%)
Involving private partners	5 (3%)
Other (e.g. safety, responsiveness, quality of life)	9 (5%)
No objective mentioned	64 (33%)
Total N = 193 (100%) – different studies included more than one objective	

Table 2: Innovation objectives

When examining this different objectives, we found that improving performance, expressed in terms of effectiveness and efficiency, was the most mentioned motivation for innovation (65: 34%). This was especially the case in the UK healthcare sector (e.g. Salge, 2011; 2012; Turner et al., 2011), where programs of the Labour government stimulated hospitals to adopt management practices, mostly due to the rise of NPM. Studies which mentioned this objective highlight notions as 'performing with less' (Kim & Lee, 2009) and innovation as a way to remain 'competitive' (Fernandez & Moldogaziev, 2013; Naranjo-Gil, 2009). We also observed that efficiency and effectiveness are often used together without differentiation (e.g. Micheli et al., 2012; Schoeman et al., 2012).

However, maybe more striking is also the conclusion that in 33% of the records studied no explicit objectives were mentioned. This could perhaps imply that innovation is a goal on itself and that innovation has implicit value for the organization, which needs no specific external legitimation.

We also see various factors more or less oriented at enhancing responsiveness through participation and cooperation (40; 22%). A number of studies mentioned for instance the involvement of citizens or the improvement of public services (e.g. Feller et al., 2011; Garcia-Goni et al., 2007). This included mostly studies which were published during the last years, which implies that the topic is only recently discovered.

As we try to understand to what kind of values these objectives refer, thereby using the distinction which has been made by March & Olsen (1989), we see that innovation in the

public sector is predominantly, however slightly, legitimized by referring to values that are related to the 'logic of consequence': efficiency and effectiveness. At the same time values referring to 'logic of appropriateness' are also present (such as trust, support and legitimacy) (e.g. Fugslang & Pedersen, 2011). This has also consequences for the discussion about the specific character of public sector innovation in contrast to private sector innovation. According to March & Olsen (1989), typical for the public sector is that is organized around the logic of appropriateness. However, the dominance of efficiency and effectiveness would presume that the degree in which private sector innovation differs from public sector innovation is not so big.

4.3 Innovation types

When studying the different innovation types, various striking observations emerged. We observe that many studies used self-defined types such as strategic reflexive innovation (Fuglsang, 2008) and systematic innovation (Bloch & Bugge, 2013). As a result, this makes it difficult to categorize them properly. Authors also used time elements to describe innovation types, for instance evolutionary (Walker & Jeanes, 2001). Related to this, conceptual mix ups appear easily. Various studies define the same innovations differently or highlight other aspects. E-government initiatives were sometimes categorized as a policy innovation (e.g. Tolbert et al., 2008), while other studies define this as a technological innovation (e.g. Arduini et al., 2010; Carter & Belanger, 2005).

Based on Damanpour et al. (2009) and Bekkers et al. (2011) (see also Edquist et al., 2001; Daft, 1978) we divided innovation in four main types which are (1) product, (2) process, (3) conceptual and (4) governance innovations. Due to the growing attention for technological aspects such as E-government initiatives, we further split up process innovations in technological innovation. We also added the dimension 'administrative', because new processes can be associated with the 'technological core' (technological process innovations) or the 'administrative core' of the organization (administrative process innovations).

Moreover, although we categorized innovation in four main categories, we see that innovation types are very often clustered with thus mutual change effects (Damanpour, 1991). Examples found in our review include the commercialization partnerships (collaboration between public and private sector partners) in the UK which are governmental in nature, but as a side effect also may lead to new or improved services.

Based on the above mentioned distinctions, the following definitions were applied:

- **Process innovations** are focused on the improvement of the quality and efficiency of internal and external business processes. They change relationships amongst organizational members and affect rules, roles, procedures and structures among organizational members (Damanpour & Gopalakrishnan, 2001).
    - *Administrative process innovations* occur in structure, strategy and administrative processes (Damanpour, 1987). They include improvements in organizational practices, the introduction of new organizational structures and the coordination of human resources. In the public sector, such changes include themes as contracting, privatization and externalization reflecting NPM (e.g. Hansen 2011; Morgan, 2010).
    - *Technological process innovations* are new elements introduced into an organizational production system or service operation to render its services to users and citizens (Damanpour & Gopalakrishnan, 2001).
- **Product or service innovations** are focused on the creation of new public services or products.
- **Governance innovation** are directed at the development of new forms and processes order to address specific societal problems. This includes cooperation with other partners such as citizens and private companies.
- **Conceptual innovations** occur in relation to the introduction of new concepts, frames of reference or even new paradigms that help to reframe the nature of specific problems as well as their possible solutions.

The different innovation categories and subtypes are included in Table 3:

Type/form	**Number**
Process	**78 (48%)**
Administrative	66 (41%)
Technological	12 (7%)
Product/service	**31 (19%)**
Governance	**19 (12%)**
Conceptual	**2 (1%)**
Other	**32 (20%)**
Behavioral component	15 (9%)
Innovative capacity	5 (3%
Lack of clear definitions	12 (8%)
Total N = 162 (100%) - different studies included more than one type	

Table 3: Innovation types

First, by far the largest category were *process innovations* (e.g. Fuglsang, 2008; Osborne, 1996). Here most studies were focused on the administrative core, including NPM oriented values (e.g. Berry, 2004; Walker & Boyne, 2006). For instance, Hansen (2011) presents an empirical assessment of nine innovations in Danish local government that all may be seen as part of the New Public Management model such as privatization and outsourcing, free user choice, benchmarking and quality management. Another example of a process innovation is provided by Piening (2011). In an attempt to decrease operational costs, various hospitals in the German public health care sector decided to implement a special chest pain treatment unit for chronic ill people, aiming at improving the quality and efficiency of hospital care. This clear focus on improving internal practices is one of the core elements of process innovation.

In addition, process innovation including more technological, instead of administrative elements, mainly focused on the introduction of E-government initiatives and the success and acceptance of this attempts (e.g. Carter & Belanger; 2005; Arduini et al., 2010).

Second, *product* or *service innovations* include the creation of new public services or products (e.g. Parma & Von Tunzelman. 2007). In their article on public entrepreneurship in UK local government, Bartlett & Dibben (2002) included 12 case studies of this type of innovation. New services examined were that of a neighbourhood care scheme for elderly people, the transfer of council housing stock to a new housing company and a new bus route.

Third, *governance innovations* (e.g. Bakici et al., 2013; Micheli et al, 2012) are directed at the development of new forms and processes in order to address specific societal problems. In the USA, the Obama administration has called for new forms of collaboration with various stakeholders (e.g. private partners and citizens) in order to increase the innovativeness of public service delivery (Mergel & Dezousa, 2013). In order to do so, the website Challenge.gov was launched in 2010. This website serves as an online platform to bring citizens together to solve an issue online.

Fourth, *conceptual innovations* occur in relation to the introduction of new concepts, frames or even new paradigms that help to reframe the nature of specific problems as well as their possible solutions. However, hardly any study in our review primarily focused on this type of innovation. The so-called ‘open health platform’, which involves the commitment of the public in improving hospital care (Bullinger et al., 2012) could be considered as an example, because it offered a new paradigm in the way patients should be involved in treating rare

diseases. However, this innovation can also be considered as more governmental in nature because it included collaboration with the patients.

Finally, the category *'Other'* yielded many, quite heterogeneous, results. First, some studies were more or less focused on the behavioural components of innovation such that of the public entrepreneur involved (e.g. Meijer, 2013; Arnold, 2013). Other studies were primarily oriented at how to stimulate innovative capacity. This part of the category consists to a large extent of studies conducted the USA, examining the way federal states could stimulate or hamper innovation (e.g. Johns et al, 2010; Morgan, 2010, Rogers-Dillon, 1999). Additionally we found a few studies which did not clearly describe how the concept was operationalized or measured (e.g. Deyle et al., 1994; Vogel & Frost, 2009).

Hence, we conclude that although innovation is often embraced as an overall 'all-inclusive' term, probably also due to its positive connotations (Rogers, 2003), it is important to make some distinctions between the type of innovations and see if our empirical knowledge is linked to a specific type. We see that our dominant body of empirical knowledge about public sector innovation is primarily focused on internal administrative, often technology driven processes. At the same time, these types are the outcome of a process in which different drivers and barriers have shaped these outcomes. That is why we turn our attention to the most influential factors that have been mentioned in the literature.

4.4 Influential factors

Innovative ideas and policies in the public domain face a complex set of barriers and obstacles, differing from organizational aspects to attributes of the employee and the environment in which the innovation takes places. Factors can be, dependent on the level of the factor and the specific context, either be a driver or a barrier.

When looking for these influential factors we found a rich variety, which we divided in drivers and barriers related to four main categories which refer to a specific level:

- environmental level (e.g. collaboration with private partners, political mandates and public pressures);
- organizational level (e.g. organizational slack);
- innovation characteristics (e.g. mouldability of the innovation);
- individual/employee level (e.g. empowerment, age of the involved people).

4.4.1 Factors related to the environmental level

In the following table we present an overview of the influential factors related to the environmental level. Overall, a width range of topics were addressed.

Factor	Number
Environmental pressures (media attention, public pressures. economic challenges, changing technologies, political demands)	17 (34%)
Participation in networks and inter-organizational relationships (collaboration with private partners/involvement of citizens)	11 (22%)
Compatible agencies/organizations/states adopting the same innovation (isomorphism)	5 (10%)
Regulatory aspects	5 (10%)
Competition with other organizations	4 (8%)
Wealth/status of community	2 (4%)
Other	6 (12%)
Total N = 50 (100%)	

Table 4: Influential environmental factors

The most significant challenge seems to exist in the pressures encountered in the specific setting of the organization Issues dealt with included media attention (e.g. Borins, 2000; 2001), public pressures (e.g. Walker et al., 2011), political demands (e.g. Eshima et al., 2011; Rogers-Dillon, 1999) and technological challenges (e.g. Lonti & Verma, 2003).

Participation with partners outside the organization itself is a second, often-mentioned, influential factor related to the environmental level (e.g. Mintrom &Vergari, 1998; Rincke, 2006). Due to the increasing budget pressures and demands this is often perceived as necessary. Studies on this topic mention for instance the establishment of commercialization partnerships as a way to improve the efficiency and effectiveness of public services (Micheli et al., 2012; Schoeman et al., 2012). When cooperating with these other organizations, the amount of compatible organizations adopting an innovation is often considered as very influential (e.g. Sanger & Levin, 1992), For instance, Berry (1994) notes that the number of neighboring state agencies that have already adopted strategic planning increases the likelihood of innovation. Next to this, Walker et al. (2011) argue that public organizations appear to seek imitation and share information as a central method to meet the needs of local people.

When it comes to other influential factors, especially regulatory aspects are interesting. Often tight regulation is considered as hampering innovation (e.g. Johns et al., 2006; Ongkittikul & Geerling, 2006). However, according to Rogers-Dillon (1999) prevailing wisdom, which holds that limiting the federal role in welfare will free states to be more

innovative, can be misleading. In this study, the establishment of the Florida's Family Transition Program (FTP), a pilot welfare-to-work program, was the direct result of federal requirements imposed. Federal regulation, in this case, promoted innovation.

In summary, the results of our analyses show that environmental factors influencing the innovation process mainly center around other involved partners and their innovative behavior. In this we notice the strong influence of isomorphism which stresses that organizations in the same field became more alike (Meyer & Rowan, 1977; DiMaggio & Powell, 1991). The second factor taken into consideration stems for the idea of 'local embeddedness' of innovation: we noticed a strong emphasis on specific context related pressures such as public demands and political pressures. Therefore it is important to take into account this influence of the specific environment in which innovation processes take place (Greenhalgh et al., 2004; Walker, 2007; Osborne & Brown, 2011). A preliminary conclusion could be, especially if we compare public sector innovation with private sector innovation, that it is this environment which accounts for possible differences. Moreover these environmental characteristics are also closely related to the importance of the earlier mentioned 'logic of appropriateness' (March & Olsen, 1989).

4.4.2. Factors related the organizational level

Many influential factors found in our review can be connected to the organizational context. The results paint a complex picture of the different factors, shown in Table 5, including 'organizational slack' leadership, incentives and the degree of risk aversion as the main components.

Overall, results indicate a high amount of attention to the 'slack' (e.g. people, money, time, competences, information, knowledge, political support and contacts) that can be devoted to support innovation activities (Maranto & Wolf, 2013). Walker (2006) also argues that the larger an organization is, the more 'slack' this organization has, because it has more opportunities for the cross fertilization of ideas as well as a larger variety of relevant skills that can be exploited.

Factor	**Number**
Slack resources (information, time, money, ICT facilities, talented personnel, communication, professionalism, skills)	27 (22%)
Leadership styles	25 (20%)
Incentives/rewards/clear goals	11 (9%)
Degree of risk aversion	11 (9%)

Room for innovation/learning	10 (8%)
Conflicts	10 (8%)
Management approach (e.g. performance based management/NPM based)	10 (8%)
Organizational structures	10 (8%)
Intra-organizational networks	3 (2%)
Other	8 (6%)
Total N = 125 (100%)	

Table 5: Influential organizational factors

Often discussed slack factors were size (e.g. Fernandez & Wise, 2010; Naranjo-Gil, 2009) organizational wealth and capacity (e.g. Bhatti et al., 2011; Berry, 1994) and talented employees in the organization (e.g. Maranto & Wolf, 2013; Niehaves, 2010). Not all results on slack however were consistent. Contrary to common expectations (e.g. Damanpour & Schneider, 2006) we also found that organizational decline, instead of growth, can also lead to innovation (e.g. Mone et al. (1998).

Second, leadership issues are highlighted by a number of authors. Studies included frequently examined the kind of organizational leader required such as leaders who have a 'vision' (Vigoda-Gadot et al., 2008) and are 'credible' (Gabris et al., 2001). Of the leadership dimension, some similar results could be reported. Kim & Lee (2009) found a direct positive relationship between government leaders that not only have a strong will for exploring innovative ideas, but also are good problem solvers and implement innovative tasks effectively. These findings appear to be consistent with other studies included in our review such as those of Borins (2000; 2001) and Sanger & Levin (1992).

The degree of risk aversion was also mentioned in various studies, including one the hand the description of an administrative culture in which innovations have to be established as risk-averse (e.g. Arnaboldi et al., 2010) as also the creation of an innovation supportive culture (e.g. Gambarotto & Cammozo, 2010). A large stream of literature also considered a learning environment as necessary for promoting innovation (e.g. Turner et al., 2011; Salge & Vera, 2012; Parna & Von Tunzelman, 2007), because of the trial and error aspect involved (Sanger & Levin, 1992), which can result in enhanced innovativeness (Kumar & Rose, 2012).

Hence, we conclude that when talking about the organizational resources organizational 'slack' (e.g. size, personnel) seems to be the most important influential factor. Next to these slack elements we also observe a strong focus on the role of innovative leaders who are able to solve problems. In this the role of environmental pressures, as discussed before, comes up

as innovations are often the result of a process in which developments in different types of the environment co evolve. Therefore we expect that it is important how, and under what circumstances, these changes will link to each other (Bekkers & Homburg, 2005; Bason, 2010; Fernandez & Wise, 2010).

4.4.3. Factors related to innovation characteristics

In contrast to the two dimensions discussed before, there is less empirical attention for the influence of innovation characteristics. Only a few studies mentioned characteristics of the innovation itself which can act as an influential factor, all primarily focused on the adoption and diffusion of innovation (e.g. Johnson et al, 1998; Neo & Calvert, 2012). Table 6 describes the characteristics included in these studies.

Factor	**Number**
Complexity	3 (23%)
Relative advantage	2 (15%)
Compatibility	2 (15%)
Trialibility	1 (8%)
Cost	1 (8%)
Trustworthiness	1 (8%)
Other (e.g. co-adoption)	4 (23%)
Total N = 13 (100%)	

Table 6: Influential innovation characteristics

The innovation characteristics most mentioned were perceived ease in use/complexity (e.g. Damanpour & Schneider, 2009), relative advantage and compatibility (e.g. Neo & Calvert, 2012). In studies which examined innovation characteristics, Rogers Diffusion of Innovations theory (2003) was often applied, which describe intrinsic characteristics of an innovation such as complexity (e.g. Carter & Belanger, 2005). Nevertheless, when comparing the number of innovation characteristics to the organizational, environmental and employee characteristics they seem to play a minor role.

4.4.4 Factors related to the individual level

The following table shows the number of influential factors related to the individual level.

Employee	**Number**
Employee autonomy (empowerment, voice)	9 (20%)
Organizational position (tenure, mobility)	8 (18%)
Job-related knowledge and skills (professionalism/experience)	7 (16%)
Creativity (risk-taking, solving of problems)	5 (11%)

Demographic aspects (age, gender)	5 (11%)
Commitment/satisfaction with job	3 (7%)
Shared perspective and norms	2 (4%)
Innovation acceptance (satisfaction with results)	2 (4%)
Other	4 (9%)
Total N = 45 (100%)	

Table 7: Influential individual factors

First, when looking at the studies that included employee characteristics, we found a diverse range of relevant attributes. The most discussed element is autonomy (e.g. Bysted & Rosenberg Hansen, 2013; Lonti & Verma, 2003), followed by the occupied position in the organization. Formulated as an influential factor, Garcia-Gonia et al. (2007) mention that the differences in motivation to innovate depends between managers and front-line employee. When examining both job positions in public health institutions across six European countries, managers were more likely to feel a higher motivation in the innovation process than front-line employees, due to their higher sense of responsibility.

Second, various authors mention job-related knowledge and skills (e.g. Audretsch et al., 2011; Jaskyte, 2011). Innovative employees usually have the room to express their opinions, discuss new or other ways of working and possess certain skills which are relevant for their job.

Third, a number of authors also argued that attributes such as risk-taking and the possibility to solve problems of problems are important. Studies of Borins (2000; 2001) highlight that innovative employees are creative and more willing to engage in risky behavior than their less-innovative peers. We also found that age and gender were addressed various times (e.g. Hite et al., 2006). The study of Nählinder sets a good example: this research analyzed a Swedish healthcare project aimed at supporting innovation among public health care workers and reported some gender differences in favour of women (e.g. creativity). However, most authors consider these demographic aspects as minor in importance (e.g. Damanpour & Schneider, 2009).

To summarize, we see that empowered employees are an important source of innovation. In addition, job-related skills are highly valued. Taken these different factors into consideration it is also interesting to see if the same kind of factors are present in the diffusion and adoption process. We present the factors that we have identified in the literature in the next section.

4.5 Diffusion and adoption

In the literature it is supposed that they influential factors related to the diffusion and adoption stage are mainly centered around innovation attributes (Rogers, 2003) and hence more or less different from the other stages. The diffusion of an innovation can be defined as ‘a process in which an innovation is communicated through certain channels over time among the members of a social system’ (Rogers, 2003: 5). Innovation adoption is ’the [voluntary and/or coercive] process through which [an organization] passes from first knowledge of an innovation, to forming an attitude towards the innovation, to a decision to adopt or reject, to implementation of the new idea, and to confirmation of this decision’ (Rogers, 2003: 20).

Half of our records studied (65; 49%) dealt with adoption and/or diffusion. We encountered that innovation characteristics were only included in the diffusion or adoption studies (e.g. Korteland & Bekkers, 2007). Hence, characteristics of the innovation did not play a role in the innovation process itself. However, we also see vary overlapping elements which implies that many factors do play a role in the innovation process and the adoption process. For instance, on the organizational side we also encountered a strong emphasis on the role of innovative leaders who encourages the spread of innovation (e.g. Bartlett & Dibben, 2002) even as the role of organizational slack (e.g. Bhatti et al., 2011; Rogers-Dillon, 1999). Studies related to individual level mostly include autonomy (e.g. Walker, 2006; Lonti & Verma, 2003), demographic aspects (age/gender) and professionalism (e.g. Young et al., 2001; Jaskyte, 2011). Hence, this implies that the alleged difference between these two different phases are not so big, if we look at the drivers and barriers.

The following diagram shows our results, the right circle representing the adoption and diffusion stage, where the left presents the earlier stages. Regulatory aspects concerning to the specific innovation environment (e.g. federal rules) were not encountered in the diffusion and adoption studies, probably because of its small amount of studies on this topic included (5 studies) and/or specific nature.

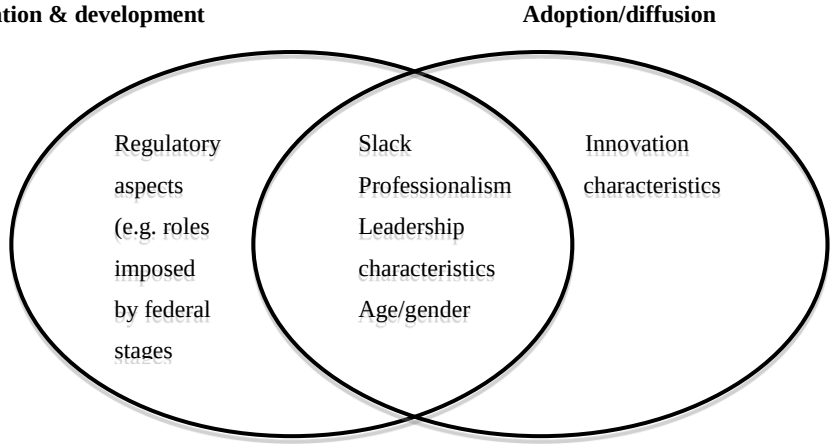

Figure 2: Influential factors related to the various stages of the innovation process

4.6 Innovation outcomes

In line with Kuipers et al. (2013) we define the outcomes of an innovation as 'substantive results of implementation of an innovation that can be intended or unintended and positive or negative'. Here, we found out that most authors did not present specific outcomes in their study results (65; 42%).

Main outcome	Number
Gaining effectiveness	49 (30%)
Gaining efficiency	20 (12%)
Involving citizens	11 (7%)
Gaining customer satisfaction	7 (4%)
Involving private partners	4 (2%)
Other (safety, equality, fairness)	4 (2%)
No outcomes mentioned	65 (42%)
Total N = 163 (100%) – different studies included more than one outcome	

Table 8: Innovation outcomes

Overall, Table 8 shows that not much outcomes are reported, especially when we take into account that most studies mentioned more than one outcome. Many studies mentioned some objective of innovation in their introduction, for instance improving effectiveness and efficiency (e.g. Pope et al., 2006; Bartlett & Dibben, 2002), but lacked a reflection of this results. In addition many articles only focused on the positive effects of innovations, where only a few articles specified failures of innovation or reported less innovative activity (e.g. Piening, 2011; Arnaboldi et al., 2011). If outcomes are reported, articles identify increased organizational effectiveness and efficiency as the main anticipated outcome (Salge & Vera, 2009; Dias & Escoval., 2013; Young et al., 2001), which is also in line with the objectives as described before.

Other outcomes, like the involvement of citizens or the gaining of citizens satisfaction, were less reported, where only a few studies describe the pursuit of more traditional public sector values such as safety and equality in schooling (Maranto & Wolf, 2013). Examples of citizens involved outcomes are given by Mergel & Desouza (2013) who examined the Challenge.gov platform. This website is a collection of challenge and prize competitions where the U.S. government seeks innovative solutions from the public. Studies which mentioned these sort of outcomes (e.g. involving citizens) often also included performance features. For instance, the study of Pope et al. (2006) examined the way the UK National Health Service (NHS) Treatment Centres (TCs) reduced waiting lists for elective care. This can be considered as both user-oriented (citizens get improved services) as efficiency focused (providing services with less effort).

5 Conclusion and future research agenda

Both researchers and practitioners realize the importance of innovation as witnessed by numerous academic publications. However, as our review has demonstrated, innovation research is fragmented and poorly grounded empirically. Most studies had an Anglo-USA focus, taking a qualitative case study based research design, which questions the external validity of the findings.

By taking on the method of a systematic review we distinguished between five dimensions of innovation which are (1) definitions, (2) objectives, (3) innovation types, (4) influential factors (including factors related to the diffusion and adoption process) and (5) reported outcomes. These dimensions guided our systematic review of empirical studies published in the period 1990-2013 that examined (certain aspects of) the innovation concept. Based on these dimensions of our review, several conclusions can be drawn.

5.1 Conclusion

When looking at the definitions used, the most remarkable finding is that most studies (93; 70%) did not provide a definition. In addition, most definitions lack details on the nature of the newness of an innovation, which might result in conceptual problems. As Osborne & Brown (2005: 121) argues, the issue of discontinuity with the past is an essential distinction in order to understand the nature of innovation, both in terms of the transformation of an idea into actual reality and also in terms of its impact upon the host organization, the existing policy sector or a community. Given the fact that many studies do not specify how radical the innovation really is, it can lead to a blurring of our knowledge regarding public sector innovation, because also incremental change can be presented as being an innovation.

Concerning the different objectives and outcomes of innovation two observations emerge. Both effectiveness and efficiency appear in our review as the main desired objective and outcome, because public sector innovations may have substantive value in terms of its productivity and the results to be achieved (Moore, 1995; Bason, 2009). Hence, it can be argued that the 'logic of consequence' is the most dominant paradigm found, while the 'logic of appropriateness' is less profound (although we found various recent studies focusing on the involvement of citizens). On the other hand, most studies did not define an objective and outcome. From this we can conclude that innovation is seen as value in itself, which may refer to a process of sense making (Weick, 1995). Especially in the public sector, an organization tries to convince the external environment in which they operate as well to

the member of the organization, that the organization makes sense (Weick, 1995). Innovation processes are then important symbolic processes (DiMaggio & Powell, 1991). This is underlined by the numerous environmental pressures found in our review as also the looking at the behaviour of other organizations and their innovation adoption pattern (paragraph 4.4.1).

We have proposed a typology for distinguishing the various innovation types in product, process, governance and conceptual innovations, thereby providing a more coherent tool for categorization. Several attempts have been made in the literature to classify different types, thereby focusing on the outcomes of the innovation process, however all more or less similar (Schumpeter, 1942; McDaniel, 2002; Mulgan & Albury, 2003; Moore & Hartley, 2008). From our review, we conclude that public sector innovation is primarily focused on internal administrative, often technology driven processes.

An overview of the relevant the drivers and barriers reveals that most research is categorized within the organizational dimension, related often to the organizational 'slack'. We observe a strong emphasis on leadership which reflects a current stream of the literature on this issue (Hartley, 2005; Bason, 2010; Osborne, 2011; Kuipers et al., 2013). According to Crossan & Apaydin (2009) this can be explained as leadership and innovation are intrinsically related because both involve the processes of discovery, evaluation, and exploitation of opportunities (entrepreneurship) and novelties (innovation).

Environmental factors most found are the pressure of other organizations (isomorphism) and political or public demand where the latter especially points to the characteristics of the public sector. As a result, it is important to take into account this influence of the specific environment, studying innovation from a more ecological perspective (Greenhalgh et al. 2004; Walker, 2007; Bason, 2010; Osborne & Brown, 2011). In addition, results regarding the drivers and barriers in the adoption and diffusion stages implies that the alleged difference between these two different phases is not so big if we look at the influential factors, hereby questioning earlier statements (e.g. Greenhalgh, 2004).

Concluding, our overall results present a very fragmented and dispersed nature of public innovation. From or review its becomes clear that the empirical knowledge is limited and puts a strong focus on the USA/UK. Furthermore, innovations are mainly process oriented, taking a more business oriented approach. If objectives of outcomes are mentioned, the dominant focus is on NPM practices. We also noticed the importance of environmental characteristics specific to the public sector, such as political demands. For the future, we

therefore argue for a more empirical-driven, ecological approach of innovation, using common definitions and tools. Also the role of innovation as a sense-making process should be recognized.

5.3 Further research agenda

Based on the analyses above, we propose the following topics for additional research:

- *Clarification of outcomes.* The lack of clear reported outcomes suggest that this topic is under researched. Hence, future studies could more closely examine outcome criteria or standards to evaluate success or failure. Specifically, researchers should refine their understanding of the mechanism by which the determinants produce (or fail to produce) the outcome of interest in a particular context .
- *Importance of environmental context.* Research should recognize the interaction between the innovation and the wider setting in which it takes place. For instance, what are the (harmful) effects of an external 'push' (such as a policy incentive) for a particular innovation? How do political pressures influence the innovation agenda of for instance local governments when adopting innovations?
- *Linkages between different influential factors found (e.g. innovative behavior and organizational characteristics).*We studied various influential factors of the innovation process, which of course all are interrelated. This raises interesting questions. For instance, what employee characteristics are important in a certain organizational context when adopting a new innovation? In particular, what is the detailed process by which new ideas are adapted by individuals and how might this process be systematically enhanced?
- *Adoption and diffusion related influential factors.* Results regarding the drivers and barriers in the adoption and diffusion stages of the innovation process show that influential factors which stimulate or hamper innovation might not be that different as commonly expected. Further research should see if this is really case, also because some scholars argue that in the public sector not enough attention is spent on adoption and diffusion (Korteland & Bekkers, 2007).
- *Innovative leaders.* Given the strong importance of leadership found, we propose to connect various leadership concepts distinguished in literature such as transformational and transactional leadership (Wright et al., 2012) to the specific innovation types and/or influential factors found. Who are the individuals who act as boundary spanners among organizations and what is the nature of their role?

- *Need for more comparative case-studies.* We found literature on innovation largely based on single country qualitative case studies. This is understandable given the importance of contextual factors. However, a comparison between cases from different countries could show to what extent national factors influence ways of innovation. In addition, we stress the importance of more quantitative research.
- *The development of contingency driven framework of public sector innovation.* In the review different innovation types were mentioned as well as categorization of relevant influential factors were presented. Now these factors have been presented as such, but a next step would be to see if there is a link between the relevance of specific factors and a specific type of innovation.

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PRISMA 2009 Checklist

Appendix – PRISMA Checklist (based on Liberati et al., 2009)

Note: some checks are not applicable as they are meant for a meta-analysis, not a systematic review.

TITLE			page
Title	1	Identify the report as a systematic review, meta-analysis, or both.	1
ABSTRACT			
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	2
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known.	4
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	4
METHODS			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.	N.A.
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	5
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	6-8
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	6-8
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	6
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	N.A
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	N.A.

Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	N.A.
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).	N.A.
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I) for each meta-analysis.	N.A.
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	9; 12
Additional analyses	16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	N.A.
RESULTS			
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	8
Study characteristics	18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.	N.A
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12).	N.A.
Results of individual studies	20	For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.	N.A.
Synthesis of results	21	Present the main results of the review. If meta-analyses are done, include for each, confidence intervals and measures of consistency	9-24
Risk of bias	22	Present results of any assessment of risk of bias across studies (see Item 15).	N.A.
Additional analysis	23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).	N.A.
DISCUSSION			
Summary of evidence	24	Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).	26-8
Limitations	25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).	28
Conclusion	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	26-28
FUNDING			
Funding	27	Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.	1