

# New public management and innovation policy: A systematic literature review

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# New public management and innovation policy: A systematic literature review

Rainer Kattel\*, Keno Haverkamp<sup>δ</sup>, Nai Kalema<sup>ε</sup> and Jakob Kofler<sup>φ</sup>

## Abstract

Innovation policy, as it is practiced today, and new public management (NPM) reforms both emerged in the 1980s. So far there is a limited number of studies focusing on the impact of NPM reforms on innovation policy. This paper offers the first systematic literature review on the topic. Based on more than a hundred sources, the article shows that in the literature there are distinct discussions of the impact of NPM on innovation as a research and development policy; and on innovation as a new way of working in the public sector. While the existing literature on NPM and innovation policy, such as it is, shows the mainly negative impact of NPM through the introduction of competitive practices, we demonstrate that the impact of NPM reforms is much more multilayered than previously assumed. NPM reforms, perhaps inadvertently, enabled the emergence of new and non-traditional actors in the innovation (policy) domain (such as innovation and digital agencies), and opened up discussions around collaboration and experimentation in the public sector innovation debates and practice. Thus, while the primary impact of NPM reforms on innovation (policy) in the public sector can be seen as negative; the secondary effect, through corrective reforms, can be seen as more positive.

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Keywords: Government, Innovation

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## 1. Introduction

Innovation policy, as it is practised today, and new public management (NPM) reforms burst onto the (Western) policy stage at the same time in the early 1980s (Rothwell and Zegveld 1981; Hood 1991; Drechsler 2005).<sup>1</sup> While there is some evidence that NPM reforms had a significant impact on various areas of innovation policy (e.g. the rise of academic capitalism (Raudla et al. 2015), the impact of outsourcing in NASA (Mazzucato and Robinson 2018) and project-based innovation policy in Central and Eastern Europe (Karo and Kattel 2009; Suurna and Kattel 2010)), the interaction between the two has not been systematically studied. Thus, the main research question this article sets out to answer is how NPM reforms have influenced innovation policy and its governance, and it speaks to how NPM-type reforms have been practised in a specific policy area and what their impact has been.

The article focuses on organisational (rather than policy) issues. While NPM is not a unified set of reforms (and we discuss this in more detail later), its main focus was on how public organisations work: management practices, relevant skills, evaluation and measurement frameworks, and how relationships with stakeholders are structured. Hence our focus in this article is on the way NPM reforms influenced public organisations implementing the innovation policy agenda. At the same time, we can expect that NPM reforms in innovation policy have contributed to some of the most important changes in policy. In the 1990s, for example, the focus of innovation policy moved from traditional sectoral industrial policies to so-called horizontal policies, enabled by a focus on project management skills in public organisations, including outsourcing much of the project evaluation through peer review. Our conceptual framework will take this overlap between organisational and policy reforms into account.

The article is structured as follows. In the first section we briefly summarise what we understand NPM to mean, and then we look at how the existing literature discusses NPM's impact on innovation policy and its governance. This is followed by the methodological section describing the key components and steps of the systematic literature review. The third section summarises the main findings of the literature review. The final section discusses key findings and suggests avenues for future research.

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## 2. What is NPM and what do we know about its impact on innovation policy?

This section briefly describes the evolution of innovation policy since the mid-1980s, distinguishing between different varieties of capitalism, and then examines how the existing literature discusses the impact of NPM reforms on the organisational practices of innovation policy.

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Following Christopher Pollitt, we argue that NPM reforms can be understood as a two-level phenomenon (Pollitt 2007): first, 'at the higher level it is a general theory or doctrine that the public sector can be improved by the importation of business concepts, techniques and values, while,' second, 'at the more mundane level it is a bundle of specific concepts and practices.' According to Pollitt, the mundane level includes the following characteristics:

- greater emphasis on 'performance', especially through the measurement of outputs;
- a preference for lean, flat, small, specialised (disaggregated) organisational forms over large, multi-functional forms;
- a widespread substitution of contracts for hierarchical relations as the principal coordinating device;
- a widespread injection of market-type mechanisms, including competitive tendering, public sector league tables and performance-related pay; and
- an emphasis on treating service users as 'customers' and on the application of generic quality improvement techniques such as total quality management. (ibid; see also Lapuente and Van de Walle 2020).

In order to simplify this dual pathway of NPM reforms, we can call the first level policy governance and the second level organisational practices. As Pollitt further argues, NPM practices do not include such ideas as partnerships, networking and governance: 'These arose later than the NPM, and were to some extent ideas that were invented to counteract the perceived limitations and weaknesses of the NPM' (ibid). In other words, when tracing the impact of NPM reforms, we can expect to find primary or direct impacts (such as introducing competitive tendering) and secondary impacts emerging from reforms counteracting primary effects (such as introducing collaborative tendering).

In the Western context, innovation policy is typically periodised through three frames:

- the post-WWII era of industrial policy in which countries mixed mission- and diffusion-oriented innovation policies;
- the era of competitiveness-focused innovation policies, which developed in the late 1980s as diffusion-oriented or horizontal policies became dominant, with complementary macro-economic policies focusing on trade liberalisation and price stability; and
- the (re-)emergence of mission- or challenge-oriented innovation policies in the late 2000s (Ergas 1987; Foray, Mowery and Nelson 2012; Edler and Fagerberg 2017; Foray 2018; Kattel and Mazzucato 2018; Schot and Steinmueller 2018).

In policy practice there is both overlapping use of such frames and a contextually diverse mix of frames. Arguably, the height of NPM influence falls into the period of the horizontal policies of the 1990s and 2000s. Accordingly, the literature looking at the impact of NPM on innovation policy that does exist shows how certain policy practices emerge influenced by the policy governance layer of NPM (e.g. the use of business practices through the privatisation of state-owned research labs and companies) and others influenced by the organisational practices of NPM (e.g. competitive grant funding for research and development, implemented by relatively autonomous

innovation agencies with a mandate to address innovation-related market failures) (Karo and Kattel 2009; Raudla et al. 2015; Karo and Kattel 2018). Therefore, our systematic literature review starts from the following assumptions: first, NPM practices in innovation policy can manifest on either more abstract policy governance or on the organisational management level, or on both; and second, the impact of NPM reforms on both levels has been predominantly negative in diminishing public sector capacities to deliver effective innovation policies (Drechsler and Kattel 2009; Kattel and Mazzucato 2018; Kattel, Drechsler and Karo 2022).

Thus, the literature review seeks to answer the following research questions:

1. NPM in innovation policy governance:
  - What kind of structural reforms took place and what was their impact on innovation policy governance during the emergence of NPM reforms?
2. NPM in innovation policy organisational management:
  - How did the understanding of innovation policy outcomes change during NPM reforms?
  - What kind of policy process reforms took place during NPM reforms?
  - How did evaluation frameworks and practices evolve during NPM reforms?

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### 3. Systematic literature review

For the systematic literature review (SLR), the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) protocol was used (PRISMA, n.d.). Searches were performed in three databases: Web of Science, Scopus and Google Scholar. The timeframe used was 1990 to 2020, as this is the period during which the relevant reforms took place. On the basis of some relevant initial literature, including that referred to in the previous section, a selection of the most important keywords and concepts of NPM reforms and their potential effect on innovation policy-making was compiled. These keywords were individually tested and improved through the use of synonyms and alternative phrases to ensure the capture of the largest number of relevant articles as possible. They were then used to perform searches in academic journals for articles that combined typical NPM reforms and concepts, such as 'cost-benefit analysis'; 'incentivisation' or 'privatisation', with typical phrases describing innovation policy, such as 'public research'; 'R&D' and 'innovation'. The exercise resulted in the following final search string:

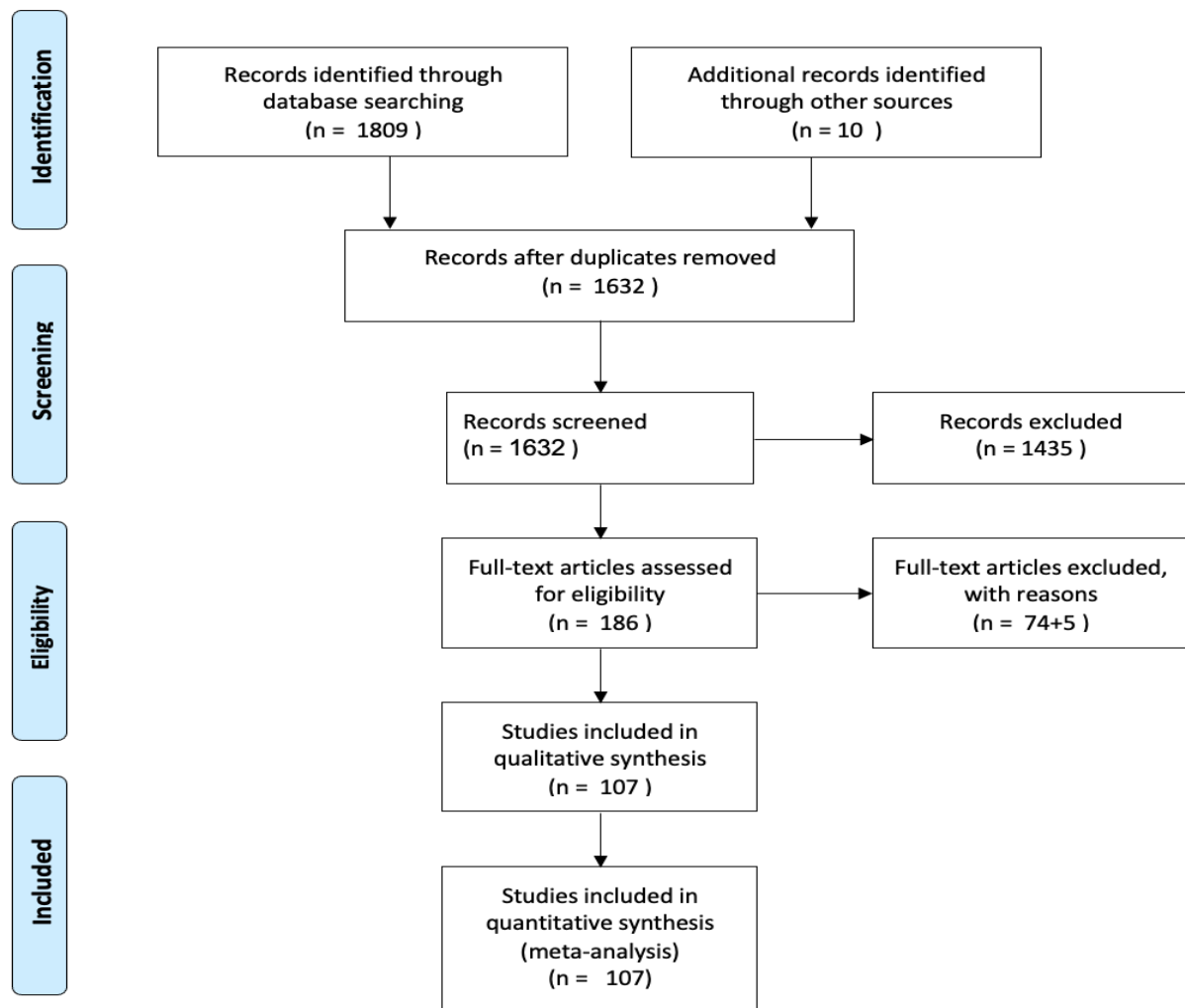
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(( "Public Policy" OR "Public Organizations" OR "Public Services" OR "Public Sector" ) AND ( "cost-benefit analysis" OR "neoliberal reforms" OR "Management Consultants" OR "expenditures" OR "results oriented" OR "competition" OR "disaggregation" OR "arms length agencies" OR "quango" OR "marketisation" OR "quasi markets" OR "performance pay" OR "agencification" OR "incentivization" OR "NPM" OR "Managerial" OR "Managerialism" OR "liberalisation" OR "Accountability" ) AND ( "Privatization" OR "Excellence-driven" OR "Development banks" OR "Competitive grants" OR "Competition" OR "Marketization" OR "Project-based funding" ) AND ( "public research" OR "R&D" OR "Science" OR "Innovation" OR "Research and Development" OR "Lab" ))
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Utilising the search string, the researchers conducted electronic database searches from September to December 2020. Additionally, along with the inclusion-exclusion criteria set by the search string, only sources for the time period of 1990 to 2020 and in English were selected for this study.

The initial screening of eligibility based on the title and abstract of the articles was conducted manually in EPPI-Reviewer, a web-based literature review application utilised for systematic, meta-analytic and narrative literature reviews (EPPI-Reviewer 4: Systematic Review Software, n.d.). The researchers performed a blind review process that included at least two reviewers for each source. This process was adopted to ensure that the sources included in the meta-analysis fulfilled the basic criteria for inclusion. Whenever it was not possible to assess a criterion, the record was included to be assessed at a later stage, based on the review of the reference's full text.

In total, 1819 articles were screened based on their title and abstract. Of those, 186 were deemed eligible for further full-text assessment. Ten sources were manually added during the review as these sources did not come up through electronic search but were referenced in other sources. Ultimately, 107 articles were included in the quantitative synthesis and meta-analysis. Figure 1 summarises the SLR process.

Figure 1. Keyword search result



Source: Authors

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### 3. Key findings

Following our research questions, the key findings from the literature review fell into four larger areas of NPM reform impacts: on structural reforms (77 references); on a focus on outcomes (63 references); on process reforms (54 references); and on evaluation practices (41). Many of the articles touched on multiple areas.

In terms of publication date, the referenced journal articles were distributed more or less evenly between 1990 and 2020. There were also no clear patterns in terms of author groups, with almost all authors listed with only one reference.

A duality could be observed in all areas: on the one hand authors discussed NPM reforms as an innovation, or as an obstacle to innovation, in the public sector (e.g. health agencies, local governments etc), but on the other hand authors focused explicitly on innovation policy (e.g. university management, science funding etc).

#### 3.1 Structural reforms

Given the widespread structural effects of NPM reforms, it is not surprising that in our review the group with the most references was structural reforms. With 77 references, structural reforms were covered in more than two-thirds of the resources included in the review. Furthermore, we were able to group structural reforms into the following sub-categories: de-regulation, increasing autonomy (with further subgroups agentification and decentralisation), marketisation (with further subgroups competition and market-oriented reforms) and public-private (with further subgroups collaborations and partnerships). Table 1 summarises the references per sub-category.

Table 1: Key concepts within structural reforms

		77 references
De-regulation		7 references
Increasing autonomy		18 references
	Agentification	2 references
	Decentralisation	14 references
Marketisation		45 references
	Competition	33 references
	Market-oriented reforms	21 references



Public-private		38 references
	Collaboration	24 references
	Partnerships	26 references

In terms of discussing the specific effects of NPM reforms on innovation policy and its organisations, most articles did not provide conclusive evidence, but rather discussed certain aspects of structural reforms. It is also worth noting that articles from the early period under review discussed NPM reforms in the context of public sector innovation rather than innovation policy.

Early examples of papers analysing the effect of structural reforms on the NPM paradigm include Johnston (1996) and Collins et al. (1994). Generally, these earlier studies had a relatively positive outlook on structural NPM reforms and their impact. In their paper on optimising productivity through privatisation, Johnston argues that through competition and legal mandates public sector managers are encouraged to improve goods and services (Johnston 1996). The private sector is generally seen as the ideal type and the public sector is encouraged to adopt entrepreneurial management in order to move towards more efficiency.

While looking at the British NHS and other European health services, Collins et al. (1994) adopt a slightly more critical approach. However, while they raise concerns and questions about reforms to the national health services, they largely blame the inability of public sector officials to rigorously question and debate market-style reforms. Nonetheless, they have already warned of a growing concern that market-style health reforms may have unforeseen and, in many cases, negative consequences.

Also looking at the British NHS, Enthoven (2000) discusses structural NPM reforms through the introduction of an internal market to put in place market incentives, stimulate innovation and increase efficiency. Questioning whether a culture of innovation, efficiency and good customer service is possible in a public-sector monopoly, Enthoven argues that the NHS could only modernise through consumer choice and competition, as well as more resources.

Other early papers from the period analysed examine the benefits of public-private collaboration. Fearman et al. (2001) analyse how public-private collaboration helped to develop procedures for risk management, internal controls and reporting for the financial market. They particularly highlight the positive role of private-sector financial firms in this process.

Analysing cooperation between European Space Agencies, research centres and industry, Atzei et al. (1999) argue that new strategies centred around customer focus and business process re-engineering need to be adopted to increase efficiency and innovation. They argue that for 'faster, better, cheaper' missions, clear targets and strategic thinking that link applications, science, technology, economics, finance and market development have to be applied.

Studies from the later period of the sample analysed, particularly from after the turn of the millennium, seem to strike a more critical voice and also focus more on innovation policy as a policy

domain. Burlamaqui (2010) proposes a knowledge governance-oriented policy-institutional framework that, in particular, should not be 'anti-consolidation but anti-unproductive entrepreneurship (Baumol 1993 and 2002); pro-efficiency but not libertarian (in the "Chicago School" sense of letting the market, almost always, take care of its own problems); and, especially, pro-cooperation, leaving room for business networks to thrive and for state-sponsored administrative-guidance initiatives.' While acknowledging that intellectual property plays an important role, Burlamaqui argue that intellectual property rights are not the magic bullet for innovation policy, but part of a much broader system and interconnection of innovation, competition and intellectual policy.

Similarly, in reviewing the rise of social enterprise and public service mutuals in the UK during austerity, public sector rationalisation and restructuring, Myres (2017) concludes that private ownership of public services has neither necessarily resulted in greater efficiency, nor has the concern gone away that profit-making strategies could result in higher prices for services.

However, while the academic discourse seems to have become more critical of the structural reforms of NPM and innovation, discussions around innovation agencies are picking up the effects of the NPM paradigm. Arundel (2015) analyses the innovative activities of public sector agencies and divides them into agencies using policy-dependent, bottom-up and knowledge-scanning innovation methods. Using a sample of 3273 public sector agencies, he finds that the three types each account for a similar number of agencies, with bottom-up agencies and knowledge-scanning agencies each accounting for 35% of the sample. Whereas policy-dependent agencies innovate in line with traditional perceptions of innovation with decisions taken by elected public officials, bottom-up and knowledge-scanning agencies are much more likely to apply NPM-type structural reforms, such as agentification, decentralisation, public-private partnerships and collaborations, and general market-oriented approaches. Arundel argues that bottom-up and knowledge-scanning agencies are far more innovative than policy-dependent agencies and significantly fewer policy-dependent agencies actively encourage staff participation in innovation.

Additionally, not all recent academic papers are necessarily critical of NPM-style structural reforms. Reviewing entrepreneurial activity and innovation in state-owned enterprises (SOEs) in New Zealand, Luke et al. (2010) argue that operational excellence and cost-efficiency are underpinned by government policy with expectations of both commercial and competitive behaviour in the SOE sector. They see strategic entrepreneurship as a key issue for innovation in the public sector faced with greater calls for NPM and see a strategic approach to entrepreneurship as a response to calls for greater efficiency as an opportunity for financial gains.

### 3.2 Focus on outcomes

As mentioned above, one of the key features of NPM reforms has been the focus on performance. In the realm of innovation and innovation policy, the performance focus of NPM reforms is associated with the competitiveness of the economy and related concepts such as internationalisation, but also with collaboration, technology transfer, open innovation and increasing

public sector capacity. The keywords and respective references are summarised in Table 2. Thus, in this category, the impact of NPM reforms is closely linked with the reactions to such reforms.

Table 2. Key concepts within the focus on outcomes

	63 references
Capacity	21 references
Collaborative R&D	30 references
Competitiveness	39 references
Internationalisation	11 references
Open Innovation	19 references
Public sector innovation	24 references
Technology transfer	26 references

One of the key features of innovation policy in the 1990s and 2000s was an increasing focus on how public investment into science, technology and innovation can increase the international competitiveness of a country (Schot and Steinmueller 2018; Breitinger et al. 2020). In the literature reviewed, we can see that the competitiveness paradigm takes two distinct forms.

First, there is a focus on understanding the impact of globalisation and the internationalisation of R&D activities (Archibugi and Iammarino 1999; Atzei et al. 1999; Park 2001) and how this impacts the funding of public research centres and universities (Masso and Ukrainski 2009; Cruz-Castro et al. 2012) and how they are increasingly managed according to incentives created by such funding mechanisms. Internationalisation, in particular, can take multiple forms, from the increasing relevance of international markets (Salter and Harvey 2008; Luke et al. 2010) to the international exploitation of technology produced on a national basis (Archibugi and Iammarino 1999) and international best practices as policy-making tools (Biseswar et al. 2012).

The focus on external competitiveness also has implications for the understanding of policy capacities: to increase competitiveness necessitates a renewal of existing policy capabilities, which in turn has led to increased experimentalism and new institution building, which may or may not be successful (Heidenreich 2005). Competitiveness as the main desired outcome is implemented through competitive grant funding, which is assumed to increase excellence, but also leads to a concentration of research funding (Masso and Ukrainski 2009).

Second, competitiveness can also take the form of a focus on competition as a driver of change within the public sector and beyond innovation policy. Here the research has focused on the question of whether competition acts as a source of innovation in the public sector. The evidence seems to indicate the opposite (Hartley, Sørensen and Torfing 2013): competition in the public sector does not yield more innovations (Negassi and Hung 2014) and indeed the apparent decentralisation through competition seems to increase administrative and monitoring mechanisms that centralise control (Foley 1999), while there is a need for more managerial flexibility (Dill 2001).

These two forms of competitiveness can be seen as the pillars of the 'competition state' (Benner and Löfgren 2007) that transcend existing types of capitalism (liberal and coordinated market economies) as countries converge around similar kinds of public investments and organisational forms. Competition between nation-states (Salter and Harvey 2008) is mirrored in the increasing competition in higher education and, as a reaction to increased competition, policymakers demand universities be responsive to societal challenges (Dill 2001).

Indeed, as a reaction to competitiveness as the key outcome and main mechanism of organisational change, collaboration seems to emerge as a major counter-point to NPM reforms: collaboration is seen as a major driver of innovations in the public sector (Hartley, Sørensen and Torfing 2013; Sørensen and Torfing 2017; Torfing 2019) and as underlying new forms of governance such as digital era governance (Margetts and Dunleavy 2013). Collaboration within the private sector, and, in particular, between private and public actors, is seen as a more relevant driver of innovation than competition: examples range from industrial clusters (Newlands 2003), regional strategies (Stejskal and Hajek 2016) and country case studies such as Taiwan (Mathews 2002).

However, collaboration requires more decentralised approaches to innovation and public investment (Estades 1999; Newlands 2003), and hence a more networked type of governance. Thus, NPM reforms seemed to have, perhaps inadvertently, opened up policy arenas to new hybrid forms of organisations and collaborations (Myers 2017).

A more decentralised approach to innovation is also reflected in the ideas of open innovation and open science, and the role of non-traditional actors, such as non-profits (Cleland et al. 2013; Paik, Kang and Seamans, n.d.).

Overall, NPM reforms are seen to have led to a changing balance in government-industry, and university-industry collaborations in both developed and developing countries (Powell 1998; Park 2001; Debroux 2008; Biseswar et al. 2012; Schacht 2013; Wong et al. 2014).

### 3.3 Process reforms

On process reforms, a total of 54 relevant sources were identified. NPM-type process reforms identified in this context are characterised across five key practice dimensions: outsourcing and contracting, open innovation, project management, external expertise and competition. A summary of the composition of this body of literature across those dimensions is detailed in Table 3.

Table 3. Key concepts within process reforms

		54 references
	Outsourcing and contracting	15 references
Competition		34 references
	Competitive grants	12 references
External expertise		12 references
	Consultancies	3 references
	Peer review	2 references
Project management practices		10 references
Open innovation practices		17 references

The review shows that most of literature pertained to competition (n = 34) and open innovation practices (n = 17). Although research has illuminated much in the practice dimensions of competition (n= 34), open innovation practices (n =17), and outsourcing and contracting (n = 15) in the context of NPM reform, the least literature was found on the project management practices dimension (n = 10). Perhaps somewhat surprisingly, in the context of the NPM process reform literature in the context of innovation policy, the subject areas least discussed were consultancies (n = 3) and peer review processes (n = 2).

Literature in this section covers the impact of NPM reforms on innovation in the public sector in general, not just in the specific area of innovation policy.

Early in the literature, the NPM paradigm was characterised by its ideological turn towards market orthodoxy, despite the public and private sectors' differing standards of accountability and interests (Collins, Hunter and Green 1994). The NPM paradigmatic shift emerged amid a political context of growing austerity. The increasing entrenchment of economic crises, combined with the growing need for public services, was the driver of governments' 'get more for less' mantra and has been pursued through the restructuring of institutional processes by organisational innovations (Hoggett 1996). These drivers emerged from governments' marked shifts towards operational decentralisation and fragmentation coupled, with an increased centralisation of their control over processes through the mechanisms of competition, contractual formalisation and performance-based management (Hoggett 1996; Foley 1999; Dunleavy 2006; Margetts and Dunleavy 2013). Further, the introduction of technologies in the public sector through procurement processes has remained a key enabler of these NPM reforms drivers and the public sector's management of

innovation (Uzuegbunam 2005; Margetts and Dunleavy 2013). NPM reforms supplanted technology-enabled transparency for trust through organisational structures, namely contractual formalisation and incentivisation through managerialism (Pollitt and Bouckaert 2017).

The NPM process reforms created various changes between institutional stakeholders relating to public sector innovation. NPM reformists argued that the increased competition between the public and private sectors, through decentralisation and centralisation of control through strategic management processes, would make the public sector more innovative (Sørensen and Torfing 2017). For instance, research became increasingly financialised by introducing policies that enabled universities, non-profits and small businesses to acquire and maintain proprietary rights over research discoveries made via federal funding (Powell 1998). As knowledge transformed into the property, the distinct incentive structures between science and technology collapsed into one another, bringing new questions of institutional legitimacy to the forefront. For instance, universities' reward structures increasingly prioritised the commercial applications of research through innovation licenses and patents over scientific research discoveries and publications as the pathway to professional advancement (Powell 1998; Dill 2001; Häyrinen-Alestalo and Peltola 2006). In addition, governments' reconceptualisation of innovation as primarily oriented around the commercialisable applications of knowledge, rather than a process of scientific discoveries alone, materially transformed the mission of universities (Vavakova 2006). Thus, the NPM transformation processes had the knock-on effect of impacting the legitimacy and redefining the mission of institutional actors.

While it was initially argued that the introduction of private sector practices and processes would make the public sector more innovative, governments' extraction of informational rents through contractual reporting requirements diminished the public sector's ability to induce its innovative capabilities (Boadway, Marchand and Tremblay 2003). These assumptions failed to examine how these processes constrained the public sector's innovative capacities and dynamic capabilities due to a high level of contract control and rigidity of outputs that diminished public sector experimentation, thus stifling innovation (Foley 1999; Kattel 2022).

The NPM process reforms diminished public sector innovation and dynamic capabilities. First, efficiency gains around outputs were being conflated as evidence of improved public outcomes (Dunleavy 2006; Margetts and Dunleavy 2013; Pollitt and Bouckaert 2017). Second, the high level of contract control and rigidity of outputs diminished experimentation and made actors more risk-averse, thus stifling public sector innovation (Foley 1999). The emergence of digital-era governments would try to reverse some of the excesses of NPM process reforms by reintegrating operational and control practices through the use of digital technologies, and realigning research and policy interests through funding instruments (Dunleavy et al. 2008; Masso and Ukrainski 2009).

### 3.4 Evaluation practices

NPM reforms raise new demands on evaluation practices. In order to contract out services and activities, new mechanisms and indicators had to be found to determine their quality and hold providers accountable. Similarly, internal performance measurement schemes and incentive structures required measures to assess project delivery and target achievement.

There is a fragmented body of literature on the practice of evaluation in the light of public administration reforms in recent decades. This is particularly true for the field of innovation policy. Most of the contributions assess the performance of procurement and contracting, as well as changes in governance modes and their effect on innovation and experimentation in the public sector. The meta-level linking evaluation practices to public administration reforms and its underlying conceptual rationale remains undiscovered in most contributions. It is therefore not surprising that only a few contributions link the observations to underlying major changes in public sector governance and use the conceptual framework of NPM.

In order to address the fragmentation, we introduced a number of subcategories into the analysis. In This is detailed Table 4. However, the in-depth examination of the contributions showed that a differentiation according to literature streams is more fruitful to identify starting points for future research. This is particularly true given the paucity of evidence on the impact of evaluation practices accompanying NPM reforms on innovation policy.

**Table 4. Key concepts within evaluation practices**

	41 references
Indicators	16 references
Value for money	13 references
Market failure methodologies	7 references
Excellence driven	11 references
Savings	8 references
Efficiency	18 references
Cost-benefit-analysis	5 references
Impact assessment	20 references
Quality management	18 references
Performance measurement	17 references

The three main features of NPM reforms, namely disaggregation, competition and incentivisation, (Margetts and Dunleavy 2013), are mechanisms to decentralise control and give organisations more scope to innovate and adapt. In order to ensure the accountability of private and public service provision, evaluation and monitoring practices gained importance (Foley 1999). Thus, the development of evaluation and monitoring systems has both enabled and facilitated NPM reforms. A number of new policy tools were developed to regulate competition, as well as assess service delivery and outputs. These included, amongst others, challenge funding (Foley 1999), contract management (Foley 1999; Uzuegbunam 2005; Siemiatycki 2011), value for money assessment (Collins, Hunter and Green 1994; Uzuegbunam 2005; Teo, Bridge and Jefferies 2010; Siemiatycki 2011; Schacht 2013), target agreements (Hoggett 1996; Foley 1999; Borrás 2008; Schneider and Sadowski 2010), result-based performance and input-output efficiency assessments (Häyriinen-Alestalo and Peltola 2006), competitive quality awards (Bovaird and Löffler 2009), performance-based funding (Kettl 2000), performance reviews, staff appraisal systems, performance-related pay, quality audits, customer feedback mechanisms, comparative tables of performance indicators including 'league tables', charter marks, customer charters, quality standards and total quality management (TQM) (Hoggett 1996).

Hoggett suggests that, in the light of decentralisation, monitoring and evaluation systems can be understood as elements of a rational-systems model of control (1996). He finds that, contrary to the aims of decentralisation processes, there is no evidence of a reduction in the formalisation of organisation within the civil service, at least in the UK. He posits that three strategies of control have been implemented in the civil service: a shift towards decentralising operational units while increasing centralised control on strategy and policy; the principle of competition as a method to coordinate activities of decentralised units; and, lastly, substantive performance management systems for decentralised units. Additionally, he observes a shift from input to output controls in performance measurement systems. The operational decentralisation is limited by a distant centre conducting performance monitoring and steering activities by a few outcome indicators. Thus, performance indicators can be seen as limits to the new organisational freedoms.

The positive narrative of NPM reforms, including greater freedom, flexibility and innovation, is thus challenged by the so called 'audit explosion' (Powell 1998; Myers 2017). The rampant growth in evaluation requirements led to concerns about increased information collection and surveillance, particularly using the gathered information for control and regulation schemes rather than for finding ways operations could be improved (Foley 1999; Margetts and Dunleavy 2013).

In the context of innovation policy, other than a few examples there is a lack of evidence on the role of the evaluation practices accompanying NPM. Some of these examples are discussed here and they open up several avenues for future research.

In her work on effective governance of innovation systems, Borrás describes how NPM techniques have affected innovation policy (Borrás 2008). Combined with policymakers' increasing adoption of the innovation systems approach, NPM-type techniques have led to a deepening of innovation policy. As a result of these public sector reforms, policymakers have increasingly experimented with different forms of governance. Examples of these are decentralisation, contract management,



privatisation and public-private partnerships. At the same time, new, more sophisticated steering mechanisms for programmes and schemes were developed. Borrás describes an array of new policy instruments, among them so-called meta-instruments. These instruments comprise indicators and benchmarks for innovation systems facilitating mutual learning across countries and institutions. She posits that new evaluation practices do not automatically improve an innovation system. Instead, she describes this shift and calls for empirical investigation; a call that has gone largely unanswered and that this paper seeks to revive.

The only exception is the literature on changing regulations of public research institutions, particularly universities. In many countries, universities are increasingly subject to a global market. In order to address these new challenges, universities need greater management flexibility to compete effectively. At the same time, governments want to ensure that universities fulfil their role in society. This has led to a number of new evaluation practices to address these new challenges (Dill 2001). Dill describes three approaches governments have experimented with to hold universities accountable, despite increased operational freedom:

- information provision on the quality of institutions in order to guarantee qualified consumer decision-making in a market environment;
- capacity-building with audit processes not tied to funding, but showing universities where they could improve; and
- performance funding which entails additional funding when excellence criteria have been met (Dill 2001).

These measures should increase the efficiency of the higher education system, while at the same time ensuring high-quality service provision. However, managing the higher education sector according to a few quantitative performance indicators can be highly problematic, as Hicks shows by examining the case of performance-based funding systems (Hicks 2012).

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## 4. Discussion

We argued in the introduction that NPM reforms and their impact have been theorised and observed on two levels: NPM as policy governance and NPM as organisational practice. Our literature review largely confirmed this, but we can, importantly, add additional dimension. When looking at NPM and innovation policy we can detect two sets of discussions: the impact of NPM reforms on innovation as research and development, and the impact of NPM reforms on innovation in the public sector in general. Indeed, based on our review it can be argued that NPM reforms widened the focus of innovation in the public sector from R&D to wider policy and organisational practices in all areas of public policy.

What is also clear is that NPM reforms can be seen as having a primary and secondary impact. The primary impact is through the intended consequence of an NPM-style reform (i.e. creating a competitive grant scheme for universities); the secondary impact is through a correction to initial

reforms (i.e. increasing collaborative rather than competitive practices). We summarise our review findings in Table 5, a simple two by two table.

**Table 5. Summary of findings: the impact of NPM reforms and innovation policy**

	NPM as policy governance	NPM as organisational practices
Innovation as R&D	<p style="text-align: center;">A</p> <ul style="list-style-type: none"> <li>▪ Focus on competitiveness as key policy outcome (primary impact)</li> <li>▪ Emergence of new and non-traditional policy actors (primary impact)</li> </ul>	<p style="text-align: center;">B</p> <ul style="list-style-type: none"> <li>▪ Managerial practices driven by competitive incentives (primary impact)</li> <li>▪ Performance measurement (primary impact)</li> </ul>
Innovation in the public sector	<p style="text-align: center;">C</p> <ul style="list-style-type: none"> <li>▪ Emergence of new and non-traditional policy actors (primary impact)</li> <li>▪ Focus on collaboration as a reaction to competition as a driver of innovation (secondary impact)</li> </ul>	<p style="text-align: center;">D</p> <ul style="list-style-type: none"> <li>▪ Focus on public sector capacities required for more networked governance (secondary impact)</li> <li>▪ Increased experimentalism (primary and secondary impact)</li> </ul>

In quadrant A we find the discussion of NPM as broader policy governance reforms in the domain of research and development policies. Here NPM reforms manifest as a focus on increasing the country's competitiveness in international markets, and as an enabler of new and non-traditional policy actors, including at-arm's-length innovation policy agencies. Continuing to quadrant B, NPM reforms take the form of reforms in managerial practices in various policy actors in the R&D space, from policy agencies to universities. These practices largely focus on competitive incentives (such as competitions for grant funding) and there is a wider focus on performance management and metrics. In terms of the impact of NPM reforms on innovation in the public sector, in quadrant C we find the discussions about how NPM plays a role in the emergence of new and non-traditional policy actors (such as government digital agencies or NGOs) and how NPM reforms galvanise reactions to its failings by focusing on collaboration, rather than competition, as a driver of innovation in the public sector. Finally, in quadrant D, the literature reviewed in this article shows the impact of NPM reforms on organisational practices as an increased focus on public (organisational) sector capacities for networked governance and increased experimentalism through diversified ways of working with public and private sector partners.

Thus, the impact of NPM reforms in the innovation policy domain is more multilayered and multidimensional than is often assumed in the innovation (policy) literature. While at the outset of the article, we expected that the impact of these reforms would be mostly negative, the literature

review shows much more mixed results. Thus, for instance, while NPM reforms focusing on increasing competition in public organisations can be seen as mostly having a negative impact, this has opened up the debate about collaborative practices around innovation in the public sector, and between public and private actors. On the other hand, NPM reforms created, perhaps inadvertently, space for new and non-traditional policy actors to emerge or gain access to (innovation) policy spaces. Examples include digital agencies or public-private partnerships such as technology parks. In sum, NPM reforms in the innovation (policy) arena brought organisational hybridisation and flexibility.

This article sought to answer the following research questions:

1. NPM in innovation policy governance:
  - What kind of structural reforms took place and what was their impact in innovation policy governance during the emergence of NPM reforms? (RQ1)
2. NPM in innovation policy organisational management:
  - How did the understanding of innovation policy outcomes change during NPM reforms? (RQ2)
  - What kind of policy process reforms took place during NPM reforms? (RQ3)
  - How did evaluation frameworks and practices evolve during NPM reforms? (RQ4)

In a broad sense, the primary impact of NPM reforms is seen predominantly as negative: the structural reforms often lead to more fragmented policy space and to organisations driven by unhelpful incentives (RQ1). Yet, through NPM reforms, international competitiveness became the key policy outcome with both positive and negative impacts throughout the innovation system (RQ2). Competitive policy practices characterise NPM reforms with a mostly negative impact on the organisations in the innovation system (RQ3). However, the secondary impact of the structural and process reforms often understood as corrective reforms to the NPM initiatives is seen in the literature as mostly positive. While in general NPM is seen to have led to an audit explosion, the literature on innovation policy is yet to discuss the impact of such practices in detail (RQ4).

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## 5. Conclusion: Avenues for future research

Perhaps the key conclusion of our literature review is that focusing on NPM reforms in the innovation policy domain opens up a whole set of research and policy questions that need to be answered by further research.

First, while in academic research innovation policy and innovation in the public sector are often discussed in separate academic disciplines, the impact of NPM reforms shows that the relationship between innovation and the public sector is more complex and multilayered. Future studies could attempt to synthesise various academic research strands to gain a more holistic understanding of innovation and the public sector.

Second, NPM reforms opened up space for new and non-traditional actors and practices to emerge into the innovation space, ranging from digital agencies to collaborative practices. While

academic research is picking up these trends, there is still relatively little research on how related capacities and capabilities evolve. For example, there appears to be very little research aimed at understanding the organisational and managerial practices of these new innovation actors, and whether and how their practices influence other public sector actors.

Third, the evolution of evaluation practices due to NPM reforms provides a particularly fruitful area for future research. We have seen that evaluation practices are a key enabling factor for NPM reforms, ensuring accountability under greater decentralisation. However, when evaluation practices focus on just a few output indicators the greater freedom to operate can quickly shift into a situation of destructive competition for resources among public institutions. Nevertheless, empirical evidence is still largely lacking. This is particularly true for innovation policy. A starting point for future research could be the literature on new evaluation practices accompanying NPM reforms for universities. Potential research questions are: What is the impact of new evaluation practices on innovation policy? How do these practices influence policy outcomes? How far do they mirror new evaluation practices in other policy fields? Furthermore, it could be whether the observed increased control, offsetting the promise of greater decentralisation, also holds for innovation policy.

In sum, our review shows that research into administrative and policy practices in the domain of innovation policy opens up a range of important avenues for future research. These questions are all the more important given the increasing demands placed on innovation policy by governments: transformative innovation policy requires highly capable and indeed innovative public organisations. As our review shows, as public sector organisations have undergone quite dramatic changes over the last decades, our understanding of the impact of these reforms on the ability to deliver innovations needs to be much deeper than it is now.

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