INNOVATION GOVERNANCE IN THE PUBLIC SECTOR

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DELFT UNIVERSITY OF TECHNOLOGY

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"You may never know what results come of your actions, but if you do nothing, there will be no results."

Mahatma Gandhi

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MANAGEMENT SUMMARY

The thesis starts with an introduction on government digitalisation. Around the 1970s, a new approach should have modernised the public sector, called New Public Management. New Public Management was aimed at efficiency, marketisation, accountability, and decentralisation. Issues such as increased administrative complexity and ineffectiveness ended New Public Management, and a new label was created in 2006: Digital Era Governance, with a central role for IT. The increased use of IT resulted in digitalisation of the government, aiming at least at increased productivity of public servants, improved service delivery, and economic growth. However, social, political, technical, and organisational challenges hinder governmental digitalisation, and meanwhile the private sector continues to digitalise. In trying to keep with technological developments in the private sector, the public sector must innovate. The missing incentives, due to no competitors or the limited priority for innovation, to innovate may eventually result in ineffective, inefficient, and inadequate government procedures and services. The issue with government digitalisation through innovation is a missing innovation approach. This resulted in the following research question and sub-questions:

How to govern innovation in the public sector to enhance public sector digitalisation?

1. How is public sector innovation defined?
2. What are drivers and barriers of public sector innovation?
3. How to define governance for public sector innovation?

The first part of the thesis consists of a literature review. In this section, different types of innovation are explained. The four basic types of innovation are radical, incremental, process, and product innovation. Radical innovation refers to reconceptualising and incremental innovation refers to improving existing products, services or processes. Other types of innovation include creative (innovate with use of own systems), adaptive (implement outside developed technologies), position (dealing with unserved or under-served markets), and paradigm (facing changes in the underlying mental model) innovation. Additionally, innovation types of public sector innovation include: service, service delivery, administrative and organisational, conceptual, policy, and systemic innovation.

These types of innovations bring along both barriers and drivers. Barriers of innovation hinder innovation. Fortunately, there are also drivers that stimulate innovation. In addition to the barriers and drivers of innovation, some sort of guidance during innovation is required. The barriers, drivers, and guidance factors are presented in the table below.

Barriers	Guidance for innovation process	Drivers
Hierarchical and bureaucratical form of the organisation, resulting in too many rules and procedures, risk-aversion, and a reduced speed of action; Lacking reward-system reduces incentives to innovate; Structural and cultural barriers for government and/or citizen (e.g. technological constraints or no perceived usefulness).	Technology Innovation process Corporate strategy Organisational structure Organisational culture Employees Resources Knowledge management Management style and leadership	Push side of innovation: technological developments, political targets, and international agreements; Pull side of innovation: user needs and preferences or competitive drivers, such as performance targets; Management commitment through support mechanisms (e.g. providing resources).

All of these factors require some sort of overview, presented as in the IT governance design framework of Weill and Ross (2004). This framework is divided into three sections: the strategy, governance arrangements, and the performance goals. These three sections are harmonised with the organisation and desirable behaviour, governance mechanisms, and metrics and accountabilities, respectively. A governance is beneficial because of the alignment, protection of budget, the ability to take advantage of business opportunities, and for avoiding potential business threats.

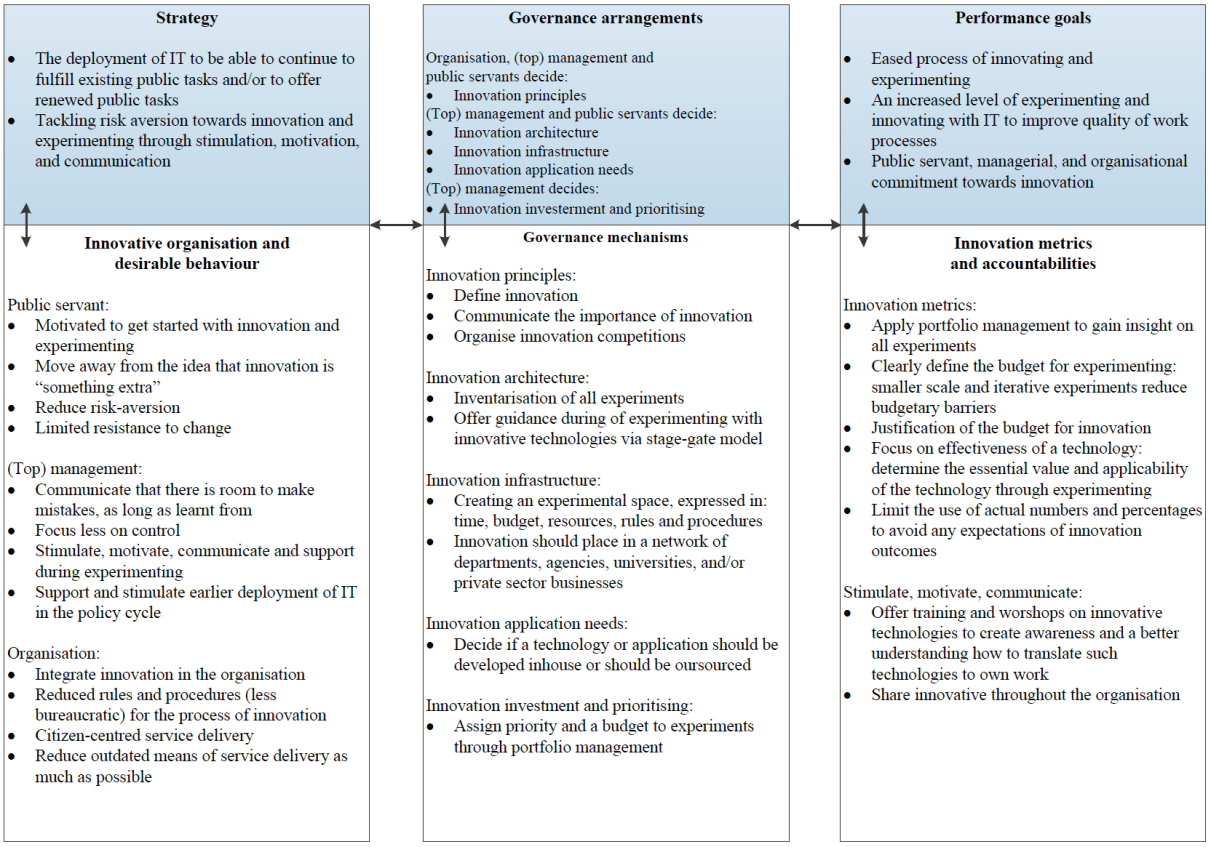
This IT governance design framework is used in the methodology as a base for developing a governance framework for public sector innovation. The research was carried out at the office of the CIO at the Dutch Ministry of Economic Affairs and Climate. The qualitative research was based on judgment sampling since innovation is not part of the daily routine of the average public servant. Eight specialists were interviewed and based on this interview the first version of the framework was developed. This framework was evaluated via five additional colleagues. The final version is presented in the Results section.

The answer to the first sub-research question is as follows: The public sector deals with many different types of innovation, but the level of intensity is debatable. The process of innovation and the introduction of technologies, whether the impact is rather small or large brings along several issues. These issues, or barriers of innovation, are explained in the next section. To overcome these barriers, drivers are explained.

The answer to the second sub-research question is as follows: the long list of barriers may hinder public sector innovation, due to for example risk-aversion, budgetary limitations, or the bureaucracy. The drivers of innovation trying to overcome these barriers deal with support mechanisms for innovation. These drivers include support mechanisms for innovation, such as communication, allow for mistakes,

and support in risk taking. Also, there are some initiatives for promoting innovation (e.g. innovation coaches or ambassadors), but innovation is still not seen as a priority.

The answer to the third sub-research question is as follows: the framework of Weill and Ross (2004) is used in developing a governance framework for public sector innovation. The first version of the framework was developed with use of the literature and eight interviews. The framework was evaluated through five additional interviews. The evaluation interviews were needed to give some extra input about the model, its understandability, and to provide insights on what needed to be emphasized, adjusted, or removed. The model is an overview of the collected barriers and drivers, suggestions for organising public sector innovation, and other related recommendations. Harmonising the three columns – the strategy, governance arrangements, and performance goals – is a step in the right direction of promoting public sector innovation. The final framework is presented below:



After answering these three sub-questions, enough information was collected to answer the main research question. Governing innovation could offer a solution if the public sector wants to keep up with developments in the private sector. Without public sector innovation, services offered become inadequate. Additionally, the input of IT can provide completely new opportunities for the government to deliver services. Since such governance for public sector innovation was not found in literature, in combination with its importance, the focus of the thesis was innovation governance. However, adjusting the governance for the entire public sector in a short amount of time –six months to be exact – seemed

rather ambitious. It was therefore decided to apply the knowledge gained through the literature review and the data collection of the interviews to develop a governance framework.

So, in answering the main research question on how to govern innovation in the public sector to enhance public sector digitalisation, the framework can be consulted. This framework shows what the strategy is in government digitalisation, who and how responsibilities are arranged and expressed, and what the final performance goals public sector innovation is supposed to reach. The framework is flexible enough to interpret and adjust some of the dimensions in the framework, but sturdy enough to offer guidance in setting up an innovation governance for the public sector. This framework can be useful for ministries, government agencies, and other organisations within the public sector in setting up their governance towards promoting and increasing innovation. The significance of this framework is expressed in the differences in dealing with innovation between the public and private sector, where the public sector is missing e.g. incentives, (financial) resources, or guidance. The framework emphasises the importance of desired behaviour of the public servant, (top) management, and the organisation in one clear overview, which has not been done before. In conclusion, the final framework could therefore be seen as a first step in filling the gap of public sector innovation governance.

Recommendations on applying the framework are: apply the framework as suitable for the organisation, since the framework is flexible enough to be adjusted accordingly but also sturdy enough to provide clear guidelines in arranging an innovation governance. Also, when it comes to innovation and experimenting, the most hands-on recommendation is, instead of continuing to develop strategies, agendas, approaches, or write other government reports, is to actually start experimenting. Third, in boosting innovation, it is recommended to learn from others for knowledge spill-overs, innovation approaches, and other methodologies in structuring the process of innovation.

However, limitations of the research were non-response on interviews, a desired higher diversity, and the level of generalisability. Yet, the limitations are acceptable in the application of the framework. For further research, a larger and more extensive research is required to fully generalise the final framework for public sector innovation. Also, the framework could be tested for its effectiveness through a form of governance performance measurement.

PREFACE

This thesis has been written partial fulfilment of the requirements for the degree of Master of Science in Management of Technology, from the faculty of Technology, Policy and Management at Delft University of Technology. The thesis is written at least for the three committee members from both Delft University of Technology and the Ministry of Economic Affairs and Climate, plus anyone interested in my vision on public sector innovation.

I would like to use this space to thank everyone that somehow contributed to writing my thesis. First of all, I would like to thank my dearest family – in particular my mom, brother, sister, uncle, aunt, and cousin – for the unconditional love and support during the hardest times in our lives. When our whole world was turned upside down, we found comfort with each other and our bond is stronger than ever. Through every ups and downs that may follow and whatever the impact may be, we must always remember, *"it may be raining, but there's a rainbow above you"* (Eagles – Desperado)

Second, I would like to thank all my colleagues at the Ministry of Economic Affairs, especially Fred Winia and Ties Hussaarts. Without Fred connecting me to my supervisor Ties, I would not have been writing this thesis. I would thank Ties for the amount of freedom and the faith in me which gave me confidence that I would successfully finish this period in my life. Our almost exclusively informal communication immediately made me feel part of the organisation. Next, I would like to thank the colleagues that gave me the opportunity and trust to further explore the ministry by participating in the organisation of the "Night of the Digital Innovation" event. Last, I would like to thank everyone at Rijksoverheid that contributed, either formal or informal, to this thesis and my time at the Ministry.

Third, I would like to thank my two supervisors from Delft University of Technology. I had the tendency to not ask for help even though I needed it. I would like to thank my first supervisor Robert Verburg for offering me this help, providing me with new insights, and for contacting me every three weeks that we should have a meeting. I would also like to thank my second supervisor Marijn Janssen for his structured approach in providing feedback, his quick responses to my emails, and his overall interest in the subject.

And finally, I want to thank all my friends and fellow students that had to hear me complain about the process of writing this thesis and for helping me get through this. Their continuous interest, support, and advice gave me the strength to finish this thesis.

My time as a student has come to an end. I have had the time of my life studying in Delft and I am sad to leave this place. To everyone that made this period unforgettable: thank a million!

Lizzy Brantsma, The Hague, August 2018

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

ABSTRACT

The growth in the use of Information Technologies in the private sector calls for the public sector to anticipate. The public sector digitalisation is expected to improve execution of public tasks and services, and increase confidence of citizens and businesses in new innovative solutions. However, public sector innovation on digitalisation is not seen as a priority, innovation is too risky, and the public sector has no incentive due to absent competitors. Nevertheless, without innovation, public tasks and services become inadequate, resulting in stagnated and eventually decreased effectiveness and efficiency of service delivery. The need for innovation approaches; the inconsistency in sustaining innovation by the public sector; and the unprecedented pace of technological, demographic and social changes, require a systematic approach. The research question answered in this thesis is therefore: "How to govern innovation in the public sector to enhance public sector digitalisation?" The thesis starts with a literature review on innovation (on different types, barriers and drivers, management, and governance), then explains the methodology (qualitative research, data collection through judgment sampling) and where the research was carried out: the Dutch Ministry of Economic Affairs and Climate. Hereafter the results are presented as: the definition and view on public sector innovation, barriers and drivers of public sector innovation, and the development of a governance framework for promoting innovation in the public sector. In the following chapter an initial evaluation is presented, followed by the discussion and conclusion answering the main research question, recommendations, and suggestions for further research. The concluding remark on the thesis shows that the final framework could be seen as a first step in setting up a governance for public sector innovation.

1. INTRODUCTION

This chapter introduces the problem statement based on government digitalisation.

1.1 FROM NEW PUBLIC MANAGEMENT TO GOVERNMENT DIGITALISATION

Between the 1970s and 1980s, the old methods of public management has been doubted for its efficiency, demanding a renewal of the approach to modernisation of the public sector, called New Public Management (NPM) (Fishenden & Thompson, 2012, p. 468; Navarra & Cornford, 2005). The focus of the NPM can be divided into four main directions: efficiency, marketisation, accountability, and decentralisation. These are explained by Navarra and Cornford (2005) as: 1) *efficiency* reduces e.g. costs and staff, and changes current methods of working, 2) *marketisation* shifts command and control of hierarchies from vertical to horizontal, 3) increase *accountability* of public servants for their decisions, and 4) *decentralisation* enhances autonomous lower level decision making, and local responsiveness and tailored solutions. Disagreement on NPM is expressed by Fishenden and Thompson (2012) by explaining the downsides of NPM. Disaggregation of public sector activities should have created incentives and competitiveness, but instead it increased administrative complexity, services compatibility, and ineffectiveness. Dunleavy, Margetts, Bastow, and Tinkler (2006) also disagreed on the term NPM and created a new label for the increased emerge and use of new technologies: the Digital Era Governance (DEG). According to Dunleavy et al. (2006, p. 468), *"the label highlights the central role that IT and information system changes now play in a wide-ranging series of alterations to how public services are organized as business processes and delivered to citizens or customers,"* changing the role of IT from supporting to central.

Liu and Hwang (2003, p. 11) described Information Technology in a government context as *"any equipment or interconnected system of equipment that federal agencies can use for automatic acquisition, storage, manipulation, management, movement, control, display, switching, interchange, transmission, or reception of data or information."* The growth in the use of IT, resulting in digitalisation of the government, increases connectivity and networking between citizens and businesses (Linkov, Trump, Poinsatte-Jones, & Florin, 2018). Expectations are rising for governments to follow companies in their digital transformation (Corydon, Ganesan, & Lundqvist, 2016). Citizens and business expect easily accessible and understandable information provided by the government (Dilmegani, Korkmaz, & Lundqvist, 2014). This must result in improved execution of public tasks and services, and increased confidence of citizens and businesses in new innovative solutions, confirmed by the "Make it Happen!" report of the Dutch Ministry of Interior and Kingdom Relations (2017). By better understanding what citizens need, assembling services more quickly at lower costs, and continuously improving services based on data and evidence, the government can transform itself into a digital government (Gummer, 2016). As explained in the "Make it Happen!" (2017) report, a digitalised government increases productivity of public servants, and can offer better services, increase economic

growth, and create a more transparent governmental operation, where the citizen is central. Although digitalisation of the government offers numerous benefits, some challenges arise. An example of such (sustainability) challenges was categorized by (Linkov et al., 2018, p. 1) as: *"Social [challenges] (i.e. the benefits or costs imposed by disruptive digital technologies upon social networks and ways of life, including threats to economic sustainability and the rise of economic disparity) and environmental well-being (i.e. natural resource stewardship and concern for future generations) driven by the automation of information processing and delivery of services."* Other challenges in digitalisation of the government political (e.g. law and legislation), technical (e.g. IT infrastructure, or safety and security issues), economic (e.g. funding), or organisational (i.e. challenges faced by/because of employees) (Al-Sebie & Irani, 2005). A major organisational challenge expressed by the "Make it Happen!" (2017) report is the misconception of politicians, directors, and public servants, notifying the importance of digitalisation but neglecting the urgency. This troubling mindset limits the benefits of a (eventually fully) digitalised government (Dilmegani et al., 2014).

Despite of the limited degree of public sector innovation, governments are continuously stimulating private companies to keep on innovating. It seems that some governments do not follow their own advice to stimulate (internal) innovation. Reasons can be that innovation is not seen as a priority, or because innovation is (too) risky, or that governments have no incentive due to absent competitors (Wainewright, 2014). Nevertheless, one clear reason for innovation should be that governments' standard operating processes are becoming inadequate (Altshuler & Behn, 2010), resulting from stagnating (and eventually decreasing) effectiveness and efficiency of services provided by the public sector. Such challenges in innovation require a new systematic approach. Traditional prescriptions are seen as insufficient, and according to the OECD new methods of innovation are needed. The need for innovative approaches; the inconsistency in sustaining innovation by the government; and the unprecedented pace of technological, demographic and social changes, were the base of four key actions for the government developed by the OECD (2015). Table 1 specifies the four key actions for the government: people matter; knowledge is power; working together solves problems; and rules and processes to support, not hinder. These actions specify how governments should stimulate its public servants, facilitate the flow of information, adjust its organisational culture, and balance its rules and processes. In addition, based on these four key actions, the OECD developed a document called 'the Recommendation' strategy, listing twelve recommendations on developing and implementing digital governmental strategies, listed in table 2. These recommendations describe why and how to develop and implement of digital government strategies. Digital government strategies could eventually lead to an electronic government, or e-government. E-government has been defined by Marconi (2014, p. 6) as: *"the use by the governments of information and communication technologies (ICTs), and particularly the Internet, as a tool to achieve better government."* The technological developments in an e-government create new possibilities and changes in societal expectations.

TABLE 1. KEY ACTIONS FOR THE GOVERNMENT, TAKEN FROM THE OECD (2015)

Key action	*Specification of the action*
1. People matter	Governments must invest in the capacity and capabilities of civil servants as the catalysts of innovation. This includes building the culture, incentives and norms to facilitate new ways of working.
2. Knowledge is power	Governments must facilitate the free flow of information, data and knowledge across the public sector and use it to respond creatively to new challenges and opportunities.
3. Working together solves problems	Governments must advance new organisational structures and leverage partnerships to enhance approaches and tools, share risk and harness available information and resources for innovation.
4. Rules and processes to support, not hinder	Government must ensure that internal rules and processes are balanced in their capacity to mitigate risks while protecting resources and enabling innovation.

TABLE 2. RECOMMENDATION OF THE COUNCIL ON DIGITAL GOVERNMENT STRATEGIES, TAKEN FROM OECD (2014)

	Recommendation
The council recommends that governments *develop and implement digital government strategies* which:	1. Ensure greater transparency, openness and inclusiveness of government processes and operations 2. Encourage engagement and participation of public, private and civil society stakeholders in policy making and public service design and delivery 3. Create a data-driven culture in the public sector 4. Reflect a risk management approach to addressing digital security and privacy issues, and include the adoption of effective and appropriate security measures
The council recommends that, *in developing* their digital government strategies, governments should:	5. Secure leadership and political commitment to the strategy 6. Ensure coherent use of digital technologies across policy areas and levels of government 7. Establish effective organisational and governance frameworks to co-ordinate the implementation of the digital strategy within and across levels of government 8. Strengthen international co-operation with other governments
The council recommends that, *in implementing* the digital government strategies, governments should:	9. Develop clear business cases to sustain the funding and focused implementation of digital technologies projects 10. Reinforce institutional capacities to manage and monitor projects' implementation 11. Procure digital technologies based on assessment of existing assets including digital skills, job profiles, technologies, contracts, inter-agency agreements to increase efficiency, support innovation, and best sustain objectives stated in the overall public-sector modernisation agenda 12. Ensure that general and sector-specific legal and regulatory frameworks allow digital opportunities to be seized

As mentioned above, the need for innovative approaches; the inconsistency in sustaining innovation by the government; and the unprecedented pace of technological, demographic and social changes, require some form of organisation of public sector innovation. However, several issues hinder public sector innovation, such as the aforementioned challenges (social, political, technical, organisational) and especially the missing incentives and priority of public sector innovation. This leads to the following problem statement.

1.2 Problem statement

The introduction points out that there are several issues related to public sector innovation. It seems that the public sector is struggling to manage technological innovation, due to a missing view on how to govern the process of innovation. The consequence of a missing method of governing public sector innovation is that innovation is not prioritised, which will eventually result in an inability to provide contemporary public services. There are insecurities in public sector innovation, such as incentives of public servants to innovate, *how* they must innovate (due to missing guidance) and *who* needs to innovate (i.e. who makes decisions and carries responsibility). This leads to the following research objective and research questions:

Based on the problem statement, the general research objective of this study is to offer support the process of public sector innovation aimed at digitalisation. An overview of the current situation of public sector innovation will be created by reviewing limitations and barriers of public sector innovations, how to overcome such barriers, what are the drivers and incentives for innovation, and methods of managing innovation. After creating such overview, a new method of governing public sector innovation, emphasizing the use of IT, can be created. This will contribute to the guidance of innovating and experimenting with Information (and Communication) Technologies for the public sector.

Following the problem statement and the research objective, a research question is formed. This question must cover the barriers of the Information and Communication Technologies innovation process for the public sector. The research question that needs to be answered is therefore formulated as:

How to govern innovation in the public sector to enhance public sector digitalisation?

In order to answer the main research question, sub-questions are developed. These sub-questions are used to describe the current situation, what fosters and hinders public sector innovation, and to find out what the needs are of the current process of innovating. The sub-questions are formulated as:

1. How is public sector innovation defined?
2. What are drivers and barriers of public sector innovation?
3. How to define governance for public sector innovation?

1.3 THESIS OUTLINE

This thesis started out with a management summary and the abstract. This chapter introduced government digitalisation and public sector innovation and the related problem statement. Chapter 2, the Literature Review, goes into depth on the types of innovation, drivers and barriers of innovation, how to manage innovation, and on governance. Chapter 3, Methodology, presents where the study has been carried out and explains the method used for performing this research. Results of this methodology are explained in chapter 4. The evaluation of these results follows in Chapter 5. The discussion, conclusion and recommendations, are presented in Chapter 6. Chapter 7 presents the reflection, including limitations of the research, what could have been done differently, and suggestions for further research. Then, after the References, the appendices are found.

2. LITERATURE REVIEW

This chapter covers the need for government digitalisation, what department is–amongst others–responsible for the transition, what at this point in time limits the implementation of Information and Communication Technologies, and how to structure experimentation/implementation.

2.1 TYPES OF INNOVATION

First it is needed to have a better understanding of innovation, therefore concept of innovation is briefly explained. If companies in the private sector want to survive, they need continuous innovation. Innovation is needed for example to increase labour productivity or to produce technological advanced products/services. Private sector companies that do not innovate will lose market share and become obsolete. Large companies with a sizeable R&D department carry out such projects/experiments themselves, having the advantage of being the first mover (or early adopters) but also face large expenditures and the risk of projects failing. A strategy of Small and Medium Enterprises can be to 'wait' for the fully developed processes, services, or other technologies to keep their costs low (i.e. free-rider effect). The disadvantage of this strategy is that then the SMEs cannot benefit from being the early adopters, but rather are seen as the early/late majority. Figure 1 shows the technology adoption over time, from innovators to laggards. Another way for a company to gain profit is through licensing intellectual property, allowing other companies to use its technology and gaining a certain percentage of the profit through the license.

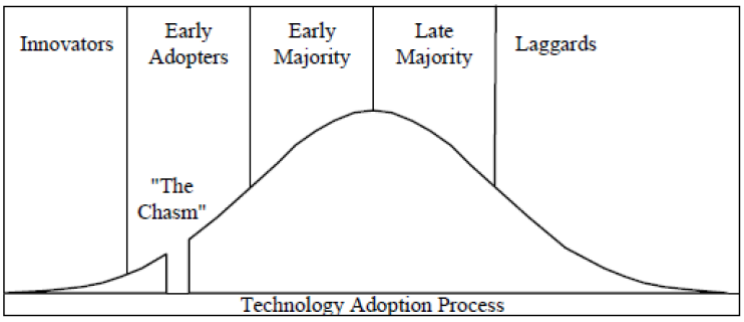


FIGURE 1. TECHNOLOGY ADOPTION PROCESS OVER TIME

A distinction can be made between radical or incremental innovation, and innovation can be carried out on product or process level. Radical innovation refers to re-conceptualizing products, services, or processes, and incremental innovation refers to improving existing products, services, or processes. These are the four most common distinctions, but other researchers (Coombs, Narandren, & Richards, 1996; Damanpour, 1991; Jin, Hewitt-Dundas, & Thompson, 2004) classified innovation as: new/novel (radical) innovation and product/service differentiation; technical and administrative innovation; creative and adoptive innovation, respectively. These types of innovation are explained below.

Coombs et al. (1996) explain innovation as either product or process innovation, where product innovation is explained as **product or service differentiation**. A further distinction is made between radical and incremental: a totally new product is called a radical innovation, and a modestly improved product is called **incremental** innovation. Radical innovations can further be divided into: new or novel. **New radical** innovation includes a radical change for an existing functionality of a product, and **novel radical** innovation includes a radical change for a product with a new functionality. Process innovation includes significant changes in the technique or technology. In addition, there are products that are developed as accessories called complementary goods. Next to radical/incremental and product/service innovation, Damanpour (1991) defines two other types of innovation, namely technical and administrative. **Technical** innovation is basically a collective name of both product or process level innovation. **Administrative** innovations focus on the organisation and its management. Jin et al. (2004) make a distinction between the ability to innovate within an organisation and with use of its own systems (**creative** innovation), or the ability to adopt and implement innovations developed outside of the organisation (**adoptive** innovation).

However, these types of innovation mostly relate to the private sector. These types of innovation can occur in the public sector, but the output of these innovations is different: private sector companies must innovate in order to survive in the market, public sector must innovate to improve, adjust or develop new services provided to society. A report on innovation in the public sector prepared by the Sunningdale Institute for the Cabinet Office (of the UK's National School of Government) contains an overview of four types of innovation (product, process, position, and paradigm), combined with its impact (incremental or radical). **Product** innovation is described as 'what we offer the world', where incremental means improved service offerings, and radical means completely new service offerings. **Process** innovation deals with creating and delivering that offering through incremental 'lean' improvements (e.g. online versions of existing processes) or radical new process delivery services. **Position** innovation, concerned with the market, deals with completely new, unserved or under-served markets, radical repositioning of public service in end users' minds, or incremental modifications such as wider participation or social inclusion for delivering existing services. **Paradigm** innovation faces changes in the underlying mental model of what the government does, such as the aforementioned road towards New Public Management. Windrum and Koch (2008, p. 8) extends this list of types of public sector innovation with:

- **Service** innovation: the introduction of a new service product or an improvement in the quality of an existing service product;
- **Service delivery** innovation: new or altered ways of delivering to clients, or otherwise interacting with them, for the purpose of supplying specific public innovations;

- **Administrative and organisational** innovation: changes in the organisational structure and routines by which front office staff produce services in a particular way and/or back office staff support front office services;
- **Conceptual** innovation: the development of new world views that challenge assumptions that underpin existing service products, processes, and organisational forms;
- **Policy** innovation: change the thought or behavioural intentions associated with a policy belief system;
- **Systemic** innovation: new or improved ways of interacting with other organisations and knowledge bases.

2.2 Drivers and barriers of innovation

The European Commission has published a report on public sector innovation in the European Union (2012), describing internal and external drivers and barriers. Internal drivers and barriers are divided by León, Simmonds, and Roman (2012, p. 17) into human-resource related factors (i.e. education and training of public servants, availability of incentive schemes for motivating public servants, and leadership and management), and bureaucracy and organisational structures and design (i.e. internal organisational processes; performance management, including monitoring and evaluation practices; and internal innovation culture). External drivers and barriers are listed by León et al. (2012, p. 19) as: international knowledge transfer and exchange, international rankings, national awards, co-creation/service user participation/collaboration between public-private sectors, and citizens and businesses demands. An additional category is political drivers and barriers, listed León et al. (2012, p. 20) as: budget reductions/restrictions, availability of funding/financial resources, EU policy decisions and requirements at EU level, political support, and (more flexible) laws and regulations. Depending on the country, these factors are either labelled as barriers or drivers. For the Netherlands, the factors that were considered essential in public sector innovation are: 1) The introduction of new operational and management tools, 2) reducing the administrative burden, 3) bottom-up approaches to public sector innovation, 4) education and training offered to public servants, 5) incentive schemes for motivating public servants, 6) a constant need for knowledge transfer and exchange with European public administrators, and 7) innovative policy measurements fostering public-private partnerships.

Barriers to innovation

Next to the European Commission, barriers for public sector innovation have been described by various scientists (Cunningham & Karakasidou, 2009; Koch & Hauknes, 2005; A. Meijer, 2015; Mulgan & Albury, 2003; Sørensen & Torfing, 2011). Especially the classic hierarchical and bureaucratic form of the public sector involves barriers to public innovation. One of the biggest barriers to public sector innovation is risk-aversion. Risk-aversion is backed by several issues dealing with failure, namely: 1) failure affects politicians' and public servants' careers, especially if picked up by media (Sørensen &

Torfing, 2011); 2) the idea that, according to a review of the Dutch Ministry of Internal Affairs, mistakes are not allowed and that innovations must be immediately successful; and 3) political punishment for failure is larger than rewards for excellence (Nauta & Kasbergen, 2009).

The size and complexity of the public sector (Cunningham & Karakasidou, 2009) and its bureaucratic rules and procedures (or: heritage and legacy) hinder the process of innovation by e.g. short-term budgets and planning horizons, delivery pressures and administrative burdens, or technologies are available but there are constraining cultural or organisational arrangements (Mulgan & Albury, 2003, p. 31). Due to these rules and procedures, the pace and scale of change might become too low, causing public servants to become *"innovation fatigued"* (Cunningham & Karakasidou, 2009, p. 2). In light of the fact that the government is a monopoly in providing its services lacking competitors, incentives to innovate are limited (Nauta & Kasbergen, 2009) and incentives are even further reduced by a lacking rewards-system (Mulgan & Albury, 2003). Additional barriers described by Mulgan and Albury (2003, p. 31) are: reluctance to close down failing programmes or organisations, over-reliance on high performers as sources of innovation, and poor skills in active risk or change management. A. Meijer (2015) took it one step further by not only defining structural barriers to e-governance innovation, but also cultural barriers, shown in table 3. These barriers are then explained for both the government as citizens, emphasizing the importance of technology acceptance of both parties.

TABLE 3. TYPES OF BARRIERS TO E-GOVERNANCE INNOVATION, TAKEN FROM A. MEIJER (2015, P. 200)

	Government	Citizens
Structural barriers	Legal constraints, lack of finances, shortage of personnel and available skills, limited political and management support, lack of coordination, technological constraints.	Lack of technological facilities, limited knowledge and competences, shortage of time, failure to integrate innovation in daily routines.
Cultural barriers	Resistance to change, fear that innovation undermines the robustness of government, interference with bureaucratic culture.	Lack of interest, little faith in and negative image of government, no perceived usefulness, resistance to technology.

In addition, Aarons, Hurlburt, and Horwitz (2011) developed a model classifying factors that influence the implementation process of public sector innovation for four stages: exploration, adoption decision/preparation, active implementation, and sustainment. Figure 2 shows the classification of the factors influencing the implementation process of innovation, describing factors from the inner context (i.e. organisational or individual adopter characteristics) and outer context (i.e. socio-political context, funding, client advocacy, interorganisational networks, intervention developers, leadership, and public-academic collaboration).

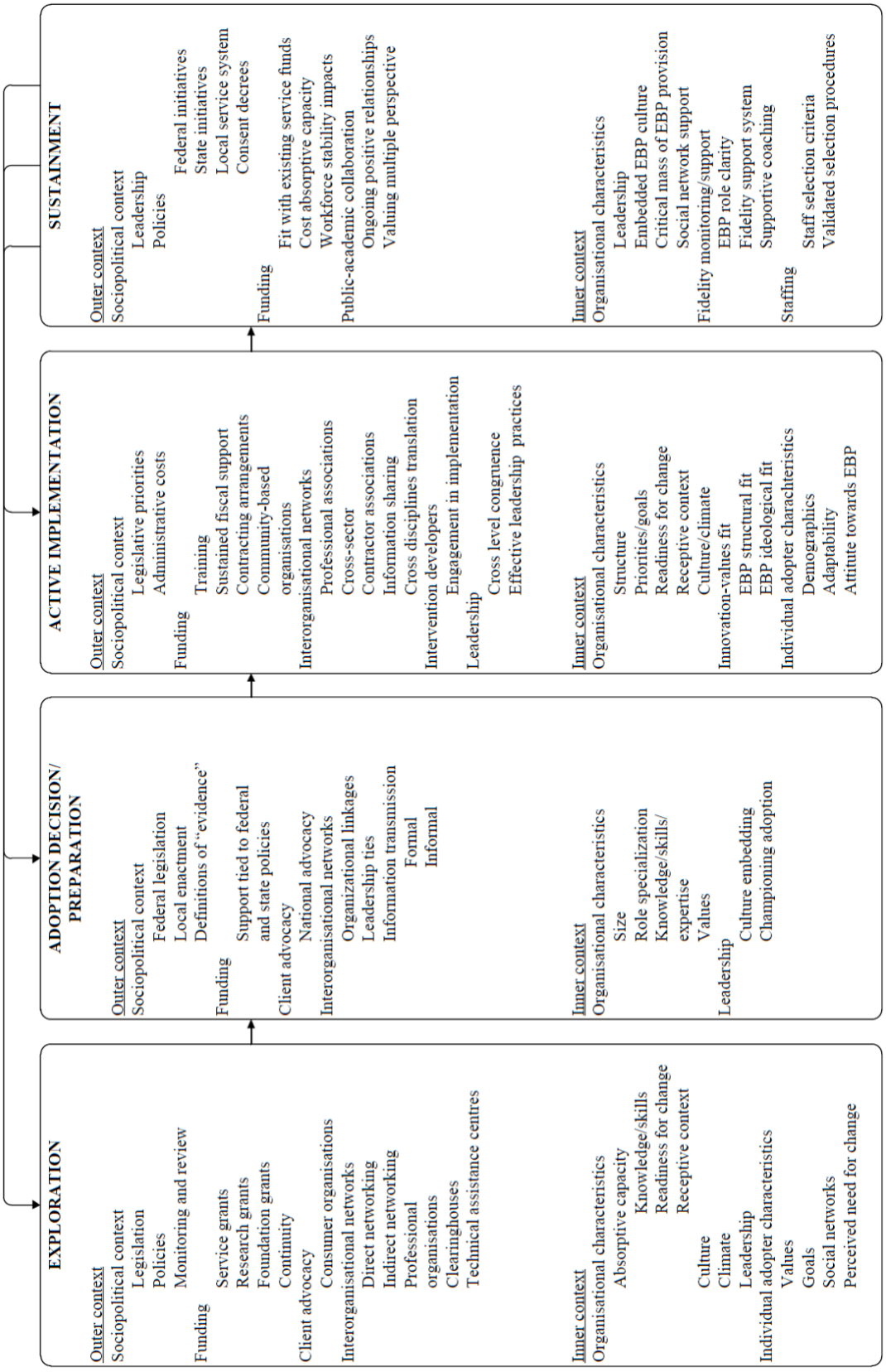


FIGURE 2. FACTORS INFLUENCING THE IMPLEMENTATION PROCESS OF INNOVATION, TAKEN FROM AARONS ET AL. (2011, P. 7)

Next to these barriers or factors influencing the implementation process of innovation, another issue arises when it comes to public sector innovation. The current process of innovation in the Netherlands is ad hoc, meaning there is no strategy or structure, or too little knowledge sharing (van Berlo & Rauch, 2014). The application of a certain technology alone is not enough to fix an organisation's default, it needs some sort of guidance to produce a valuable outcome (Hoque, 2012). Technologies need to have a certain level of effectiveness or efficiency to create public value. However, budget cuts do not help in the paradox of government innovation: the demand for a better, faster and especially cheaper government on one hand, and the financial need to properly implement innovative (information and communication) technologies to create such a government on the other (Gill'ard & Sonnenschein, 2011; van Berlo & Rauch, 2014). With all these barriers, factors, and other rising issues in mind, drivers of innovation are of high importance.

DRIVERS OF INNOVATION

To overcome such barriers, innovation should be stimulated through certain drivers. Defining drivers is necessary in knowing *why* an organisation is innovating (Baporikar, 2015). An organisation's motivation to innovate is generally related to increasing its market value (e.g. in the form of its market share or product differentiation), a crisis (e.g. loss of vital personnel or entrance of a new entrant to the market (Baporikar, 2015)), or previous successfully innovation projects (increasing revenue). For private sector organisations, the drivers are quite straightforward.

Baporikar (2015) has listed three levels that drive innovation, starting out with the **individual**. It makes sense that organisations or departments in itself are unable to innovate but need individuals. As individuals cannot do everything by themselves, they need a dynamic **team** of individuals with different a different area of expertise. Lastly, the **organisation** needs to support and guide these innovations through procedures, policy, metrics, and recognition. Motivation for the public sector to innovate is not related to de aforementioned drivers, calling for a different point of view. As explained in Chapter 1 Introduction and the previous section 2.1 Types of Innovation, drivers of the public sector are derived from service innovation, service delivery innovation, administrative and organisational innovation, conceptual innovation, policy innovation, and systemic innovation.

The drivers of innovation itself depend on the view on innovation. For example, Halvorsen (2005) expresses drivers in a push and pull for innovation. The *push for innovation* can come from international agreements, laws, regulations, and standards. This may result in national/local policies and political targets, also explained by Koch and Hauknes (2005) as top-down political will. Around elections, politicians increase popularity by explicitly stating the importance of public sector innovation, especially if dissatisfaction with the service level is enlarged by the media (Halvorsen, 2005). Dissatisfaction can be tackled by *problem-oriented drivers* or *non-problem-oriented improvements* solving specific problems or improve the former situation (Koch & Hauknes, 2005). Furthermore,

technological and scientific developments, e.g. technologies developed by NGOs and private companies that can be applied in the public sector may also push innovation (Halvorsen, 2005; Koch & Hauknes, 2005). The *pull for innovation* may come from both the public servants as (top) management, for example the user needs and preferences, and frustration from not being able to provide services (Halvorsen, 2005). The managerial side of the pull for innovation includes *support mechanisms for innovation*: resources to promote innovation and implementation or increasing the *capacity* for innovation of public servants, e.g. through *competitive drivers*: performance targets, indicators, or league tables (Koch & Hauknes, 2005).

Next to the distinction of the push and pull for innovation, Mulgan and Albury (2003) created a framework for fostering innovation, shown in figure 3, expressed as each of the four stages of the simplified innovation process: from generating possibilities, to incubating and prototyping, to replicating and scaling up, to analysing and learning. These drivers are explained by Mulgan and Albury (2003) as:

1) *Generating possibilities* through researching and listening to the needs of public servants, strong diversity of staff, learning from others, creative thinking, working backwards from outcome goals, creating space, break the rules, and competition;
2) *Incubating and prototyping* through selection rules, safe spaces to experiment, modelling and simulations, funding, involve end-users;
3) *Replicating and scaling up* through collaboration with peers, diversity (i.e. no 'best practices' which reduces the ability of services and systems to innovate to meet future unforeseen and unforeseeable circumstances); and
4) *Analysing and learning* through metrics for success, real-time learning, peer and user involvement, trade-offs, evaluation and double-loop learning, and requisite variety.

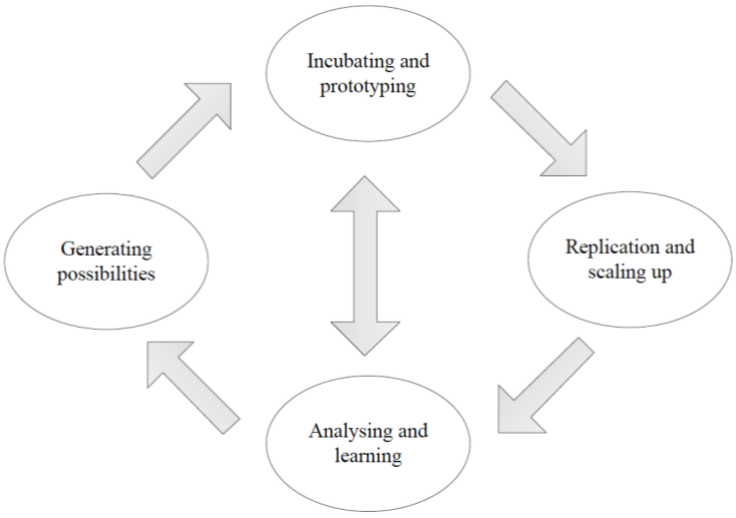


FIGURE 3. A FRAMEWORK FOR FOSTERING INNOVATION, TAKEN FROM MULGAN AND ALBURY (2003, P. 12)

2.3 Managing innovation

According to Smith, Busi, Ball, and Van der Meer (2008, p. 14) organisational culture is a key factor in the management of innovation. Other factors influencing innovation management are: technology, innovation process, (corporate) strategy, organisational structure, employees, resources, knowledge management, and management style and leadership. These factors, including sub-factors, were derived from over 100 scientific papers reviewed in Smith et al. (2008)'s research, are shown in table 4. Since these factors and sub-factors influence the organisation's ability to manage innovation, these are further elaborated upon. Some of the factors are explained more extensively than others.

Table 4. Factors and sub-factors influencing an organisation's ability to manage innovation, taken from Smith et al. (2008)

Factor	Sub-factors
Technology	Utilisation of technology, technical skills and education, technology strategy
Innovation process	Idea generation, selection and evaluation techniques, implementation mechanisms
Corporate strategy	Organisational strategy, innovation strategy, vision and goals of the organisation, strategic decision making
Organisational structure	Organisational differentiation, centralisation, formality
Organisational culture	Communication, collaboration, attitude to risk, attitude to innovation
Employees	Motivation to innovate, employee skills and education, employee personalities, training
Resources	Utilisation of slack resources, planning and management of resources, knowledge resources, technology resources, financial resources
Knowledge management	Organisational learning, knowledge of external environment, utilisation of knowledge repositories
Management style and leadership	Management personalities, management style, motivation of employees

Technology

Related to technologies facilitating innovation, including the utilisation, technical skills and education, and the technology strategy (Smith et al., 2008). Since public sector innovation is related to e-government, the utilisation of technology is expressed by Cunningham and Karakasidou (2009) as: *"initiatives to ease administrative burden, introduction of ICTs, 'electronification' of public services to raise quality and speed, the modernisation of public administration, etc."* Using such technologies need training in order to (fully) understand the changes. As explained by Tidd, Bessant, and Pavitt (2005, p. 469), *"long-term commitment to education and training [is needed] to ensure high levels of competence and the skills to learn effectively"* is one of the components of an innovative organisation. The last sub-factor of this category is the strategy, whereas the technology strategy is often explained in a government's digitalisation strategy, explained more clearly below in the section: Corporate strategy.

INNOVATION PROCESS

The general innovation process steps are generation, development, and implementation (Smith et al., 2008). A common innovation process is Cooper (1990)'s stage-gate model. A typical stage-gate system is shown in figure 4, however, this process is to be customised per project or organisation.

Cooper (1990) explains the typical stage-gate process as follows: it starts with an idea which is input for Gate 1: The Initial Screen. This is the first go/kill moment, based on the decision of commitment to the project. This commitment is based on 'must meet' and 'should meet' criteria, such as feasibility, or synergy with the firm's core business. This gate excludes financial resources. A 'go' means the project can continue to Stage 1: the inexpensive Preliminary Assessment, with activities such as literature search, networking, and focus groups. In this stage, a technical assessment is carried out for assessing feasibility, costs, and duration.

Gate 2: Second Screen re-evaluates this stage, which is comparable to Gate 1, with additional 'must meet' and 'should meet' criteria. During this Gate the financial resources are included, although through a simple calculation. A 'go' moves the project to Stage 2: Detailed Investigation Preparation, the final stage before actual product development. As the title of the stage suggests, it includes a market research and competitive analysis, and sometimes even a preliminary design or laboratory work. Customer needs, manufacturability, and the financial analysis are input for Gate 3: Decision on Business Case.

Gate 3 is the last decision moment before product development, meaning it is the last decision moment prior to heavy spending. Therefore, all activities, especially the financial analysis, in Stage 2 are examined. Next to the 'must meet' and 'should meet' criteria, a number of key items must be agreed upon, for example the target market, product concept, or positioning strategy. A 'go' means the product can be developed, including plans for detailed testing, marketing, and operations, and an updated financial analysis.

The Post-Development Review in Gate 4 checks the progression and continued attractiveness of the project and product. This includes a review of the market, operations plans, and financial analysis based on updated data. Stage 4: Validity tests the entire viability of the project, product, process, customer, and economics. Activities of stage 4 include product tests, user trials, pilot production, market tests, and a reviewed financial analysis.

Gate 5: Pre-Commercialisation Decision is the final gate, including go/kill decision, before commercialisation. This gate reviews the quality of the results of the activities in Stage 4, and emphases the importance of financial protections. The market launch plan and operations plan are implemented during Stage 5: Commercialisation. The final phase of the stage-gate model is the Post-Implementation Review includes a critical assessment of the project's strengths and weaknesses and points out teachable moments.

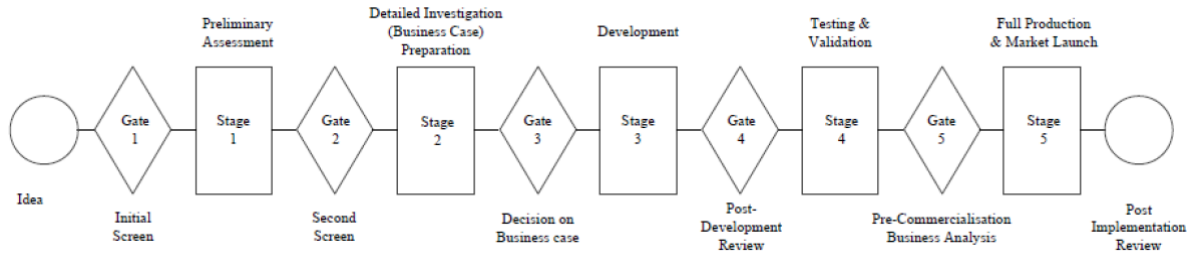


FIGURE 4. AN OVERVIEW OF A STAGE-GATE SYSTEM, TAKEN FROM COOPER (1990)

However, not all private-sector models that are developed are applicable for public sector innovation. Therefore, Ebbers and Van Dijk (2007) have developed a model for the initiation and implementation of innovative e-government related services, as shown in figure 5. This model was based on the linear Minnesota Innovation Research Program (MIRP) Innovation Pathway and also includes some features of the stage-gate model, expressed as the adopt/reject decision. Due to the linearity, the focus on development instead of implementation, the lacking focus on user participation, and difficulties in identifying the moment of adoption in the MIRP Innovation Pathway, Ebbers and Van Dijk (2007) developed a new model. This model tackles the problems found in the MIRP Innovation Pathway and solves them through highlighting the moment of adoption, merging of development and implementation, non-linearity, and emphasizing implementation. The model also contains three decision-making moments to continue or stop the project.

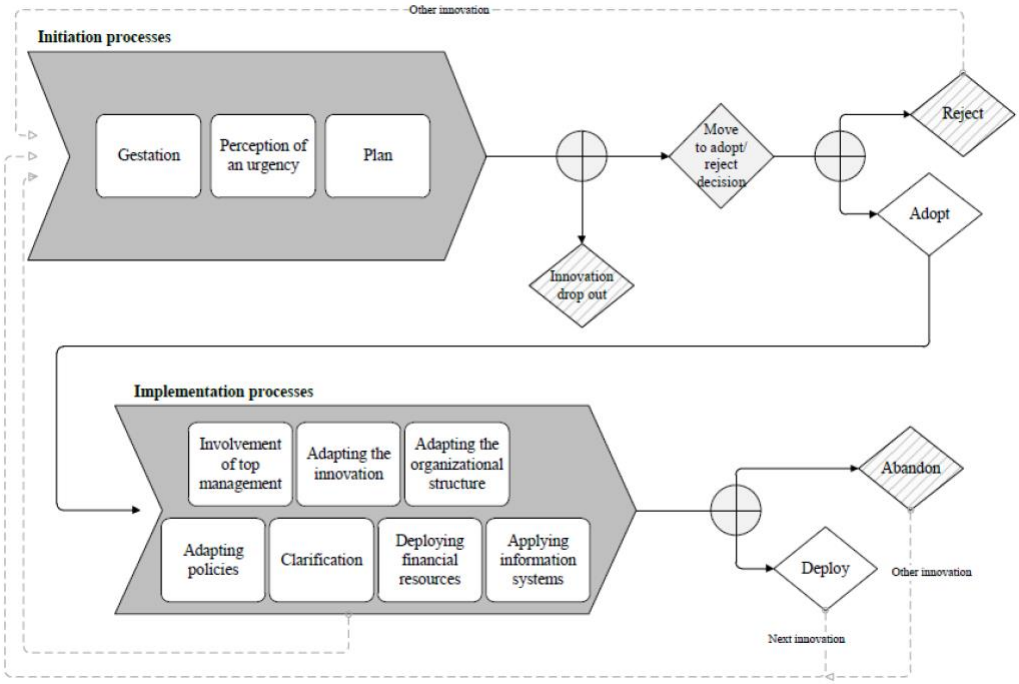


FIGURE 5. A MODEL OF THE INITIATION AND IMPLEMENTATION OF INNOVATIONS RELATED TO ELECTRONIC GOVERNMENT SERVICES IN COMTEMPORARY GOVERNMENT ORGANISATIONS, TAKEN FROM EBBERS AND VAN DIJK (2007)

However, criticism on stage-gate models is expressed as: the slowness and inflexibility, the limited contact with users of the final developed service, the order of the stages that differs for the public sector, and the focus on structure of development instead of content due to a time frame (Kallio, Lappalainen, & Tammela, 2013). Also, difficulties with innovation in the public sector lie in the amount of (traditional) rules, regulations, procedures, and a limited degree of freedom, slowing down the process of innovation (Mergel & Desouza, 2013). This criticism resulted in a more adjusted stage-gate model developed by Alam and Perry (2002), including users (i.e. citizens) in the development of a new service. This is a more 'Open Innovation' approach, defined by Chesbrough, Vanhaverbeke, and West (2006, p. 1) as *"the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation, respectively. [This paradigm] assumes that firms can and should use external ideas as well as internal ideas, and internal and external paths to market, as they look to advance their technology."* Citizen participation may include for example small-scale voluntary work within their neighbourhoods, but citizens may also be involved in as what the Dutch government calls the 'do-ocracy'. This type of democratic collaboration between citizens and the government provides a platform for citizens to develop tailor-made solutions together with the concerning authorities, instead of dealing with standard solutions for everything. Including citizens has several benefits, namely their potential of bringing new ideas, and including the social aspect of scientific and technological challenges (Mergel & Desouza, 2013). For example, the government of the United States developed a competitive "Prizes and Contests" platform called challenge.gov, where citizens can participate and compete in solving governmental issues online. Lessons learnt in the first two years of challenge.gov (Mergel & Desouza, 2013) were:

- **Defining a successful challenge is not straightforward**, due to different views on e.g. rewards and therefore the focus of the challenge;
- **Designing clear goals for challenges**, to increase understanding of the challenges;
- **Being precise in challenge problem definition**, to reduce confusion in terms of expectations;
- **Attracting attention and participation through incentives**. Incentives do not necessarily mean a monetary reward in the form of a grant or prize purses, but also (social) media mentions and coverage. This attracts citizens that feel connected and that care about the challenges faced by the government; and
- **Building a community of practice to share lessons learned**, to make sure mistakes are not repeated.

CORPORATE STRATEGY

Corporate strategy includes strategies of the organisation and how they impact innovation management (Smith et al., 2008). Considering the government has no corporate enemies, the strategy differs. The OECD has listed several (overviews of) strategies for innovative governments, such as "The Innovation Imperative in the Public Sector: Setting an Agenda for Action" (OECD, 2015) or "Embracing Innovation

in Government - Global Trends" (OECD, 2018). Some examples of government digitalisation strategies are: The Australian Digital Transformation Strategy of the ICT and Digital Government (2014), UK's Government Digital Strategy of the Cabinet Office (2017), USA's Digital Government Strategy of the US Department of State (2012), the Danish Strategy 2016 – 2020 of the Danish Agency for Digitisation or the Dutch National Digitalisation Strategy (2017). Next, The Observatory of Public Sector Innovation of the OECD (2017) has listed Public Sector Innovation Strategies for Australia, Canada, Denmark, Finland, France, Japan, South Korea, Spain, Sweden, UAE, and the US, as shown in table 5.

TABLE 5. PUBLIC SECTOR INNOVATION STRATEGIES, TAKEN FROM THE OECD (2017)

Country	Public Sector Innovation Strategy
Australia	Innovation Action Plan (Victorian State Government, 2009)
	Australian Public Service Innovation Action Plan (2010)
	National Innovation and Science Agenda (2015)
	Support for Public Sector Innovation in the APS (2015)
	National Innovation and Science Agenda (2015)
	"Putting Innovation in Motion" Public Sector Innovation Strategy (Victorian State Government, 2017)
Canada	Blueprint 2020 (2014)
	Experimentation Directive (2016)
Denmark	"Denmark 2020" Action Plan (2010)
Finland	Government Policy Analysis Unit (2004 – reformed in 2014)
	"Strategic Programme" on Experimentation, Innovation and Digitalisation (2015)
	"Place to Experiment" Platform (2017)
France	"Référentiel Marianne" (2008)
	First Minister in Charge of Digital Developments and Innovation (2012)
	"L'Innovation Publique: Concevoir Autrement les Politiques Publiques" (2017)
Japan	Creation of the Incorporated Administrative Agency (IAA) system (2001 – reformed in 2014)
	Japan Revitalisation Strategy's "Intensive Reform Plans" (2014)
South Korea	Presidential Commission for Administrative Innovation (1995-Present)
Spain	Plan de Choque para El Impulse de la Administración Electrónica en España (2003)
	Avanza 2 2011-2015 (2010)
Sweden	Swedish Innovation Strategy 2020 (2012)
UAE	National Strategy for Innovation (2014)
USA	National Partnership for Reinventing Government (1993 – renamed 1998)
	A Strategy for American Innovation (2015)
	Executive Order: Using Behavioural Science Insights to Better Serve the American People (2015)
	Challenges and Prizes Toolkit (2016)
	Office of American Innovation (2017)

ORGANISATIONAL STRUCTURE

Especially organisational challenges arise when taking a closer look on government digitalisation. Al-Sebie (2005, p. 84) described the organisational challenges as: employees' challenges (i.e. lacking IT skilled employees, resistance to change), reengineering of internal processes (i.e. transforming existing off-line data online, and time and finance required for reengineering), new legislation, and changes of the organisational structure. Additionally, the Information Society and Government Study Group of the Dutch Ministry of Interior and Kingdom Relations (2017) described challenges as preventative zero-mistake-tolerance risk management, or the insufficiently developed "core" competence of digital knowledge. Of course, not the entire government has to deal with implementing digitalisation technologies. Instead, there is a department responsible for the consistent and strategic approach to the use of IT across the organisation (Weldon, Colella, Schulte, & Mello, 2016): the CIO and its supporting office.

The role of a CIO emerged in the 1970s, due to the growing importance of IT. Moreover, two organisational needs eventually were the base of the focus for the CIO: 1) accountability, because one single executive was held responsible for the organisation's information provision, and 2) closing the gap between organisational and IT strategies (Gottschalk, 1999). The enormous growth in the use of IT for the public sector called for public sector organisations to anticipate. Initiatives for the digitalisation of the government are usually led by the (Office of the) Chief Information Officer, where employees of the office are required to have a high degree of knowledge on citizen needs, government procedures, combined with IT knowledge (Almazan & Gil-Garcia, 2011). According to Brown (1993, p. 400), the role of the CIO is divided into three contextual characteristics: *"1) The CIO will be responsible for the information infrastructure, but application development (and local hardware), responsibilities will be decentralized to divisions and departments, 2) The CIO will have a staff orientation and will utilize communication, education, standards and other indirect controls to perform integrator and gatekeeper roles for new technologies, 3) The CIO will become an integral member of the top management team and have the corporate-wide responsibility for information resource policy and strategy."*

A more recent research of Liu and Hwang (2003) divided the focus of the CIO into People, Processes and Products. **People** are needed for advising, assisting, developing, maintaining, promoting, monitoring, and assessing the IT programs and its personnel. **Processes** for IT purchases must be designed to maximise value for the organisation. **Products** include all IT-related equipment and services. Moreover, Weldon et al. (2016) developed a model of OCIO capabilities. Figure 6 shows the model of the scope of the OCIO.

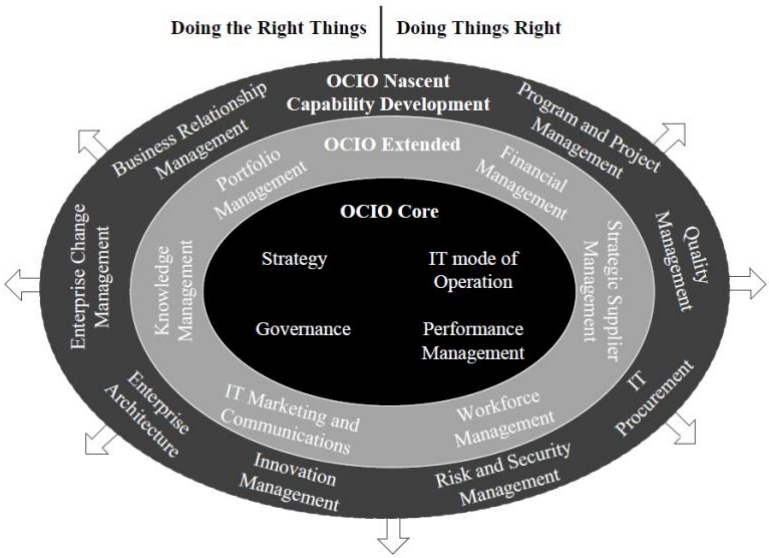


FIGURE 6. OCIO'S CAPABILITIES DIVIDED INTO: FOUR KEY, SIX ADDITIONAL, AND EIGHT NASCENT CAPABILITIES, TAKEN FROM WELDON ET AL. (2016, P. 8)

The inner layer of the model represents the four key capabilities: 1) Strategy: how information technologies (IT) can contribute to the organisation's success; 2) Governance: focus on the decision making for implementing business and IT strategies; 3) IT mode of operation: designs and positions the IT organisation; and 4) Performance management: defines, maintains, and reports on the progress of IT achievements. The second layer, six additional capabilities, represents: 1) Financial management: focus on IT budget, costs (allocation), and investments; 2) Strategic supplier management: analyse and anticipate on future IT needs; 3) Workforce management: HR-comparable functionality, focusing on staffing levels, talent, and personal objectives; 4) IT marketing and communications: communication on, and value and role of IT within the organisation; 5) Knowledge management: ease the process of knowledge capturing and sharing across the organisation; and 6) Portfolio management: transparency of the total portfolio of investment on IT. The outer layer contains eight nascent capabilities the OCIO provides support for. These capabilities are not yet integrated fully in the organisation (Weldon et al., 2016).

The OCIO is also often called the Office of the Chief Innovation Officer, meaning another focus point of the OCIO should be innovation. The OCIO can be a place where employees can share innovative ideas, get feedback from their colleagues, or find support to experiment with these ideas (Newbold & Azua, 2007). Research performed by León et al. (2012, p. 11), funded by the European Commission, shows that the definition for public sector innovation for the Netherlands is described as: *"stimulating knowledge and innovation in realising societal objectives and solving societal challenges, of which innovative service provision is one aspect; and stimulating innovation to improve the process of public service provision."* As mentioned by Weill and Ross (2004, p. 231), *"decisions and behaviours influenced by the CIO [and] contributions made by the CIO as a member of the senior management team generating value for the enterprise"* are dimensions for assessing the impact of the CIO.

ORGANISATIONAL CULTURE

For organisations to innovate, the overall atmosphere must be open towards innovation. This openness, amongst other requirements, comes from the normative beliefs and shared expectations of the organisation (Aarons et al., 2011), or better: organisational culture. A broader description of organisational culture is presented by House, Hanges, Javidan, Dorfman, and Gupta (2004, p. 15). as: *"shared motives, beliefs, identities, and interpretations or meanings of significant events that result from common experiences of members of collectives that are transmitted across organisations."* Additional components of an innovative organisation are e.g. effective team working for problem solving, organisation-wide high involvement in innovation, an external focus through customer orientation and networking, and a positive approach towards creativity (Tidd et al., 2005, p. 469).

EMPLOYEES

Non-management employees of the organisation influence the innovation management (Smith et al., 2008). Therefore, part of the burden lies on the shoulders of the public servants actually participating in the innovative process, mainly the previously mentioned members of the OCIO. During the innovation process, these public servants need to be motivated to participate in the innovative process and have a certain level of absorptive capacity. The definition of absorptive capacity according to Cohen and Levinthal (1990, p. 128) is: *"the ability [of a firm] to recognize the value of new, external information, assimilate it, and apply it to commercial ends."* This ability can increase through training and development. *Motivation* makes employees feel valued when acquiring new skills, *empowerment* exercises enable employees to take on more responsibility and demonstrate initiative, and *training* reduces resistance to change, because employees feel more confident to be involved with innovation if they possess innovative skills (Glor, 2001; Tidd et al., 2005). Of course, not only the non-management employees are supposed to deal with innovation management, which will be explained below in Management and leadership.

RESOURCES

Concerned with every type of resources (e.g. human, financial, and physical) and how they are managed. Especially human resources are seen as an organisation's major assets for innovation (Gupta & Singhal, 1993). Human resources include: previously mentioned employees and (later discussed) management. Another important resource for innovation is of course the budget. What is important is that the freed-up budget should be used for innovation and innovation only, meaning that if there is a budgetary shortfall elsewhere, it should not be deducted from the innovation budget. By locking in a certain budget, innovation gains a certain level of priority. Combining these resources in one clear overview occurs in portfolio management. Portfolio management collects all running projects, and evaluates and compares them. Mikkola (2001, p. 423) explains that *"portfolio techniques can help strategic managers in*

evaluating whether a portfolio of products is adequate from the perspective of long-term corporate growth and profitability."

KNOWLEDGE MANAGEMENT

The availability, management, and utilisation of all aspects knowledge both internal and external to the organisation (Smith et al., 2008). Examples of knowledge management are presented by Tidd et al. (2005, p. 469) as: continuing and stretching individual development (through education and training), extensive communication, and learning organisation (involvement in experimenting, solving problems, communicating, and knowledge sharing and capturing). One way of creating a learning organisation is through an innovation lab. According to an online review on government innovation from van Berlo and Rauch (2014) development of such an innovation lab where experiments can take place, can offer the following benefits:

1. Connect and spread innovations: connecting people working on public sector innovation and provide insight on and exchange of innovations or innovative ideas;
2. Alert to relevant innovations: trend watching and bring it to the attention of decision makers, policy makers and policy implementers;
3. Strengthen the innovation climate: act as a knowledge centre for public sector innovation for collecting and spreading knowledge on new methods, to increase innovative capacity of the government;
4. Make innovation approachable and measurable: serve as a point of contact for (Dutch) public sector innovation, for example for international contacts;
5. Apply innovation on societal problems: pro-actively search for societal challenges or bottlenecks and try to solve them, and to strengthen promising initiatives (e.g. start-ups).

MANAGEMENT AND LEADERSHIP

Top management involvement includes leadership, which has been described as *"the ability of an individual to influence, motivate, and enable others to contribute toward the effectiveness and success of the organisations of which they are members"* (House et al., 2004, p. 15). Leadership is crucial in creating organisational culture (Aarons et al., 2011). Taking ownership of the process of innovation and the adoption of service innovations increases top management involvement. Particularly, tolerance for mistakes, support for creativity, speed of action, and funding are important to reduce risk-aversion for public sector innovation. Especially in a hierarchy such as within a government, (top) management involvement is necessary to experiment with innovative technologies.

2.4 GOVERNANCE

All of the above-mentioned factors and sub-factors influencing an organisation's ability to manage innovation require some sort of guidance and structure, for example through a governance. The design

of a governance can offer guidance in the process of innovation. Governance is explained as a form of policy of the coordination of activities (Tielenburg, 2008), performance of agents (Fukuyama, 2013), and specifying decision rights and accountability (Weill, 2004) of said agents. According to Bossert (2004) *"governance focuses on stakeholders of the organization, the related objectives of this organization, and the responsibility of the management of this organization to achieve the objectives."* Howlett (2009) has listed four types of governance, see table 6, namely: legal, corporate, market, and network governance. However, since the importance of IT in public sector innovation, another type of governance is required: IT governance.

TABLE 6. MODELS OF GOVERNANCE, TAKEN FROM HOWLETT (2009)

Type of governance	Overall aim	Implementation preference
Legal	Legitimacy and compliance through the promotion of law and order in social relationships	*Legal system*: legislation, law, and rules and regulations
Corporate	Controlled and balanced rates of socio-economic development through the management of major organised social actors	*State system*: plans and macro-level bargaining
Market	Resource cost/efficiency and control through the promotion of small and medium sized enterprises and competition	*Market system*: auctions, contracts, subsidies, and tax incentives and penalties
Network	Co-optation of dissent and self-organisation of social actors through the promotion of inter-actor organisation activity	*Network system*: collaboration and voluntary associational activity and service delivery

IT GOVERNANCE

Considering the focus of public sector innovation, an IT governance could provide a possible structure for ICT projects. However, IT governance does not have one uniform definition (Simonsson & Johnson, 2006). Examples of IT governance definitions are:

- Weill and Ross (2004, p. 8): specifying the decision rights and accountability framework to encourage desirable behaviour in the use of IT.
- Webb, Pollard, and Ridley (2006, p. 7): IT Governance is the strategic alignment of IT with the business such that maximum business value is achieved through the development and maintenance of effective IT control and accountability, performance management and risk management.
- Haghjoo (2012, p. 2): IT Governance is an organisation's framework for business-IT decision making. It involves specifying a) in what domain(s) the decision-making process will be involved, b) who makes the decisions and who has input to those decisions, and c) how, i.e., through what mechanisms, these decisions should be made and supervised.

In spite of the fact that there are several definitions of IT governance, all agree that IT governance focuses on the contribution of decision making, rather than actually making specific decisions; it determines who makes the decisions. Benefits of IT governance are listed by (Haghjoo, 2012) as: 1) strategic alignment between IT and enterprise objectives 2) protecting the enterprise's investment in IT 3) taking advantage of current business opportunities 4) avoiding potential business threats. According to Weill and Ross (2004), IT governance has a positive influence on the results of IT investments, and on value creation of an organisation. Weill and Ross (2004, pp. 14-18) mentioned eight reasons why IT governance is important:

1. **IT governance pays off**. According to their research, above-average governance performance in combination with effective management increased the return on assets with twenty percent, compared to a firm with the same strategy but lower performing governance.
2. **IT is expensive**, calling for management and control to ensure value is created.
3. **IT is pervasive**. Because decisions on IT are not centrally managed, IT spending, and thus decision-making, originates all over the organisation. Governance arrangements identifies who is responsible for each decision made.
4. **New Information Technologies bombard enterprises with new business opportunities**. Such business opportunities are mainly focused on survival in the private sector. The threat of competitors is missing in the public sector, shifting the focus to adequate public service delivery.
5. **IT governance is critical to organisational learning about IT value**. Though IT is not always expressed in monetary value, it can be expressed as the ability to respond to (competitive) pressures. Also, IT governance facilitates organisational learning through different approaches than standardised practices, also important in innovation. Governance is used to make 'learning via exceptions' explicit and to share new practices across the organisation.
6. **IT value depends on more than good technology**. The missing fit with or ineffective application of a promising technology causes failure of IT projects. Also, IT increases standardisation and integration which results in intertwined decision making. Governance states such decision-making arrangements.
7. **Senior management has limited bandwidth**, meaning senior management is not supposed to make *all* IT decisions. Rather, transparent decisions are made on lower levels, aiming at the direction stated by the senior management, including empowering creativity.
8. **Leading enterprises govern IT differently**. Governance of leading enterprises differs and depends on their desired outcome (e.g. revenue growth or profit). What they had in common was the transparency on IT decisions.

These eight reasons express the importance of IT governance, for which Weill and Ross (2004) developed a design framework. Figure 7 shows the IT governance design framework. The framework is set up harmonise three sections: 1) the enterprise strategy and organisation, 2) governance arrangements, and

3) business performance goals. *Enterprise strategy and organisation* defines the desired behaviours motivating governance. The *governance arrangements* both enable and influence the strategy. The effectiveness of an enterprise's strategy and its combined governance arrangements are reflected in its ability to achieve the stated *business performance goals*. The harmonisation must occur through 1) organisation and desired behaviour, 2) governance mechanisms and five key decisions: principles, architecture, infrastructure, applications, and investment, and 3) metrics and accountabilities. Below, the six interlocking components of the framework are explained.

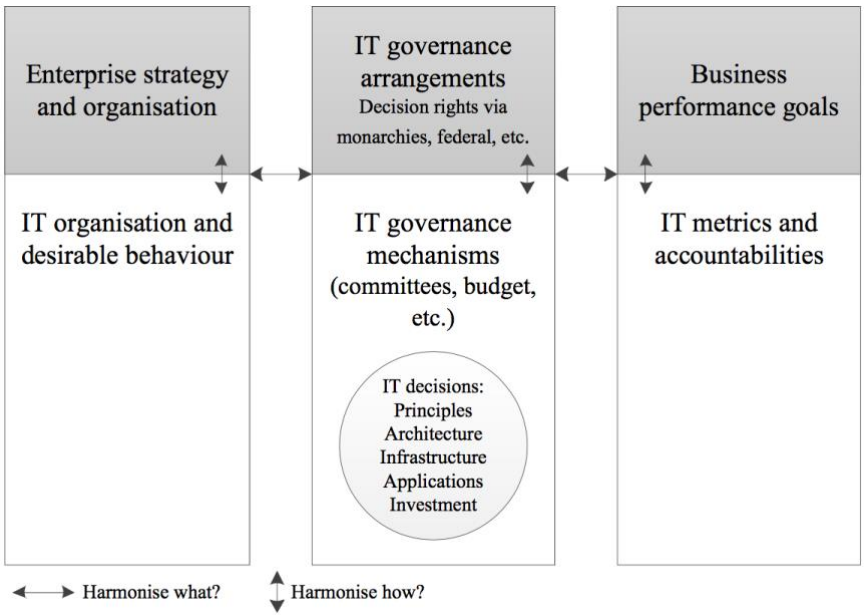


FIGURE 7. IT GOVERNANCE DESIGN FRAMEWORK, TAKEN FROM WEILL AND ROSS (2004, P. 149)

The framework is explained by Weill and Ross (2004) as follows. The **enterprise strategy and organisation**, and its corresponding **IT organisation and desirable behaviour** quite speak for itself. The **IT governance arrangements** include assigning decision rights for the corresponding **IT governance mechanisms**. These governance arrangements are based on the governance arrangement matrix, as shown in table 7. The different archetypes (left side of the table) should be are responsible for the IT decisions (upper side of the table). The archetypes include:

- Organisation monarchy – Top managers: a group of organisation executives or individual executives (CxOs). Includes committees of senior business executives (may include CIO). Excludes innovation executives acting independently.
- Innovation monarchy – Innovation specialists: individual or groups of innovation executives
- Feudal – Each business unit making independent decisions: business unit leaders, key process owners or their delegates.

- Federal – Combination of the corporate centre and the business units with or without innovation people involved: executives and business groups (e.g. business units or processes); may also include innovation executives as additional participants.
- Duopoly – Innovation group and one other group (e.g. top management or business unit leaders): innovation executives and one other group (e.g. CxO, business unit or process leaders)
- Anarchy – isolated individual or small group decision making: each individual user.

And the IT decisions are explained as:

- IT principles: Clarifies the business role of IT
- IT architecture: Defines integration and standardisation requirements
- IT infrastructure: Determines shared and enabling services
- Business application needs: Specifies the business needs for purchased or internally developed IT applications
- IT investment and prioritisation: Decides which initiatives to fund and how much to spend

TABLE 7. GOVERNANCE ARRANGEMENT MATRIX, TAKEN FROM WEILL AND ROSS (2004, P. 11)

Decision / Archetype	Innovation principles	Innovation architecture	Innovation infrastructure	Business application needs	Innovation investment
Organisation monarchy					
Innovation monarchy					
Feudal					
Federal					
Duopoly					
Anarchy					
Don't know					

The third section of the framework includes the **business performance goals**, focusing on effectiveness of the strategy and its combined governance arrangements, reflected in its ability to achieve stated organisation performance goals. This is measured through the **IT metrics and accountabilities**, defining how innovation will contribute to enterprise performance goals and provide the means of separately assessing innovation effectiveness.

3. METHODOLOGY

This section explains where and how the study has been carried out. The study was carried out at the Dutch Ministry of Economic Affairs and Climate.

3.1 FOCUS OF THE STUDY

The organisation where the study was conducted was is the Dutch Ministry of Economic Affairs and Climate. This ministry tries to stimulate the Netherlands to become more sustainable and entrepreneurial. The ministry is committed to develop an excellent business climate and to maintain a strong competitive position internationally, by providing the proper conditions and allowing entrepreneurs to innovate and grow. In addition, since the department of 'Climate' has been part of the ministry, attention is also paid towards our nature and living environment, focusing on sustainability. In this way, EZK further develops its top positions in agriculture, industry, services and energy and it invests in a strong and sustainable country. According to the intranet of the Dutch government, Rijksportaal, this ministry stands for:

- A competitive business environment. This includes for example less, but better formulated, rules, or an enterprising tax policy.
- Targeted policy for innovation and entrepreneurship, supporting companies wherever needed.
- A world-class agro-food sector, in which the position is further strengthened through investments in innovation and sustainability.
- Support for entrepreneurship across the border, e.g. through economic diplomacy and help from embassies and consulates.
- A continuous flow of clean energy.
- Entrepreneurship emphasizing nature and animal welfare, creating a balance between economy and ecology.

OFFICE OF THE CIO

An important department within EZK is the office of the CIO (Chief Information Officer). One of the main goals of the CIO is to create more consciousness on Information Technology and therefore developed an I-strategy, where I stands for information. In its guiding functionality, the OCIO tries to combine social and governmental developments and to make the required translation to EZK. To be able to adjust to public interests arising from the development of the digital age, it is important for the CIO to keep on innovating. Especially according to the website of Centraal PlanBureau (2017), for ICT related subjects, because here the emphasis lies on privacy, cyber security, market power, and changes in the geographical spread of economic activity. The ambition of the office of the CIO is to strengthen EZK, so that it can respond optimally to the developments, opportunities and challenges for these ICT-

related issues. Additionally, the office of the CIO strengthens the control over ICT-processes and I-issues. The office of the CIO tries to reach these ambitions by:

- Creating I-awareness among policymakers of ICT- and related implementation issues;
- Fulfilling a guiding function in what is happening in society and within the government, and making the required translation to EZK (I-developments, opportunities, frameworks, rules);
- Providing an overview of large ICT processes and I-issues, and to advise and report on this to the CIO and CIOs of EZK services;
- Looking for balance in and advise on the many different interests such as: renewal and innovation, overview and controllability, continuity and reliability of services, cyber security, protection of privacy, and open data, but also support and provide space for the many different organisations components of EZK to carry out their own tasks.

CURRENT METHOD OF INNOVATION: I-STRATEGY

One of the roles of the Office of the CIO is to ensure that information provision and ICT optimally support the existing processes. The office therefore developed the previously mentioned I -strategy. This strategy focuses on both broad implementation, e.g. addressing of obsolete applications (i.e. legacy), and on specific policy core, e.g. strengthening of the CIO role for policy. In addition, the strategy attempts to discover promising technological trends. The I-strategy consists of 5 interrelated themes. These themes form the base for the elaboration and shaping of the I-strategy. Each theme in the strategy has its own focus within the overarching theme ‘SMART’ and thus its own challenges. SMART stands for smart usage of information, tools and techniques, and smart cooperation within EZK and with external organisations. The challenges in each theme point out the practical relevance of the research. The themes are:

1. SMART use of data
2. SMART performance in the digital world
3. SMART collaboration in a contemporary working environment
4. SMART value-adding with I
5. SMART innovation and experimenting

ISSUES WITH CURRENT STRATEGY

Although interrelated, the main focus of the study is theme 5: SMART innovation and experimenting. This theme has the focus because, compared to society, the government lags behind when it comes to technology adoption. This might become an issue when performed work become inadequate, causing e.g. unnecessary high costs due to inefficient or ineffective processes. It is therefore needed to provide structure in the current process of innovation, to improve experimentation and implementation. Experiments (or pilots) must be carried out with these innovative technologies to find out if EZK-wide

implementation is possible. However, in practice, this process of innovating seems to be problematic to realise, both on product and process level. This is due to the lack of some sort of structure for innovative Information Technologies, hindering the implementation of these technologies. This results in a growing gap between policy development and implementation, and society. This gap results in insufficient insight on what the current and future needs are for policy departments focusing on innovative IT.

3.2 RESEARCH APPROACH

The study is a combination of inductive and deductive research: a number of theories and studies on public sector innovation and/or IT governance was available (deductive), but the limited knowledge on how to govern public sector innovation calls for a more inductive approach. Therefore, this thesis was written with use of a qualitative study research approach. Figure 8 shows the elements of the research design.

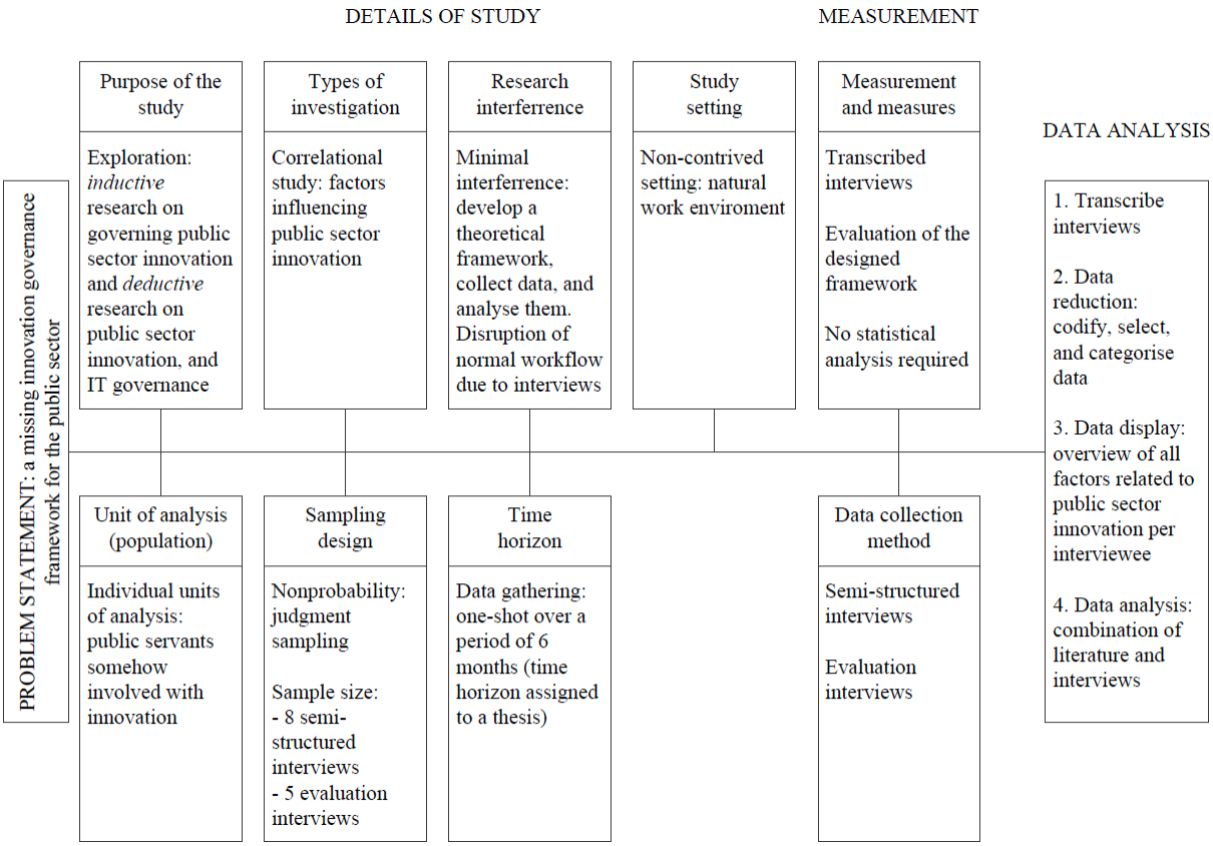


FIGURE 8. THE ELEMENTS OF THE RESEARCH DESIGN, DERIVED FROM SEKARAN AND BOUGIE (2016)

The figure reads as follows: the simplified problem statement is 'a missing innovation governance framework for the public sector'. The *purpose of the study* is exploring public sector innovation in order to better understand the problem of public sector innovation and its governance. The *type of investigation* is a correlational study on finding out what barriers, drivers, and managerial factors influence public sector innovation. The *research interference* is minimal, meaning disruption of the normal workflow is only caused due to interviews, therefore the *study setting* is non-contrived. The *unit*

of analysis consists of individuals, public servants, that are somehow involved in or with innovation. *Sampling* is done through judgement sampling and the *data collection method* is expressed as a total number of 13 semi-structured interviews is held: eight exploratory interviews and five evaluation interviews. The *time horizon* in which the research takes place is 6 months, which is the time horizon assigned to a thesis. The *data gathering* is therefore one-shot: data is gathered just once in order to answer the research question. For the data *measurement*, no statistical analysis is required, because the *data analysis* is presented as a collection of all factors related to public sector innovation (derived from both literature and interviews), filled into the governance design framework. Below, the steps followed during conducing the research are explained in more detail.

STEP 1: LITERATURE REVIEW

First, a literature review was performed to understand the history of government digitalisation, to state a definition of (public sector) innovation including barriers and drivers, and how to manage public sector innovation. The literature that was used mainly came from scientific journals, considering its scientific relevance. Web-based journals are derived from scholar.google.com, books.google.com, sciencedirect.com, and researchgate.net (if access is provided). Key words are: '*Public Sector Innovation', 'innovation barriers', 'innovation drivers', 'innovation management', 'e-government', 'digital government',* and optional was to include '*The Netherlands'*, or to search the same key words in Dutch. Other (digital) sources such as opinion articles, unpublished manuscripts, or (government) reports were used as additional information as non-scientific knowledge. When enough background information had been gathered, a selection was made between the different literature. This was done to define the problem of the study and the actual scope. Literature that seems relevant after reading the abstract, introduction and/or conclusion, was further elaborated upon and the screening process became more precise. This included: collecting a list of important references in bibliographies, discovering the scientific gap in the selected literature and defining the methodology of filling this gap, and repeating this process if relevant references were mentioned.

STEP 2: SEMI-STRUCTURED INTERVIEWS THROUGH JUDGMENT SAMPLING

To evaluate the barriers found in the literature on public sector innovation, semi-structured interviews were conducted (see appendix A for the interview questions). This type of interviewing was performed, because it was known what the needed outset of information should be. The interviews were semi-structured, which means that the topics of discussion were known, but the open approach allowed for both the interviewer and respondent to continue on new ideas discussed during the interview. Since the time limit, a minimum of six and a maximum number of interviews of twelve was decided, based on Guest, Bunce, and Johnson (2006, p. 59)'s notion that *"saturation occurred within the first twelve interviews, although basic elements for metathemes were present as early as six interviews."*

The data collection was done through judgment sampling. This type of sampling was chosen because the information that was needed could only be provided by certain experts (Sekaran & Bougie, 2016, p. 544), since experimenting (with innovative technologies) is not part of the daily routine of the average public servant. The initial sample was drawn from the OCIO of the ministry where the study was carried out. At the end of each interview, the interviewees were asked to recommend additional respondents. The target population during the data collection on public sector innovation consists of public servants that are somehow involved with innovation, e.g. managers, advisors, or innovation project leaders. Since the thesis was carried out at the Ministry of Economic Affairs, the first step was to consult three public servants for the semi-structured interviews. Since the study was carried out at the OCIO, the first interviewee was the manager of this department. Additionally, since innovation and experimenting are promoted through the ministry's I-strategy, the programme manager and the project leader were interviewed.

The starting point of these interviews was to find out if there was a need for a form of governance to adjust structure to the current process of innovation. Through their network and advice, public servants from other departments/ministries were contacted. Second, since the Ministry of Interior and Kingdom Affairs has a similar OCIO, their Advisor was consulted. The outcome of the interview was expected to show similarities but also present additional barriers. However, the outcome of this interview was different than expected (which will be explained later in the Results section), meaning the focus of the study shifted from 'development of (some sort of) IT/innovation governance' to 'creating an overview of barriers in public sector innovation'. Therefore, the Advisory Council for Science, Technology, and Innovation was consulted. This advisory council has a clear view of the different core departments and their innovative processes. Due to the innovative environment at the Ministry of Defence, the advisory council recommended to contact this department, which lead to the Innovation Manager of Material Organisation. Since the limited focus on internal innovation through I(C)T of this innovation centre, the Strategic Advisor of the same ministry was approached. Likewise, since the national police is also actively experimenting, the Deputy Portfolio Holder of Innovation was contacted. Table 8 presents the interviewees.

STEP 3: TRANSCRIBE AND CODE THESE INTERVIEWS

Next, the interviews need to be analysed, so the recorded interviews were transcribed and codified. The codified interviews were used to provide an overview of all experienced barriers and drivers of public sector innovation. Together with the barriers and drivers and other aspects found in literature, these were input for the Innovation Governance Framework.

TABLE 8. INTERVIEW RESPONDENTS, INCLUDING ORGANISATION, FUNCTION, AND DATE/TIME

Person	Organisation	Function	Date/time
A	Ministry of Economic Affairs and Climate	Programme manager I-strategy	8 March 2018, 11:00
B	Ministry of Economic Affairs and Climate	Manager Office of the CIO	12 March 2018, 14:30
C	Ministry of Economic Affairs and Climate	Project leader SMART Innovation & Experimentation	14 March 2018, 11:30
D	Ministry of Interior and Kingdom Relations	Advisor CIO	15 May 2018, 15:00
E	Advisory Council for Science, Technology, and Innovation	Advisor	28 May 2018, 10:00
F	Ministry of Defence	Innovation Manager Defence Material Organisation	6 June 2018, 13:30
G	Ministry of Defence	Strategic Advisor	13 June 2018, 10:15
H	National Police	Deputy Portfolio Holder Innovation	25 June 2018, 10:00

STEP 4: THEORETICAL FRAMEWORK

After the literature research and the interviews were conducted, a theoretical framework was decided upon. Figure 9 shows the simplified theoretical framework of the dependent (public sector innovation) and independent variables (type of, barriers of, drivers of, and managing innovation), including the mediating variable (innovation governance). The total of these variables defines the scope of the research. It is expected that an innovation governance, based on the independent variables, will positively contribute to the degree of public sector innovation. Appendix B shows the extended version of the theoretical framework.

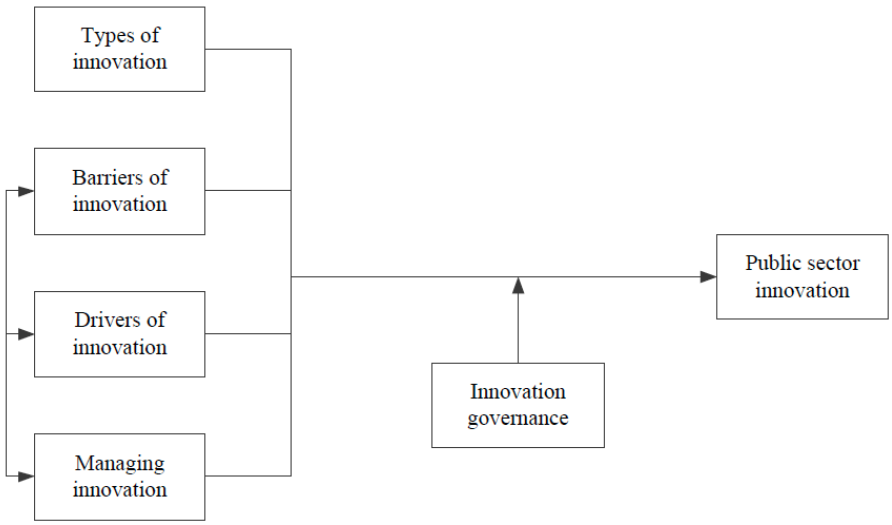


FIGURE 9. SCHEMATIC DIAGRAM OF THE SIMPLIFIED THEORETICAL FRAMEWORK

STEP 5: THE GOVERNANCE DESIGN FRAMEWORK

The governance design framework used in the development of the final deliverable (an innovation governance framework for public sector innovation), was decided to be derived from Weill and Ross (2004). Reasons for using this design framework were threefold:

1) The IT governance design framework was developed with use of six interlocking components of effective governance and presenting a clear overview on how to harmonise these components;
2) The inexistence of an innovation governance for the Dutch public sector calls such a design framework;
3) The framework that needed to be developed on Public Sector Innovation, focusing on Information (and Communication) Technologies.

However, Weill and Ross (2004) is not the only way to design a governance. For example, another framework for IT governance is COBIT: Control Objectives for Information and related Technology. As mentioned by ISACA's preview version (2012) on their latest version, COBIT 5, is based on the following principles: 1) meeting stakeholder needs, 2) covering the enterprise end-to-end, 3) applying a single integrated framework, 4) enabling a holistic approach, and 5) separating governance from management. Still, Weill and Ross (2004)'s framework has been used as a base for the study, because COBIT 5 might be seen as *"too complex"* (as mentioned by two consultants of KPMG (2015, p. 47)), which is to be avoided for public sector innovation. In addition, Weill and Ross (2004) present a step by step explanation on how to custom their governance design framework, also explicitly mentioning the importance for CIOs, where the study has been carried out.

STEP 6: DESIGN OF AN INNOVATION GOVERNANCE FRAMEWORK

With use of the literature review and the codified semi-structured interviews, the first draft of the innovation governance design framework was developed. An overview of all factors mentioned during interviews was made. This shows which barriers and/or drivers are mentioned by whom and especially how often. As seen in the overview (appendix D), some factors were mentioned by all the interviewees and were therefore considered to have a higher priority to be included in the governance framework. Other factors were for example mentioned by only one of the eight interviewees, reducing its priority to include it in the framework. The framework was eventually derived from the factors mentioned during the interviews, backed by the literature review, and guided by the explanations of each section of Weill and Ross (2004)'s framework (as mentioned in Chapter 2.4 IT Governance).

The framework was set up as follows: the overview of all barriers and drivers was conducted and were categorised according to the six interlocking components of the framework. The *strategy* was derived from the interviews and current strategies from the Dutch public sector (e.g. the I-strategies of several ministries). The *innovative organisation and desirable behaviour* was divided into three sections to

create more overview and to explicitly state what and how the ideal organisation should look like. These statements were derived from the overview of all the (especially) barriers and drivers. The *governance arrangements* were paid least attention to because this section is rather dependent on the organisation culture. Therefore, the governance arrangements are described but not in detail (compared to the other five components). What is more important, is the *governance mechanisms*, in which the give decisions (principles, architecture, infrastructure, applications, and investment) are based on the explanation provided by Weill and Ross (2004), the interviews, and the literature review. The *performance goals* were derived from literature and government reports, as well as the *innovation metrics and accountabilities*. In designing the framework, the process was just plain 'puzzling': writing all these dimensions on paper, then aiming to generalise, reorganise and/or fine-tune the framework until it was found satisfactory for the following step. After designing the framework, it had to be evaluated, which led to the following step.

STEP 7: EVALUATION AND ADJUSTMENT

Evaluation was needed to check if the framework with meeting the organisation's need and its usefulness. For this step, specialists working on either of the fields covered in the framework, were asked for their opinion (or: user evaluation). Instead of evaluating the framework through double sampling, another round of judgment sampling took place. This was done to gain additional information on the framework. For the evaluation experts, the framework and its input were new, which made it possible to review the framework without any biases. The interviewees are shown in table 9. Again, as in the case of the interviews, a number of six respondents was found sufficient. Unfortunately, as the research was partly carried out during the summer break, two candidates could not participate due to holiday.

In contrast to the previous interviews, the evaluation interviews are not transcribed word-for-word but are summarised, meaning only information relevant to the subject were transcribed. This is due to a time limit and the need for specific information, irrelevant information for evaluation is therefore left out. After the five evaluation conversations (or email contact), the model was adjusted accordingly. This process was as follows: the interviewees were asked to review the framework and to provide feedback on the framework, as explained in the interview protocol shown in appendix E. To remove any language barriers or insecurities in presenting feedback in English, the framework was translated in Dutch. The framework was adjusted following the feedback, no additional literature was conducted. Unfortunately, due to the limited time in which the research was performed, the framework was developed and evaluated during through the above steps, but application of the framework was limited.

TABLE 9. EVALUATION EXPERTS, INCLUDING ORGANISATION, FUNCTION, DATE/TIME, AND TYPE OF CONTACT

Person	Organisation	Function	Date/time	Type of contact
V	Ministry of Interior and Kingdom Relations	*RADIO*, the National Academy for Digitalisation and Computerisation of the Government (RijksAcademie voor Digitalisering en Informatisering Overheid in Dutch)	9 July 2018, 13:00	Email (due to holiday)
W	Ministry of Justice and Security	CIO Custodial Institutions Department (Dienst Justitiële Inrichtingen in Dutch)	11 July 2018, 11:00	Personal
X	Ministry of Justice and Security	Enterprise Architect	11 July 2018, 11:00	Personal
Y	DUO	Enterprise Architect	12 July 2018, 16:00	Email (due to holiday)
Z	Ministry of Interior and Kingdom Relations	*RADIO*, the National Academy for Digitalisation and Computerisation of the Government (RijksAcademie voor Digitalisering en Informatisering Overheid in Dutch)	16 July 2018, 12:00	Personal

4. RESULTS

The following section will answer the research questions. The research questions are concerned with defining public sector innovation, barriers and drivers for internal public sector innovation, and the development of an innovative governance framework.

QUESTION 1: HOW IS PUBLIC SECTOR INNOVATION DEFINED?

To find out how public sector innovation was defined, the transcribed interviews were consulted. First it is useful to define why the public sector needs to innovate. One clear answer is that the government should not lag behind on the private sector and should keep up with developments occurring outside of the government (A, personal communication, 2018). The government should understand what is going on outside its own organisation and should anticipate by trying to translate such developments into own ways of working (A, personal communication, 2018). If not, the government could lose credibility if for example applications done by citizens or companies takes too long or use outdated methods (such as paperwork instead of online applications) (B, personal communication, 2018). One way to develop insights on what is happening in the private sector is through the Advisory Council for Science, Technology, and Innovation. This council analyses the current situation by asking question such as "How to stimulate the use and development of IT?", "Which and how should ministries act?" and composes an advisory report (E, personal communication, 2018).

Types of public sector innovation

Innovation within the government can be divided into two types: external and internal (B, personal communication, 2018). External public sector innovation deals with stimulating, mainly through financing, private sector innovation. If the government does not invest in private sector innovation, companies can no longer realise their business model, resulting in an ultimately deteriorated economy (B, personal communication, 2018). Public sector investment in private sector innovation helps creating a strong economy with healthy companies. Private sector innovation includes – recalling Chapter 2.1 Types of innovation – all types of innovation, the four most common being **product**, **process**, **radical** and **incremental** innovation. The following types of innovations are derived from Windrum and Koch (2008) and the UK's report from Sunningdale Institute for the Cabinet Office, written by Bessant, Hughes, and Richards (2010).

When looking at internal public sector innovation, several types of innovation discussed in Chapter 2.1 are mentioned during the interviews. First, according to the manager of the OCIO of the Ministry of Economic Affairs, B (personal communication, 2018) public sector innovation deals with its business management, systems, working methods, and methodologies; or **administrative and organisational** innovation (*changes in the organisational structure and routines*). A form of the organisational innovation can be **systemic** innovation (*new or improved ways of interacting with other organisations*

and knowledge bases): ideally, according to D (personal communication, 2018), CIO advisor of the Ministry of Interior and Kingdom Relations, there should be an integrated government-wide database, including: experts and their position/physical location, platforms to share ideas, a government-wide accessible knowledge base, etc. These types of innovation are concerned with the organisational side of the innovation. Another type related to the organisational side is '**social** innovation', dealing with the use and acceptance of the technology (E, personal communication, 2018). Second, when looking at the technical side of innovation, a distinction has been made between innovations related to IT: white and green IT (G, personal communication, 2018). White IT is concerned with digitalisation of the office, for example easier ways to reach colleagues – either **service** innovation (*new or improved service product*). Green IT, or **service delivery** innovation (*new or altered ways of delivering to clients*), focuses on operational IT, e.g. communication between soldiers, airplanes and/or ships.

When looking at the impact, innovation occurs through a two-tier strategy: *optimising* and *transforming* (D, personal communication, 2018). Optimisation of existing technologies deals with **incremental** innovation. Transformation completely adjusts current working methods, based on **radical** innovation. An example has been provided by H (2018), employed at the National Police: implement smart cameras instead of police officers in guard houses in front of e.g. embassies. What has also been mentioned (Y, personal communication, 2018) is another type of radical innovation, namely **paradigm** (*changes in the underlying model of the government*) or **conceptual** (*development of new world views*) innovation: changes in the underlying model of what the government does or "the government should not do things differently, it should do different things." This corresponds to the view of the Ministry of Interior and Kingdom Relations that a shift has to take place towards citizen centred service delivery (D, personal communication, 2018). This means more tailored solutions for unserved or under-served citizens, as part of **position** innovation.

Examples of innovative projects

In the Information and Innovation Strategy of the Ministry of Interior and Kingdom Relations, 'a day of the future (2021) public servant' is described as follows. This example shows what type of innovation could take place in the near future: the application of artificial intelligence.

> *The car automatically pulls over. I can already start working. My agenda and tasks appear on the windshield. "Siri [voice assistant], is there any news that has an impact on my agenda this week" "Statements at the D66 [a Dutch political party] Congress. You can expect a phone call from the Ministry of Interior and Kingdom Relations: they will need your expertise to prepare for possible parliamentary questions about the heatmaps on Google Maps" "From Kees Verhoeven?" "Probably, I will read the newspapers. I will also check on what has been written abroad." "Also look at social media, Siri: what are the main concerns of the people?" "Okay. I will provide you with an overview of people with whom you may want to talk to."*

Unfortunately, there are too many issues related to this example, which makes this a long-term vision. The technology in itself should not be a problem, but the organisation, compatibility, acceptance, and many other issues are holding this back (E, personal communication, 2018). Such barriers will be explained in the second sub-question. However, there are experiments, for example with data, that are more realistic for the short-term. Ministries and municipalities run a number of experiments on big data, offering opportunities to develop or sharpen insights on citizen's perspective. For example, among others, the Ministry of Defence, the police, and the Municipality of Rotterdam experiment with tailored citizen-centred service delivery with use of data (E, G, H, personal communication, 2018). They deal with questions such as "How can we get more specific information from our data derived from e.g. unmanned aircrafts?" or "How can we use big data on social domains, for example in helping citizens to shorten the time they need social assistance?" Other examples of internal innovative projects, as a form of **adaptive** innovation (*implementing outside developed technologies*), or experiments are:

1. **Service** innovation: the introduction of Pepper, a chatbot. The project was based on the running experiment at the city hall of Leidschendam-Voorburg (in the Netherlands), where robot Elvie is used to assist visitors with their questions and appointments, or to provide information about the municipality. The goal of this chatbot is to experiment what robotization does for an organisation such as the Ministry of Economic Affairs and Climate (C, personal communication, 2018).

2. **Systemic** innovation: the mobile application called Boiler. This app is a very practical way to bring together public servants that share the same ideas (A, B, personal communication, 2018). According to the website of Boiler (2018), *"It is a smart & playful platform that helps people to collaborate on ideas. Engage your crowd to solve inspiring challenges in a structured and customisable way. Use Boiler to boost your innovation event or campaign."*

3. As part of **conceptual** innovation: next to the introduction of new technologies, innovation is introduced in the form of events. Such events are used to enthuse and motivate public servants (D, personal communication, 2018). Examples of these events are "knowledge festival Directie Kennis", or the "Night of the Digital Innovation". Another form of introducing innovation is through reoccurring challenges or competitions. In such challenges, public servants across the organisation are working together on a project, where the competitive element works as an extra stimulant.

Concluding remark

The public sector deals with many different types of innovation, but the level of intensity is debatable. The process of innovation and the introduction of technologies, whether the impact is rather small (such as an app) or large (a new robot colleague), brings along several issues. These issues, or barriers of innovation, are explained in the next section. To overcome these barriers, drivers are explained.

QUESTION 2: WHAT ARE BARRIERS AND DRIVERS EXPERIENCED DURING PUBLIC SECTOR INNOVATION?

The previously mentioned examples seem very promising, but the preceding slow and exhausting process significantly delays the introduction of an innovative technology (B, personal communication, 2018). The barriers and drivers of public sector innovation are collected through the interviews and are combined with the theory (Halvorsen, 2005; Koch & Hauknes, 2005; A. Meijer, 2015) explained in Chapter 2.2 Drivers and barriers of innovation. Appendix D show a complete overview of all the barriers and drivers mentioned during the interviews, who mentioned these, and therefore also shows how often the barriers and drivers are mentioned in the total of eight interviews.

Barriers of innovation

Barriers of innovation can be divided into three sections: barriers experienced by public servants, barriers occurring due to top management, and barriers caused by the organisation. Barriers of by public servants include resistance to change, prioritising, and risk-aversion. The first barrier, resistance to change, is a **cultural** barrier. Resistance to change occurs because of different personalities (C, personal communication, 2018) or missing knowledge on the newly introduced technology (H, personal communication, 2018). The more radical the change, the more resistance (D, F, personal communication, 2018). The missing incentive to innovate results in that innovation is not seen as a priority, due to time pressure of their daily activities (A, C, D, H, personal communication, 2018). Especially since the presence of other **cultural** barriers, such as: innovation is not seen as a core activity (A, C, F, G, personal communication, 2018), the missing insight of how to translate technologies into their own work (A-D, G, H, personal communication, 2018), spending time on innovating and experimenting is reduced even more. Moreover, due to the risk-averse mind-set, experiments supposedly should not 'fail'. The view that a 'failed' experiment is not acceptable comes from the higher levels of management and/or the **cultural** barrier of the public having little faith in and a negative image of the government (H, personal communication, 2018). Experimenting with innovative technologies is also hindered due to the vision that mistakes are not allowed (D, E, personal communication, 2018) and that the experiment should be immediately applicable (G, personal communication, 2018) – strengthened by the idea that (political) punishment is larger than rewards for excellence (Nauta & Kasbergen, 2009). Top management may hinder innovation even further through the **structural** barriers of having too much focus on controlling the experiments (C, personal communication, 2018), not prioritising innovation (F, H, personal communication, 2018), or missing stimulating for experimenting (G, personal communication, 2018). The unorganised and missing process of innovation does not help either (A-C, personal communication, 2018).

Next to the public servants and their managers, the organisation also hinders innovation. Especially the **cultural** barrier of the bureaucratic organisation, including too many opinions all through the hierarchy,

slow down the process of experimenting (A, C, D, F-H, personal communication, 2018). In addition to these opinions, the **structural** barrier of (too many) rules and procedures slows down or even ends experimenting (A-C, F-H, personal communication, 2018). Examples of such rules and procedures are procurement, ICT-prerequisites, and the budgetary rule of the European tender boarder. The limited space – either in room for manoeuvre in rules and procedures, budget, time, speed of action, or physical space – decreases the flexibility needed for innovating and experimenting (A, C-E, G, H, personal communication, 2018). These barriers, together with missing compatibility between the technology used to conduct experiments and the current working processes (or the **structural** barrier of technological constraints), hinder the process of scaling up (D, F, G, personal communication, 2018). The governance in general is not geared towards promoting innovation (H, personal communication, 2018).

In addition to these barriers, a missing insight on which experiments have been carried out, causing experiments to be run double, which limits learning from each other (F, G, personal communication, 2018). All these barriers of innovation limit experimenting. Fortunately, there are also drivers of public sector innovation, explained below.

Drivers of innovation

Drivers can be expressed as drivers for public servants and top managers. The main driver for public servants is the intrinsic motivation and willingness to innovate (A, B, F, G, personal communication, 2018). To increase the willingness to innovate – or the **capacity for innovation** of public servants – **support mechanisms for innovation** promote innovation via: the **competitive driver** of challenges or competitions can increase knowledge; offering training, courses, and workshops to increase awareness; presenting new technological developments; or introducing introduce new concepts (A-C, E-G, personal communication, 2018) (Koch & Hauknes, 2005). This is needed when dealing with innovative technologies, because the focus should be on the effectiveness, or: the fit with the organisation (C, F, H, personal communication, 2018). In addition to the public servants' intrinsic motivation, top management can stimulate innovation through **support mechanisms for innovation** such as: communicating the importance of experimenting and communicate success stories; allowing for mistakes, as long as learnt from, and support in risk taking; reward initiatives, either in appreciation or in assigning *fun* innovation projects (A-H, personal communication, 2018). Overall, top management commitment to overcome the barriers of innovation (B, F-H, personal communication, 2018).

Next, what has been mentioned as a barrier in the previous section, could also become a driver: an experimental space, expressed in time, rules and procedures, budget, resources. (A-G, personal communication, 2018). Providing another **support mechanism for innovation** such as an experimental space supports executing experiments and could create some sort of currently missing organisation in the process of innovation (A, B, E, F, personal communication, 2018). Such an experimental space could be expressed as an "innovation lab": a protective environment to experiment, occurring 'outside' of the

hierarchy (E, F, personal communication, 2018). Another approach is the development of innovation centres, were teams are focusing on innovation full time (C, E-G, personal communication, 2018). These innovation labs, centres, or teams deal with both the **push** and **pull** of innovation, such as technological and scientific developments (push) and user needs and preferences (pull) (Halvorsen, 2005). Within such labs, centres, or teams, innovation should not take place in splendid isolation. The sooner top management is involved in the project, the higher the chance of succeeding. This is a win-win situation: management feel involved and appreciated for their expertise and is therefore more likely to cooperate. For the innovators this is a win because they feel supported, which is considered as more important than the outcome of the experiment (F, personal communication, 2018). Of course, innovation cannot happen via one single person, this individual needs a network of experts joining the experiment and for knowledge exchange (A, B, C, E-H, personal communication, 2018). A diverse network, or **pull** for innovation (Halvorsen, 2005), exists of individuals from other departments, universities, or business, i.e. **NGOs or private companies** (Koch & Hauknes, 2005) providing technologies that can be applied in the public sector (B-E, H, personal communication, 2018).

Another driver, especially important around elections, is the **push** for innovation coming from political targets (Halvorsen, 2005; Koch & Hauknes, 2005), meaning that investing in innovation is used to promote a certain political party (D, personal communication, 2018). During elections, innovation is mentioned more often in the hope of becoming more popular and getting more votes.

Examples of promoting innovation

Next to the aforementioned innovation labs or centres providing protected environments to experiment, there were two other methods provided during the interviews (G, H, personal communication, 2018) on promoting innovation. The first method is a training of 'innovation coaches' (G, personal communication, 2018). Innovation coaches are trained through 'design thinking' to adjust their way of thinking and approach to problem solving. They are provided with a methodology and are trained to apply this and to tackle problems. This training takes a couple of days, and in the end the goal is that these innovation coaches can be deployed in the process of problem solving. The second method is the 'innovation expedition' (H, personal communication, 2018). The expedition is a combination of day-to-day learning and periodic gettogethers. The day-to-day learning takes place via an app providing a 10 to 12-minute lecture on global developments and what it does for society, for the police, and for the employee – in total 1 hour per week. After eight weeks, the first gettogether is an inspiration-day, where the employees are required to work on an innovative experiment. During this process, the participants are expected to think about the required tool set and skill set for the experiment, or answer questions such as what steps are required to take when starting an experiment, or what design thinking is. The expedition takes around six months in total and in the end the projects are presented. The goal of the innovation expedition is not to bring forth a certain number of experiments but to prevent managers from directly rejecting innovative projects or experiments, and to create a more open-minded mindset.

These methods, especially the innovation expedition, sound like promising approaches to diffuse innovation throughout the organisation. However, as mentioned by H (personal communication, 2018), in the beginning there are between 70 and 80 participants, but in the end only 25 remain, the rest claims to be too busy. Although this seems a rather small number, it has occurred that they organise their own expeditions and ask the organisers to help set up their own expedition. They, most of the time higher level management with a willingness to innovate, become a kind of innovation ambassadors.

Concluding remark

The long list of barriers may hinder public sector innovation, due to for example risk-aversion, budgetary limitations, or the bureaucracy. The drivers of innovation trying to overcome these barriers deal with support mechanisms for innovation. Also, there are some initiatives for promoting innovation, but innovation is still not seen as a priority.

QUESTION 3: HOW TO EXPRESS GOVERNANCE FOR PUBLIC SECTOR INNOVATION?

As explained in the second step of the methodology (Chapter 3 Methodology), the framework of Weill and Ross (2004) is used as a starting point for the development of a governance framework. Below, the six interlocking components of the framework are applied to public sector innovation, providing the base for the first draft of the innovation governance framework.

ENTERPRISE STRATEGY AND ORGANISATION

The enterprise strategy and organisation describe plans to realise the (business performance) goals. As already mentioned in the Chapter 2 (Corporate strategy, p. 28), there is a whole list of public sector innovation strategies from OECD countries. Taking a closer look upon the Dutch innovation strategies (since the study was carried out in the Netherlands), some ministries, such as the Ministry of Interior and Kingdom Relations or the Ministry of Justice and Security (B, D, personal communication, 2018), have a similar strategy to the I-strategy of the Ministry of Economic Affairs and Climate (in short): stimulating the use of IT. This is required for the government to keep up with the developments around IT happening in a rapidly digitalising society. As stated in the I-strategy of the Ministry of Economic Affairs and Climate, the strategy is to *"stimulate the use of IT earlier in the policy cycle"*. The strategy was therefore described as:

- The use of innovative IT to be able to (continue to) fulfil the public task in a rapidly digitalising society
- Stimulate the use of IT earlier in the policy cycle

INNOVATIVE ORGANISATION AND DESIRABLE BEHAVIOUR

Similar to the barriers and drivers of innovation, the innovation organisation and desirable behaviour can be divided into three sections: the public servant, (top) management, and the organisation itself. First, the desirable behaviour of the public servant include: an (intrinsic) motivation to deal with innovation and experimenting (A, B, F, G, personal communication, 2018), abandon the idea that innovation is an extra activity instead of integrated in daily activities (A, C, D, H, personal communication, 2018), no risk-aversion towards innovation (A, D, E, G, H, personal communication, 2018), and reduce resistance to change (A, B, D, F, H, personal communication, 2018). This eventually results in the following dimensions of the framework for the public servant:

- Motivated to get started with innovation and experimenting
- Move away from the idea that innovation is "something extra"
- Reduce risk aversion
- Limited resistance to change

Second, the desirable behaviour for (top) management is defined as: allow to make mistakes, as long as learnt from (A, B, D-G, personal communication, 2018); focus less on control (C, personal communication, 2018); stimulate, motivate, communicate, and support during experimenting (A-H, personal communication, 2018); and as mentioned in the I-strategy of, among others, the Ministry of Economic Affairs and Climate, support and stimulate the use of IT earlier in the policy cycle. This results in the following dimensions for (Top) management:

- Communicate that there is room to make mistakes, as long as learnt from
- Focus less on control
- Stimulate, motivate, communicate, and support during experimenting
- Support and stimulate earlier deployment of IT in the policy cycle

Last, the innovative organisation ideally integrates innovation within the organisation (A-C, personal communication, 2018). What is currently missing is a government-wide standardised process for innovating and experimenting. Such a process, like the aforementioned stage-gate process, is desired to guide innovation. Next, society expects continuity of government services (C, personal communication, 2018) and the shift towards a citizen-centred government (E, personal communication, 2018), calling for an innovative organisation, stated as:

- Integrate innovation in the organisation
- Continuity of government services
- Citizen-centred service delivery

Basically, all these dimensions are the opposite of the barriers of innovation (e.g. from *risk aversion* to *reduced risk aversion*), and drivers of innovation (e.g. the support mechanisms for innovation such as allowing for mistakes). The innovative organisation and desirable behaviour could be seen as the ideal situation in which the barriers explained in Question 2 have overcome, and the drivers of innovation are stimulated.

INNOVATION GOVERNANCE ARRANGEMENTS

This section focuses on assigning responsibilities on decision-making, followed from the governance arrangement matrix. The governance arrangements are based on the five governance mechanisms described below. If the governance arrangements are handled similar to the Innovative organisation and Desirable behaviours, then for decision 1 all (public servants, (top) management, and the organisation itself) decide; (top) management and the public servant decide on decision 2, 3 and 4; and (top) management itself decides for decision 5.

INNOVATION GOVERNANCE MECHANISMS

The innovation governance mechanisms include innovation principles, innovation architecture, innovation infrastructure, innovation application needs, and innovation investment and prioritisation (as explained in Chapter 2.4 Governance). The dimensions for the five innovation mechanisms are defined through reviewing the literature (especially focusing on the Table 4. Factors and sub-factors influencing an organisation's ability to manage innovation, as explained in Chapter 2.3 Managing innovation), as well as the input provided from the interviews. The factors and sub-factors, derived from Smith et al. (2008), are written in cursive. Below, each decision is explained.

Decision 1: Innovation Principles

The principles are needed to state the business role of innovation. First of all it is needed to define innovation before experimenting (D-F, H, personal communication, 2018): the experiment must have a technical aspect to be an innovation instead of just a renewal (H, personal communication, 2018), defining innovation could reduce resistance to change (F, personal communication, 2018), or this creates awareness in the effectiveness of the technology (C, F, H, personal communication, 2018) and therefore fit with the organisation (A-D, G, H, personal communication, 2018). Currently, the focus of innovation in the public sector is mainly incremental innovation. The advantage of incremental innovation is a reduced resistance to change of public servants. This resistance may come from missing knowledge in understanding a technology or application (H, personal communication, 2018). Also, it takes time to adopt a new method of working (C, personal communication, 2018). The more radical the innovation, the longer the adoption of the new method due to higher resistance to change of public servants. Ideally, experiments on the level of both types of innovation are carried out to optimise (incremental) or transform (radical) existing work methods (E, personal communication, 2018). Recalling the factors and sub-factors of table 4, defining innovation adjusts *employees'* motivation to innovate, and the *organisational culture's* attitude towards risk and innovation.

Second, the importance of innovation should be communicated (A-C, F-H, personal communication, 2018). Communication can create awareness among the importance of innovating and experimenting, and eventually result in innovation becoming a priority (A, C, F, G, personal communication, 2018). Also, communicating the importance of innovation could adjust the *organisational culture*, where the shared motives, beliefs, identities, and interpretations or meanings could eventually shift towards a more innovative mind-set. Last, competitions can create even more awareness of the business role of innovation (B, E, G, personal communication, 2018). Competitions increase *organisational learning*. This results in the following dimensions for the innovation principles:

- Define innovation
- Communicate the importance of innovation
- Organise innovation competitions

Decision 2: Innovation Architecture

The innovation architecture describes the organisation of innovative experiments, including policies, relationships, and technical choices to achieve desired business and technical standardisation and integration. The architecture is a coherent and consistent collection of principles, guidelines, standards, and rules, which describes how an organisation its information provision, applications, and technical infrastructure have been set up and shaped.

Part of the innovation architecture include an inventory of all running experiments (D, F, H, personal communication, 2018) or, recalling table 4, the *utilisation of a knowledge repository*. Also, the development of a standardised process could provide the aforementioned desired business and technical standardisation and integration. A standardised process for experimenting also offers guidance for the public servant (A-C, personal communication, 2018), and might lead to *selection and evaluation techniques* or eventually (large-scale) *implementation mechanisms* (sub-factors of the factor 'innovation process', table 4). Also, guidance of management could *motivate employees*. The dimensions for the innovation architecture are therefore:

- Inventory of all experiments
- Develop a standardised process of experimenting with innovative technologies

Decision 3: Innovation Infrastructure

Innovation infrastructure decisions include centrally shared services that provide the foundation for the organisation's innovation capability. An "experimental space" eases the process of experimenting. This space is expressed as time, budget, rules and procedures, and resources. Resources are expressed as *knowledge, technology and/or financial resources*. The "experimental space" is a combination of at least the following factors: *technology (utilisation of technology), organisational structure (differentiation), employees (skills and education, and training), resources,* and *knowledge management (organisational learning*.

Experimenting should not occur in splendid isolation but should take place within a network. Different areas of expertise and management levels will increase the success rate (F, personal communication, 2018). Ideally, the network exists of a combination of other departments, organisations, universities, and/or private sector businesses to maximising knowledge spill overs (B-E, H, personal communication, 2018). This view matches the sub-factor *knowledge of (external) environment* from the factor *knowledge management*.

During experimenting, the technology preferably fits the current IT infrastructure, to increase large scale implementation (as part of the *innovation process*). If not, scale-up will be more difficult and timely. Additionally, a misfit with IT infrastructure might bring along compatibility issues, slowing down the

adoption of the technology or application (D, F, G, personal communication, 2018), hindering *organisational learning*. The innovation infrastructure is described as:

- Creating an experimental space, expressed in: time, budget, resources, rules and procedures
- Innovation should take place in a network of departments, agencies, universities, and/or private sector businesses

Decision 4: Organisation's Application Needs

The application needs specify the organisation need for purchased or internally developed applications. The public sector has resources to develop certain apps inhouse, however sometimes the development is outsourced. This can have several reasons: lacking resources, budget, convenience, etc. This is experiment-dependent. Sometimes it is clear that the development is outsourced (as in the case of the robot), but sometimes the development occurs inhouse. Outsourcing is a form of attracting *knowledge from external environment*.

Next to the organisation's application needs, compatibility is an issue. This has also been mentioned in decision 3: innovation infrastructure. The downside of focusing on solely compatible technologies, reduces a more radical innovation which might become more effective. If experiments are carried out independent on the fit with the current infrastructure, the organisation might benefit more (H, personal communication, 2018). However, this brings along many issues, such as resistance to change and large-scale diffusion (which is a disadvantage for *organisational learning*, but also for the *utilisation of technology*). Compatibility is therefore an attention point when looking at the organisation's application needs. The organisation's application needs are explained as:

- Decide if a technology or application should be developed inhouse or should be outsourced
- Focus on compatibility of the technology

Decision 5: Innovation Investment and Prioritisation

Innovation investment and prioritisation includes decisions on how much and where to invest in innovation, including project approvals and justification techniques. One way to decide how much and where to invest in innovation is through portfolio management. Portfolio management (as a form of *knowledge management*) is, among others, used to explicitly state the budget for innovative projects. The current issue is that there is limited budget available for experimenting, and that budget is mostly used to straighten past decisions instead of focusing on future applications of technologies. Tidd et al. (2005, p. 367) explain that clearly stating the budget in a portfolio reduces the lack of a strategic focus, or weak decision-making criteria for a project.

When it comes to investment, budget-related issues arise from for example political decisions on budget cuts or the European tender border. This is shortly explained as European authorities (governments) are

required to issue public contracts, exceeding a certain level of expenditures for an experiment, through the European tender procedure. This can be circumvented by means of downsizing experiments: smaller sized and short-cycle experiments require a smaller budget. The innovation investment and prioritisation is simply expressed as:

- Assign a certain budget through portfolio management

BUSINESS PERFORMANCE GOALS

The overall goal of innovation and experimenting is an increase in the digitalisation of the government. This means that the quality of work processes increases through the use of IT. Therefore, dealing with technology should become "consciously competent" ("bewust bekwaam" in Dutch). In addition, an effective and ongoing cooperation in a large network of experts and management during the process of innovation and experimenting will integrate innovation in the daily activities. The performance goals stated in the framework are:

- Digitalisation of the public sector
- Dealing with technologies becomes "consciously competent"
- Improved quality of work processes through the use of IT
- Effective cooperation in a network of experts and management

INNOVATION METRICS AND ACCOUNTABILITIES

These business performance goals can be measured through the innovation metrics. Such assessment methods include: an x percentage of the experiments should be scaled up. This is explained in the Dutch I-implementation agenda (2016, p. 18), stating that the Dutch government CIO-board has decided that "*by 2020, innovation should become a structural component in the portfolio, and that one out of 10 innovations also structurally lands in the organisation."* Also, justification of the budget for innovation is necessary. If the budget of innovative projects is not justified, it could create resistance of the public and distrust towards the government. The assessment methods are therefore:

- An x% of the experiments should be implemented or scaled-up within a certain amount of time (quarterly, yearly, etc.)
- Justification of the budget for innovation

In addition, stimulating, motivating, and communicating is expressed as: 1) offer training and workshops to better understand innovative technologies and to translate the use of these technologies to the organisation, and 2) to share innovative projects or experiments throughout the organisation.

PUBLIC SECTOR INNOVATION GOVERNANCE FRAMEWORK: VERSION 1

The above six interlocking components now have to become concrete and be filled into the framework to become an innovation governance framework. To remove any barriers, the first version of framework that was set up for discussion was in Dutch. Because this framework still needed some evaluation, validators should have not felt held back due to a language barrier. Figure 10 shows the first version of the innovation governance framework.

FIGURE 10. VERSION 1 OF THE INNOVATION GOVERNANCE DESIGN FRAMEWORK

PUBLIC SECTOR INNOVATION GOVERNANCE FRAMEWORK: FINAL VERSION

This framework needs evaluation and therefore five colleagues were consulted. Appendix E shows the evaluation interview, including an introduction, the framework, and questions that were asked during the interview. The goal of this step was to gain insights on if the framework was clear enough to understand without too much background information, if something was missing, or if some statements were for example contradictory. Appendix F provides a complete overview of all recommendations on how to improve first version of the innovation governance framework (from interviewee V to Z).

The first fair point is that innovation and experimenting should be as free as possible, and therefore terms such as "standardised" or "should be implemented" ought to be avoided as much as possible (W, X, personal communication, 2018). This creates an atmosphere where innovation is expected to be successful, immediately increasing the risk aversion (W, personal communication, 2018). This 'expectation management' strengthens the feeling that innovation and experiments that have a "negative outcome" (read: the outcome of the experiment is that the technology is, at least for the time being, non-applicable) are immediately a failure (W, X, Z, personal communication, 2018). What has also been mentioned is that the innovation architecture and application-needs are of importance in a later stage of the innovation process. That is because these two mechanisms also create certain expectations, which should be avoided at the beginning of innovation and experimenting (W, X, personal communication, 2018).

Second, the framework needs clearer definitions. To start with, the scope of the framework should be defined more clearly, innovation can include technical innovation but also social innovation (V, Y, personal communication, 2018). The innovation does not need to be state-of-the-art (W, personal communication, 2018), but should have a clearer focus. Also, the application needs need to be defined, because it is not clear if it is focused on IT or something else (Z, personal communication, 2018). And last, governance arrangements could also be defined as 'management controls', in which governance arrangements, or decision making, is one of the management controls (Z, personal communication, 2018).

Third, the budget for experimenting should be defined. There is a huge distinction between an experiment with a budget of for example 5000 euros than an experiment requiring a budget of 50 million euro (V, personal communication, 2018). Smaller scale and iterative experiments reduces such budgetary barriers (W, personal communication, 2018). However, there is a difference between the innovation budget and experimenting budget: depending on the experiment the budget is rather small, but during the (government-wide) scale up, the required budget increases enormously (Z, personal communication, 2018). In addition, responsibilities change during the process of scaling up, which makes experimenting tricky: public servants can keep on experimenting and taking advantage of carrying out more 'fun' projects, but not deal with the increased responsibilities when actually scaling

up, and therefore let the projects fail. Scale up also shift responsibilities to higher levels of management, whom may also prefer to avoid such responsibilities.

Fourth, another undefined problem is the compatibility. Compatibility is split into two camps: on one side, compatibility is preferred because otherwise scaling up is slowed down increasingly (F, personal communication, 2018), and on the other side it can become a limitation of the innovation strength (W, personal communication, 2018). Z (personal communication, 2018) summarises it as *"an issue that limited government organisations have any answers to."* As explained by G (personal communication, 2018): *"compatibility is challenging."*

Last, an interesting point made by Y and Z, through personal communication (2018), is that the public sector should think about not 'do things differently' but 'do different things', in order to effectively and efficiently offer citizen-centred public services. This is in line with the opinion of Z (personal communication, 2018), mentioning that the strategy should be adjusted: currently the strategy is focused on incremental innovation by easing the current public tasks with use of IT, but the use of IT might develop completely new public tasks.

Fortunately, the evaluation interviews also expressed the importance of tome points of the framework. The first was an inventory should be made on all (running, stopped, or eventually implemented) experiments (Y, Z, personal communication, 2018). This has also been mentioned in the first data collection (D, F, H, personal communication, 2018), confirming the importance on creating insight on experiments carried out in the public sector. Portfolio management is another way of creating insights and can be seen as a tool for decision making on projects (W, Z, personal communication, 2018), confirming the thoughts of D and H (personal communication, 2018). Second, the size of the experiments has also been confirmed. Smaller-scale and iterative experiments are a little more viable (W, Z, personal communication, 2018), which has also been mentioned by A, B, D, F (personal communication, 2018). Third, the risk aversion is expressed as top management's vision, which is affecting the view on innovation of public servants (W, personal communication, 2018). If top management does not express the importance of innovation, public servants do not feel obligated to innovate and experiment. In other words, managers may not prioritise innovation (F, G, H, personal communication, 2018). What should not be forgotten is the middle management, who have to communicate to both top management and to the public servants and are the first point of contact in the event of experimental faults (Z, personal communication, 2018). And final, the focus on effectiveness (C, F, H, personal communication, 2018) has been confirmed by Z (personal communication, 2018) by mentioning that experimenting is used to understand the essential value and the applicability of a technology.

With use of the input gained through this evaluation step, the model was adjusted accordingly. Figure 11 shows the final version of the governance framework for promoting innovation in the public sector.

FIGURE 11. FINAL VERSION OF THE GOVERNANCE FRAMEWORK FOR PROMOTING INNOVATION IN THE PUBLIC SECTOR

The adjustments that were made are as follows:

- The **strategy** changed to "the deployment of IT to be able to continue to fulfil existing public tasks and/or to offer renewed public tasks" and "tackling risk aversion towards innovation and experimenting through stimulation, motivation, and communication".
- "Reduced rules and procedures (less bureaucratic) for the process of innovation" was added for the Organisation in **innovative organization and desirable behaviour**. Also, "reduce outdated means of service delivery as much as possible" is added.
- In **governance mechanisms** under the innovation architecture, the term 'standardised' has been removed and replaced by "Offer guidance during of experimenting with innovative technologies via stage-gate model".
- The **performance goals** have been adjusted to "eased process of innovating and experimenting", "an increased level of experimenting and innovating with IT to improve quality of work processes" and "public servant, managerial, and organisational commitment towards innovation".
- The **innovation metrics** have been extended with "applying portfolio management to gain insight on all experiments", "clearly defining the budget for experimenting", "focus on effectiveness of a technology: determine the essential value and applicability of the technology through experimenting" and "limit the use of actual numbers and percentages to avoid any expectations of innovation outcomes".

Concluding remark

With these adjustments, the final model has been evaluated and extended. The evaluation interviews were needed to give some extra input about the model, its understandability, and to provide insights on what needed to be emphasized, adjusted, or removed. The final model includes input from the literature, interviews and evaluation interviews. The model is an overview of the collected barriers and drivers, suggestions for organising public sector innovation, and other related recommendations. Harmonising the three columns – the strategy, governance arrangements, and performance goals – is a step in the right direction of promoting public sector innovation.

5. EVALUATION

This chapter is a further evaluation of the framework, including guidelines on how to use the framework and related specific recommendations. First a little introduction is required in the run-up to the development of the framework.

In the first two to three weeks of the research, time was mostly spent getting to know the organisation and the colleagues at the OCIO of the Ministry of Economic Affairs and Climate in the Netherlands. Whenever the topic of the thesis was explained in short (which in the beginning was explained as "somehow structuring innovation in the public sector"), responses were enthusiastic and importance of this type of research was often expressed. After conducting the first three interviews with colleagues within the OCIO, a wider perspective was seen as required by the researcher/writer of the thesis and different ministries and organisations were consulted. Again, importance of this research was expressed, quoting *"it is indeed important to look into why it [innovation] is so slow, what the causes are"* (D, personal communication, 2018) and *"we don't have that [a process of innovation] yet, but we want to have it"* (G, personal communication, 2018). Even though innovation itself is difficult to structure, some form of support is still desirable: *"on the one hand, people think 'innovation is a free process', but on the other hand, there is a need for direction, focus"* (G, personal communication, 2018). The aim of the research was eventually the design of a governance framework, since *"the governance is not adjusted for innovation, we got a too protective governance"* (H, personal communication, 2018). The overall goal was to develop a framework that could, even at one glance, provide insights in what was missing in the current governance, or what elements should be thought of in setting up an innovation governance.

After following the required steps in designing the innovation governance (see the previous section, Question 3), guidelines in using the framework are as follows. On the left-hand side of the framework, the **strategy** is stated. The strategy can be seen as the base of a more organisation-specific innovation strategy for the organisation adjusting its innovation governance. However, a strategy should be more than just two bullet points and is therefore required to be extended towards a more extensive strategy. Next, this strategy should be harmonised with the **innovative organisation and desirable behaviour**. This section is divided into three categories, where the public servant and (top) management (the first and second category) immediately see what is expected from themselves and each other in order to create an innovative organisation (third category). Then, on the right-hand side of the framework, the **performance goals** state the goals of the innovation governance framework. Measuring if these goals are reached occurs through the **innovation metrics and accountabilities**. This section states how to measure the innovative performance, or what actions must be undertaken to reach the performance goals. These goals are to be aimed through the strategy and the **governance mechanisms**. These mechanisms explain innovation principles, architecture, infrastructure, application needs, and investment and prioritising. Each of these mechanisms are further expressed as actions that can be

undertaken during either the process, promotion, or guidance of innovation. The **governance arrangements** state who decides on what mechanism, which is flexible and dependent on the organisation, therefore this section should be seen as recommendations. In setting up the innovation governance, ideally the six interlocking components are harmonised. The framework must be seen as a first step into setting up an innovation governance. The framework is flexible in the way that the organisation conducting this framework can select the proper dimensions within the framework, since some dimensions are more applicable than others or some might already be present in the organisation. The overall goal was to provide one clear overview of what is expected from whom, to overcome barriers of innovation by presenting clear actions, and how to start the process of innovation and experimenting.

Additionally, innovation in the public sector could also be evaluated. The governance performance in itself could not be measured, since adjusting the entire governance towards innovation is impossible in just six months. Therefore, the framework in itself should be evaluated somehow. Unfortunately, time left for evaluating the framework (e.g. for its effectiveness) was limited. However, the importance of the framework can be evaluated. The practical relevance of the research has been expressed by several colleagues, whether during interviews or during informal contact. What has been mentioned most often was the importance of the final deliverable: the innovation governance framework. Especially the fact that the framework is presented as one clear and understandable figure, without having to read entire documents on how to govern innovation, makes the research relevant for the organisation. This is especially important since the topic of innovation is generally still seen as "something extra" with a low priority. Fortunately, further importance of this research has been expressed by several colleagues (especially those who participated to the development of the framework) requesting to read the final thesis.

6. DISCUSSION AND CONCLUSION

The discussion and conclusion will present an answer to the main research question. The underlying meaning of this research was to provide an overview of how to govern public sector innovation by presenting all barriers, drivers, and other related issues. The goal is creating a starting point in adjusting the current governance towards a (more) innovative governance for the public sector. The main research question of this thesis was:

How to govern innovation in the public sector to enhance public sector digitalisation?

In answering the research question, sub questions were derived. The first sub-question was concerned with defining public sector innovation. Next to the basic distinctions of radical and incremental innovation, literature provided a larger list of types of public sector innovation. What came forth during the interviews was that radical innovation might result in more effective processes or procedures, but the resistance to change (either from the public servant or society, or both) also increases with radical changes. Ideally, both incremental and radical innovation are carried out, aiming at centralising citizens. The second sub-question was used to collect barriers and drivers of public sector innovation. Barriers include, among others, technical, societal, or financial barriers. In overcoming these barriers, drivers of innovation are needed. The number of drivers of innovation is high and include useful examples but does not yet seem significant enough to overcome the barriers of innovation and in integrating innovation in the public sector. Therefore, the last sub-question needed to be answered. This sub-question focused on expressing governance for public sector innovation. Since the focus of innovation was government digitalisation through IT, it was decided that Weill and Ross (2004)'s IT governance design framework could provide the required overview of the strategy, arrangements and goals of public sector innovation. The framework was used to apply governance to public sector innovation (instead of the original focus of the framework on IT). The input of the framework was derived from the consulted literature, interviews with public servants, and other unpublished government reports. For validity purposes, the model was reviewed by another group of public servants. The final model is supposed to present an overview on how to approach public sector innovation.

After answering these three sub-questions, enough information was collected to answer the main research question. Governing innovation is highly required if the public sector wants to keep up with developments in the private sector. Without public sector innovation, services offered become inadequate (imagine having to apply for a student loan through filling in a number of paper forms instead of arranging this online). Additionally, the input of IT can provide completely new opportunities for the government to deliver services. Difficulties in governing innovation is that governance is does not has a uniform definition. Although the definitions differ in some aspects, governance is mainly focused on the coordination of activities, the performance of agents, and specification of decision rights and accountabilities. Since such governance for public sector innovation was not found in literature, in

combination with its importance, the focus of the thesis was a governance. However, adjusting the governance for the entire public sector in a short amount of time –six months to be exact – seemed rather ambitious. As explained by Weldon et al. (2016), one of the core OCIO capabilities is governance. Innovation management is a nascent capability development. It was therefore decided to apply the knowledge gained through the literature review and the data collection of the interviews to develop a governance framework, attempting to combine governance and innovation management. So, in answering the main research question on how to govern innovation in the public sector to enhance government digitalisation, the framework can be consulted. This framework shows what the strategy is in government digitalisation, who and how responsibilities are arranged and expressed, and what the final performance goals public sector innovation is supposed to reach. The framework is flexible enough to interpret and adjust some of the dimensions in the framework, but sturdy enough to offer guidance in setting up an innovation governance for the public sector. This framework can be useful for ministries, government agencies, and other organisations within the public sector in setting up their governance towards promoting and increasing innovation. However, during the research, not the entire public sector was included. Therefore, implications of other areas of study include ministries, government agencies, and other implementing organisations that have not been part of this research, or where innovation has not yet been prioritised and/or feel the need to innovate but do not know where to start. For each department or organisation within the public sector, the strategy, arrangements, and/or performance goals might differ slightly. Still, the framework is general but sturdy enough to be applied at other departments, where some purposes in the framework are more applicable than others. Nevertheless, the innovation governance framework is only the beginning of becoming an innovative organisation. The goal of the research was to create an overview, but this framework has to be applied by adjusting the current governance towards a (more) innovative governance, for the organisations in the public sector to eventually become more innovative and to increase experimenting.

What has already been mentioned in the introduction and problem statement is that public sector innovation is challenging. With a focus on government digitalisation, public sector innovation should be promoted more. The four key actions for the government, as explained by the OECD (2015), 'people matter', 'knowledge is power', 'working together to solve problems', and 'rules and processes to support, not hinder' are all covered by the innovation governance framework, and it may therefore be able to contribute to the existing issue of public sector innovation. Therefore, the significance of this framework is expressed in the differences in dealing with innovation between the public and private sector, where the public sector is missing e.g. incentives, (financial) resources, or guidance. The framework emphasises the importance of desired behaviour of the public servant, (top) management, and the organisation in one clear overview, which has not been done before. Recalling the twelve recommendations of the OECD council on digital government strategies, the main focus of the research was recommendation 7: "Establish effective organisational and governance frameworks to co-ordinate

the implementation of the digital strategy within and across levels of government". In addition, the importance of other recommendations has been expressed in either literature, interviews or both. Most often mentioned were corresponding with (or at least partly) recommendation 3, 6, 10 and 11, "Create a data-driven culture in the public sector", "Ensure coherent use of digital technologies across policy areas and levels of government", "Reinforce institutional capacities to manage and monitor projects' implementation" and "Procure digital technologies based on assessment of existing assets including digital skills, job profiles, technologies, contracts, inter-agency agreements to increase efficiency, support innovation, and best sustain objectives stated in the overall public-sector modernisation agenda", respectively. The framework adds to science in the way that it is now focusing on the public sector, in which support for innovation is essential. The framework is set up to reduce the level of complexity for innovation and to reduce public servants' risk-aversion towards experimenting, through alignment of the six interlocking components. This has not been presented before, adding to the scientific importance of the research.

As for practical relevance for the OCIO of the Dutch Ministry of Economic Affairs and Climate, the interviews provide an extended view on what innovation must look like within the OCIO; the final framework presents bottlenecks for innovation on which the I-strategy can anticipate; and by presenting barriers and drivers, the thesis can guide the department in developing a more hands-on approach in stimulating innovation. The practical relevance of the framework will be explained per column. On the left side of the framework, the *innovative organisation and desirable behaviour* offers guidelines for public servants, (top) management, and the organisation itself. The public servant will increase a sense of support through (top) management commitment, and (top) management has a clearer view on what is expected from them during the process of innovation. By stating what is expected from each part of the organisation, it reduces insecurities on how to deal with innovation and experimenting, which will eventually enhance executing the *strategy*. On the right side of the framework, the *innovation metrics and accountabilities* present clear methods on how to measure issues of the innovation process, such as insight on running experiments or effectiveness of technologies. Also, it presents what type of measurements are better to avoid, in order to reduce any expectations. The *performance goals* can be harmonised, and the *metrics and accountabilities* can measure (or at least direct towards) an innovative public sector. The middle section presents the governance arrangements including *governance mechanisms* providing statements on how to organise innovation principles, architecture, infrastructure, application needs, and investment and prioritising. Eventually, the framework has been set up to create some order in the chaos. Visualising and summarising important aspects dealt with during innovation increases understandability on what is needed in the process of public sector innovation. When an organisation (e.g. department, government agency, innovation team, etc.) consults the framework, it becomes clearer what bottlenecks are present or might be present in this specific organisation, some of which the organisation was not even aware of that it could become a bottleneck. With this increased

awareness, the process of innovation is expected to run smoother. The framework also presents guidelines of dealing with such bottlenecks. However, further interpretation of these guidelines (such as "create an experimental space") is dependent on too many factors, which makes it impossible to generalise for the entire public sector. The framework therefore only presents guidelines, which makes it flexible enough to be applied in different organisations within the public sector, and sturdy enough to offer a certain level of guidance. In sum, the advantage of consulting this framework the offered support in the process of innovation.

Overall, the innovation design framework is not completely generalisable for every organisation within the (Dutch) public sector. However, when looking at the framework, it can certainly help in pushing the current governance towards a (more) innovative governance. What has been discussed in literature has been confirmed during data collection and new issues arose. The research therefore definitely contributed to the overall topic of public sector innovation. Next in the process of increasing the level of public sector innovation is experimenting with the application of the framework. In conclusion, the final framework could therefore be seen as a first step in filling the gap of public sector innovation governance. Recommendations on how to apply the framework are presented below.

RECOMMENDATIONS

First, in consulting the framework, it is recommended for the user to understand that not every dimension of the framework is completely one-on-one applicable for another ministry or government agency. The framework presents possibilities in promoting, stimulating, guiding, or communicating innovation which can be **applied in a way that suits the organisation**. If a certain dimension is not applicable, this does not mean that the whole framework is irrelevant.

Second, as society changes, so do the expectations for the public sector, therefore the organisation, and therefore the governance. It is therefore recommended to **revise and adjust the governance framework when needed**. Adjusting the framework is dependent on the required change in desired behaviour (Weill & Ross, 2004).

Third, an entire adjustment of governance cannot be done by one single person, **different levels of management need be involved**. Once, for example, the CIO believes in the importance of innovation within the organisation and also propagates this, issues such as risk aversion can be tackled. Conducting the innovation governance framework that has been designed in this research can contribute to the propagation because it provides an overview of related subjects in public sector innovation and how to tackle these. Also, since governance is concerned with assigning responsibilities, it is recommended to **assign responsibility for communicating the importance innovation**, either through a CIO or an equivalent function within the organisation. This is especially needed to increase importance on the subject of innovation. This does not mean that innovation in itself is their responsibility, but they can

influence decisions and behaviours towards innovation, and generate value for innovation in senior management (Weill & Ross, 2004).

Next to the recommendations in consulting the framework, there are two recommendations for public sector innovation in general. First, when it comes to innovation and experimenting, the most hands-on recommendation is, instead of continuing to develop I-strategies and implementation agendas, or related government reports, is to **actually start experimenting**. This has been emphasised by D and Z (personal communication, 2018). Of course, experimenting needs some kind of guidance and decision-making methods. It is therefore recommended to develop a methodology, such as the stage gate model, which can provide support throughout the process of innovating.

Second, in boosting innovation, it is recommended to **learn from others**, expressed as 1) knowledge spill-overs between departments or other organisations within the public sector, 2) other approaches to innovation (e.g. the innovation coaches, expedition, or ambassadors), and 3) methodologies in somehow structuring the process of innovation.

7. REFLECTION

This section discusses limitations of the research, what could have been done differently if the research was performed again, the academic reflection, personal experience during writing this thesis, and suggestions for further research.

LIMITATIONS OF THE RESEARCH

The following section will express some limitations, or weaknesses, that occurred during writing of the thesis. The first limitation was the non-response for interviews. In the judgment sampling, public servants dealing with innovation (i.e. innovation managers or equivalent) were contacted from several ministries and other organisations. However, due to limited time (or what has also been mentioned in interviews: *"unknown makes unloved"* (A, personal communication, 2018), implying priority is low when someone you do not know asks for help) these experts were not able to conduct an interview. Ministries or other government agencies that were contacted include: Rijkswaterstaat and the Ministry of Social Affairs and Employment (*SZW*). Additionally, the main focus was ministries (and their agencies), but municipalities could have been included. Municipalities can be compared to ministries, deal with similar barriers such as the organisational culture and/or structure on a smaller scale.

This lead to the second limitation. A total of eight interviews was conducted, which is higher the above-mentioned minimal number of six interviews (referring to step 3 in Chapter 3 Methodology). However, for the purpose of an increased scientific relevance, a higher diversity might have given more input and unexpected outcomes for the development of the final model.

Third, these limitations decrease the generalisability for the final model for the entire public sector. However, in the evaluation step (referring to step 7 in Chapter 3 Methodology), other public sector organisations (the Ministry of Justice & Security, *J&V*; Ministry of Interior and Kingdom Relations, *BZK*; and DUO, a government agency of the Ministry of Education, Culture and Science, *OCW*) were contacted. This means the model is generalisable until a certain level.

Finally, during the process of writing the thesis, the methodology has been adjusted from a quantitative approach (namely: six stages of the designing cycle of Verschuren and Hartog (2005)'s *design-oriented research*) towards a qualitative method of data collection (interviewing through judgment sampling). Due to time constraints and the adjusted scope, data from the quantitative questionnaire has not been used. The scope has shifted from "barriers and drivers for public sector innovation" towards "a governance framework for public sector innovation", including a wider range of covered topics (e.g. accountabilities). These topics were less covered in the questionnaire, which made it more difficult to include an analysis of this data in the final innovation governance framework. However, at the end of each list of questions on a certain topic, a blank space was left to leave remarks or feedback on that topic. This type of data collection gives some interesting insights of a larger group, in this case the OCIO

of the Ministry of Economic Affairs and Climate. Some of these insights (stated in these blank spaces) were taken a closer look upon, but not all data was analysed accordingly. Appendix C shows the questionnaire and its results. The questionnaire in itself was useful to gain a better understanding of the location where the questionnaire was held (OCIO of the Ministry of Economic Affairs), but was less useful for developing the model, due to the size of the sample and the limited variation (since it was only sent out to OCIO employees).

In concluding remark, the limitations are acceptable in the application of the framework. As already explained in the conclusion, the framework is inclusive yet flexible, meaning it is still applicable for a wide range of in public sector. However, due to the rather small size of the research, suggestions for further research are presented below.

ADJUSTMENTS WHEN REPERFORMING RESEARCH

The following section describes the adjustments that could have been made if the research was performed again. The first consideration in reperforming the research, as it is the largest part of this research, is the governance design framework. The framework of Weill and Ross (2004) has been used as a base for the final framework. Additional (IT) governance frameworks could have been taken a closer look upon, for example COBIT (Z, personal communication, 2018). If the research were to be performed again, more attention would have been paid to the different types of governance frameworks, either focusing on IT or even a completely different focus.

Second, as mentioned above, the change in the research methodology reduced the time in which the research could be performed. If the research methodology was decided immediately to be qualitative (which makes sense since the public sector seems to have a "talk culture"), the data collection ought to have a more structured approach. In addition, data collection would then include trying to incorporate a larger number of different organisations within the public sector.

ACADEMIC REFLECTION

The research is in line with the Master of Science study that has been followed for which this thesis has been written: M.Sc. Management of Technology at Delft University of Technology. Since the public sector is struggling to manage technological innovation, the alignment with the Master programme is expressed through reviewing how to manage innovation, the use of technology as a resource (e.g. for service delivery or administrative purposes), the assignment of responsibility and decision-making, and the importance of future societal and/or technological requests and developments combined with the importance for the public sector to keep up with such developments. Additionally, the fact that this type of research (the design of a clear overview on how to shape an innovation governance within the public sector in the form of a framework) has not yet been performed as such, expresses the scientific relevance.

PERSONAL EXPERIENCE

On a personal note, what I have learnt during writing the thesis is an increased understanding in qualitative research. As this is the first time I have performed a qualitative research, I did not know what to expect. What I appreciated the most during performing my research, was the motivation of colleagues all over the public sector to contribute, either through meeting in person or via email. The enthusiasm of the public servants and their willingness to cooperate was represented by the levels of management interviewed (e.g. the CIO of the Ministry of Justice and Security), the extended emails when personal contact was unmanageable due to holidays, the number of requests I got asking if they could read this thesis, and even offers of colleagues to contribute when the research was already rounded up. This again shows what the importance of this research was, and that public servants of all levels are more willing to somehow contribute to innovation than expected beforehand.

SUGGESTIONS FOR FURTHER RESEARCH

For further research, a larger and more extensive research is required to fully generalise the final framework for public sector innovation. A larger and diverse group of public servants experienced in innovation can provide more input to increase the validity of the framework. Over a larger time span it is expected that it should be possible to speak to at least one expert per organisation (including ministries, government agencies, and/or even municipalities).

Also, the framework could be tested for its effectiveness. Before testing the effectiveness of the innovation metrics: is the fixed budget for innovation and experimenting actually used, are trainings and workshops actively arranged and visited, or is the desired behaviour reached (or at least progression), etc., the recommendation of 'actually starting experiments' should be followed. During experimenting, other issues (expected are missing guidance, support, and/or structure) are expected to arise and further research could provide solutions to such issues. To ease the process of innovating and experimenting, an iterative process is expected to offer guidance and support. It is therefore recommended to take a closer look upon innovation implementation processes, such as the stage-gate process.

In addition, the framework could be empirically tested. As mentioned in the evaluation, a governance performance measurement could be developed and also be tested. An example of such measurement is called the 'governance performance survey', explained by Weill and Ross (2004). If this measurement is applied, the framework and performance measurement are consistently based on the same research. Since the limited time of the research, performance measurements were not conducted, but this would have definitely strengthened the usability of the governance framework. It is therefore suggested to further research the development of a performance measurement method.

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APPENDICES

APPENDIX A. SEMI-STRUCTURED INTERVIEW

To get a clearer view of what the needs for an innovation governance model are, structured interviews are held. These interviews will cover the following subjects: 1) internal governmental innovation, 2) their strategy to increase innovative behaviour: the I-strategy, and 3) relations with other departments/ministries/organisations. These questions will give a clearer view on the bottlenecks of internal innovation, and preconditions for the development of an innovative IT governance framework.

Note: The interviews were held in Dutch, since the interviewer and interviewees were both speaking Dutch.

Interview questions

Interview 1, 2 or 3; location; interviewee; function; date and time.

1. Introductie

Welkom, goed dat je er bent. In dit interview zullen we het gaan hebben over het huidige innovatieproces binnen de CIO office. Dit gebruik ik in mijn onderzoek om verbeterpunten te identificeren om een structuur aan te brengen in het huidige proces. Het interview zal ongeveer een uur duren en de resultaten zullen anoniem worden verwerkt. Mocht je verbeterpunten hebben, is daar altijd ruimte voor en hoor ik dit graag. Ik vind het uiteraard ook prettig om te horen wat je wel goed vond gaan.

Vind je het goed als ik een opname maak van dit interview? Dit maakt het voor mij makkelijker uit te werken. Achteraf zal ik het verslag naar je mailen zodat je het nog kunt aanpassen als ik iets verkeerd heb begrepen.

2. Overheidsinnovatie

Tijdens dit onderdeel van het interview zullen er vragen gesteld worden over de noodzaak van innoveren, barrières van innoveren, en de huidige structuur van het innovatieproces.

2.1 Noodzaak van innoveren

a. Wat is volgens jou de voornaamste reden voor de overheid om te innoveren?
b. Hoe probeer je jouw team meer bewust te maken van de behoefte om te innoveren?
c. Hoe zorg je ervoor dat jouw team de noodzaak van innoveren inziet?
d. Een term die veel voorkomt in literatuur is ‘willingness to innovate’, hoe zorg je ervoor dat jouw team bereidwillig is om te innoveren?

2.2 Huidige proces van innovatie

a. Zou je kunnen uitleggen hoe het huidige proces van innovatie eruitziet?
b. Is er een model of proces waarin stapsgewijs wordt aangegeven hoe een innovatieve technologie uiteindelijk geïmplementeerd kan worden?
c. Heb je het idee dat er vraag is naar zo’n proces of model?
d. Wat zou je als een essentieel onderdeel omschrijven wat mist in het huidige proces van het doorvoeren van innovatie?
e. Communicatie is essentieel in een vrije informatiestroom (free flow of information). Hoe worden commutatieve vaardigheden gestimuleerd binnen jouw team?
f. Hoe zorg je ervoor dat er gebruik gemaakt wordt van bestaande informatie?

2.3 Barrières van innoveren

a. Hoe wordt er op dit moment innovatie gestimuleerd?

b. Merk je aan jouw team dat er bepaalde 'barriers of innovation' zijn? Zo ja, welke barrières komen vaak voor?
c. Een veelvoorkomende barrière in literatuur is 'risk-aversion', hoe zou je ervoor kunnen zorgen dat werknemers minder risicomijdend worden?

2.4 Structuur aanbrengen in het innovatieproces: innovation governance

a. Ben je bekend met de term 'innovation governance'? Zo ja, wat versta je hieronder?
b. Zo niet: innovation governance wordt omschreven als: "*a system of mechanisms to align goals, allocate resources and assign decision-making authority for innovation, across the company and with external parties"*. In hoeverre heb je het idee dat jouw afdeling/team hiermee bezig is?
c. Naast innovation governance, bestaat ook de term innovation governance model, wat omschreven wordt als: *"how the management team of a particular company has chosen to allocate responsibilities for innovation – overall or part of it within the organisation"*. Hoe sta jij tegenover het toewijzen van verantwoordelijkheden binnen een innovation governance? In hoeverre denk je dat het nodig is om dit te doen?

3. I-strategie

Deze vragen zullen gaan over de I-strategie, een programma binnen het CIOffice wat zich bezighoudt met innoveren.

3.1 I-bewust

a. Wie (welke afdelingen) zijn er actief in het promoten van de I-strategie?
b. Een van de activiteiten van de I-strategie is het creëren van bewustwording rondom 'I'. Hoe wordt dat op dit moment gedaan?
c. Wat zijn uitdagingen in het bewustmaken van beleidsmakers van ICT- en andere uitvoeringsvraagstukken?
d. Waar zitten mogelijkheden om deze bewustwording te vergroten?

3.2 Thema 5: slim innoveren en experimenteren

a. Een van de thema's binnen de I-strategie is het thema 'slim innoveren en experimenteren'. Wat houdt dat grofweg in?
b. Op welke manier wordt er aangetoond dat er ruimte is om creatieve ideeën te delen?
c. Welke resources (in de breedste zin van het woord) zijn er beschikbaar om een innovatieve technologie te implementeren?
d. Zou je een voorbeeld kunnen noemen van een innovatie die is geïntroduceerd en uiteindelijk ook is geïmplementeerd?
e. Wie bepaalt of een idee waardevol genoeg is om er vervolgens werk van te maken? Hoe gaat dit precies in zijn werk?

f. Wat mist er in dit proces?

4. Andere departementen/ministeries

Deze vragen zullen gaan over innovatieve strategieën binnen andere (kern)departementen of ministeries

4.1 Relaties met andere departementen

a. EZK staat bekend om het stimuleren (ondanks dat dit vaak in subsidies voorkomt) van innovatie. Hoe is de relatie tussen een afdeling zoals bijvoorbeeld *Directoraat-generaal Bedrijfsleven en Innovatie*, *Directie Innovatie en Kennis* en de CIO office?
b. Vind je dat er een kloof is ontstaan in het stimuleren van de private sector en het inern innoveren?
c. Worden deze afdelingen wel eens bij elkaar gebracht? Zo ja, hoe ziet zo'n meeting eruit? Zo niet, denk je dat dit nut heeft?

4.2 Relaties met andere overheidsinstanties

a. Hoe is het contact tussen jouw team en andere overheidsinstanties (zoals bijvoorbeeld RVO)?
b. Hoe intensief is dit contact?
c. Op welke gebieden wordt er informatie uitgewisseld? Hoe wordt dit gedaan (online/offline)?
d. Hoe is het contact met omliggende universiteiten (Leiden en Delft)? Wat is het voordeel van samenwerken met universiteiten?

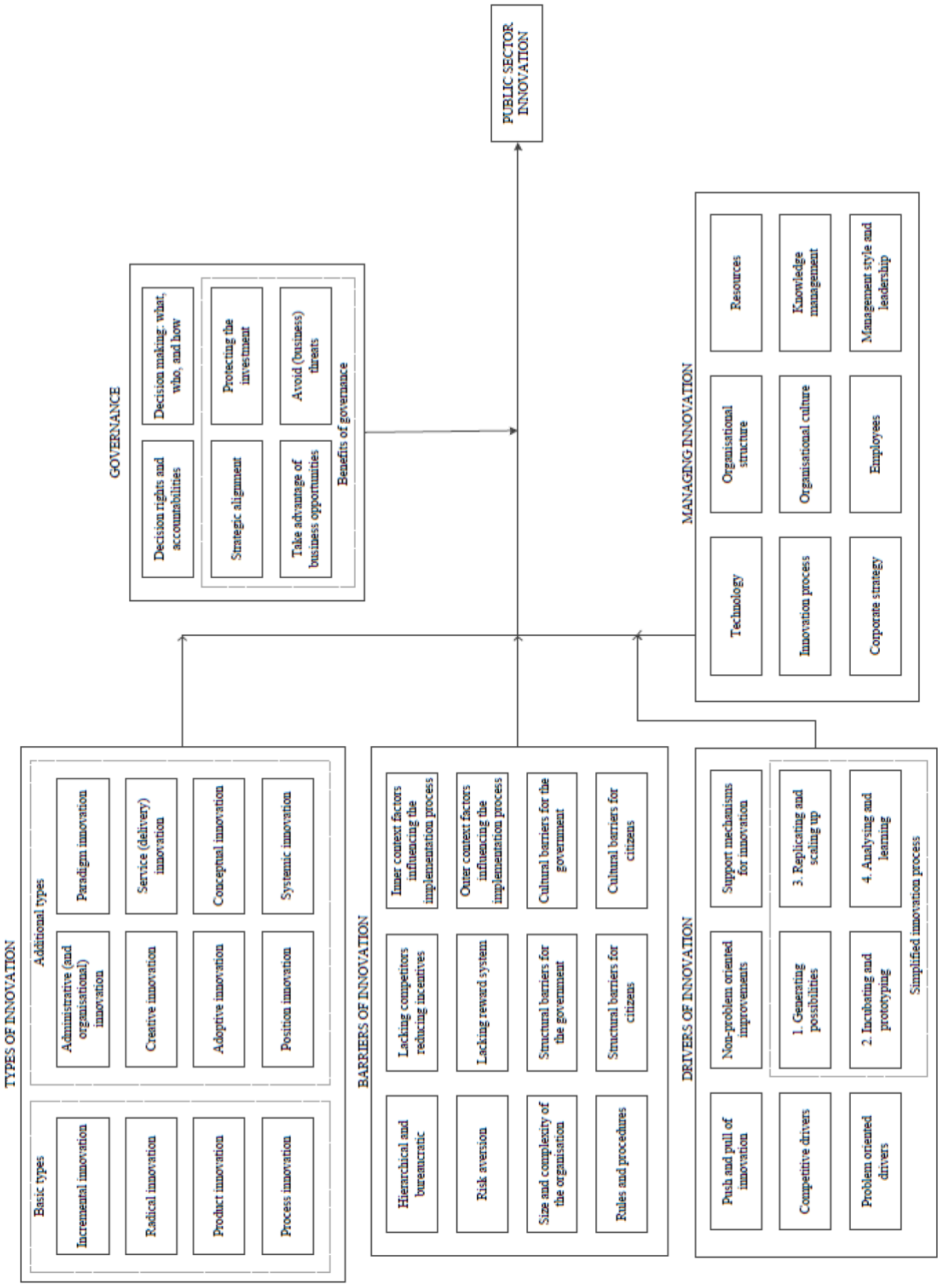
4.3 Relaties met andere ministeries

a. Is er ook, buiten overheidsinstanties zoals RVO, contact met andere ministeries? Hoe ziet dit contact eruit (oppervlakkig/intensief)?
b. Wordt er binnen deze ministeries ook met een soortgelijke I-strategie gewerkt?
c. Hoe zou je het verschil omschrijven tussen innovatie binnen jouw team en binnen een vergelijkbaar team van een ander ministerie?

5. Wrap up

a. Heb je contactpersonen voor mij die een soortgelijk interview kunnen houden?
b. Heb je nog opmerkingen of vragen die je graag kwijt wilt?
c. Bedankt voor je tijd.

APPENDIX B. THEORETICAL FRAMEWORK



APPENDIX C. QUESTIONNAIRE WITH CORRESPONDING ISSUES AND FACTORS

The following questionnaire statements were used to determine if the issues as addressed in the interviews from stage 1 are confirmed or refuted. The outcome of the questionnaire was used as input for determining stage 2: requirements and assumptions. All statements were ranked from 1: completely disagree to 5: completely agree. The results from the questionnaire are shown in appendix X.

Appendix B consists of:

- Appendix C. I. Vragenlijst Innovatie binnen EZK/LNV
- Appendix C. II. Questionnaire: Innovation within EZK/LNV with corresponding issues
- Appendix C. III. Questionnaire feedback

Note: The questionnaire (appendix C. I.) was in Dutch. The subsequent table (appendix C. II) shows the English version, including the underlying meaning (or issue) of each question. These issues were derived from the first three interviews with CIO colleagues.

APPENDIX C. I. VRAGENLIJST INNOVATIE BINNEN EZK/LNV

Beste collega,

Voor degene die mij nog niet kennen: Ik ben Lizzy en ben bezig met mijn masterscriptie voor de TU Delft, M.Sc. Management of Technology.

Voor mijn afstudeeronderzoek wil ik kijken naar het huidige proces van innoveren via de CIOffice (voor EZK/LNV), vallend onder thema 5 'SLIM innoveren en experimenteren' van de I-strategie. Onderwerpen die aan bod komen zijn: het stimuleren van innovatie, belemmeringen tijdens innoveren, uitdagingen en mogelijkheden.

De vragen zullen voornamelijk gaan over je beleving van interne overheidsinnovatie. Ik wil je vragen deze vragenlijst in te vullen en mij te laten weten wat je van dit onderwerp vindt (je antwoorden worden anoniem verwerkt).

Bij vragen kan je contact met mij opnemen via *e-mailadres.*

Bedankt voor je deelname!

Groeten,

Lizzy Brantsma

1. Interne innovatie:

Ik vind dat de overheid genoeg doet aan interne innovatie

Zeer oneens 1 2 3 4 5 *Zeer eens* Of: n.v.t.

Ik vind dat er binnen mijn afdeling genoeg wordt geïnnoveerd

Zeer oneens 1 2 3 4 5 *Zeer eens* Of: n.v.t.

2. Tijdsbestek:

Ik besteed, naast mijn vaste werkzaamheden, x% van mijn tijd aan innovatie

0% van mijn tijd 1 2 3 4 5 6 7 8 9 10 *100% van mijn tijd*

3. De volgende vragen gaan over het stimuleren van innovatie:
    a. Ik heb het gevoel dat innoveren genoeg wordt gestimuleerd
    b. Ik vind dat er regelmatig wordt aangekaart hoe ik kan bijdragen aan innoveren en experimenteren
    c. Als ik een innovatief idee heb, weet ik precies bij wie ik steun kan vinden
    d. Ik wil meer begeleiding in het proces van innoveren
    e. Ik vind dat er genoeg seminars zijn die gaan over huidige technologische trends of andere innovaties

f. Ik vind het belangrijk wat mijn collega's van mij vinden
g. Bij een door mij aangedragen & geïmplementeerde innovatie vind ik aanzien van mijn collega's belangrijker dan een financiële compensatie
h. Ik voel me gewaardeerd als ik mij bezighoud met innoveren en experimenteren
i. Ik vind dat er meer contact gelegd mag worden met andere afdelingen die zich bezighouden met innovatie
j. Ik vind dat er genoeg mogelijkheden zijn om innovatieve skills te trainen
k. Ik heb genoeg ruimte om te experimenteren met een innovatief idee
l. Ik heb behoefte aan meer houvast om een innovatief idee voor te dragen en uiteindelijk te implementeren

Gelieve vraag 3.a. tot en met vraag 3.l. in te vullen op volgende schaal:

Zeer oneens 1 2 3 4 5 *Zeer eens* Of: n.v.t.

Aanvullende feedback over stimuleren van innovatie:

_____

_____

_____

4. De volgende vragen gaan over barrières of andere belemmeringen tijdens het innoveren:
   a. Ik vind dat een innovatief idee doorvoeren te lang duurt
   b. Ik vind dat er te veel regels zijn die innoveren en experimenteren belemmeren
   c. Ik innoveer niet omdat ik niet het risico wil lopen dat mijn project faalt
   d. Ik vind dat er te weinig beloond wordt voor innoveren of experimenteren
   e. Er ligt te veel druk op mijn huidige werk dat ik het gevoel heb dat ik geen tijd meer heb voor innovatie/experimenteren
   f. Ik vind dat ik te weinig kennis of vaardigheden heb om te innoveren
   g. Ik vind mijn netwerk te klein om de juiste mensen bij elkaar te vinden om te experimenteren
   h. Ik wil wel innoveren, maar ik weet niet waar ik moet beginnen
   i. Ik vind dat er vanuit management te veel controle is, wat innoveren belemmert
   j. Er is genoeg geld vrijgemaakt voor innoveren en experimenteren
   k. Ik vind dat er meer contact gelegd moet worden met omliggende universiteiten om kennis te vergaren
   l. Ik vind het lastig om de juiste mensen te benaderen die iets voor mij kunnen betekenen in het proces van innoveren
   m. Ik vind dat innoveren en experimenteren te veel verhinderd wordt door de hiërarchie

Gelieve vraag 4.a. tot en met 4.m. in te vullen op volgende schaal:

Zeer oneens 1 2 3 4 5 *Zeer eens* Of: n.v.t.

Aanvullende feedback over belemmeringen of barrières voor innoveren en experimenteren:

_____

_____

_____

5. De volgende vragen gaan over I-bewustzijn:
    a. Ik ben op de hoogte van algemene technologische ontwikkelingen
    b. Ik bezoek de I-strategie pleio site om erachter te komen wat er speelt op het gebied van technologische ontwikkelingen
    c. Ik ken alle 5 de thema's van de I-strategie
    d. Ik vind dat deze technologieën meer toegepast mogen worden om mijn werkprocessen te verbeteren
    e. Het aanbod (trainingen, cursussen, workshops) voor het creëren van I-bewustzijn is toereikend
    f. Ik vind dat mijn I-bewustzijn wordt gelimiteerd door vertragingen van de Cloud werkplek
    g. Ik denk dat er slimmer samengewerkt kan worden dan dat op dit moment gebeurt
    h. Ik heb behoefte aan een manier om sneller in contact te komen met collega's dan via e-mail
    i. In mijn privéleven ben ik meer I-bewust dan op mijn werk

Gelieve vraag 5.a. tot en met 5.i. in te vullen op volgende schaal

Zeer oneens 1 2 3 4 5 *Zeer eens* Of: n.v.t.

Aanvullende feedback over I-bewustzijn:

_____

_____

_____

APPENDIX C. II. QUESTIONNAIRE: INNOVATION WITHIN EZK/LNV WITH CORRESPONDING ISSUES

Question per topic	Issues
Stimulating innovation	
Q3a. I think innovation is stimulated enough	Stimulation
Q3b. I think that it is regularly discussed how I can contribute to innovation and experimentation	Support
Q3c. If I have an innovative idea, I know exactly where I can find support	Support
Q3d. I want more guidance in the process of innovation	Guidance
Q3e. I think there are enough seminars that deal with current technological trends or other innovations	Training
Q3f. I think it is important what my colleagues think of me	Status
Q3g. I think it is more important what my colleagues think of me compared to financial compensation	Status and incentives
Q3h. I feel appreciated when I am involved in innovation and experimentation	Incentives
Q3i. I believe that more contact can be made with other departments that are engaged in innovation	Multi-disciplinary
Q3j. I think there are plenty of opportunities to train innovative skills	Training
Q3k. I have enough space to experiment with an innovative idea	Space
Q3l. I need more guidance to present and ultimately implement an innovative idea	Guidance
Barriers and obstacles of innovation	
Q4a. I think that implementing an innovative idea takes too long	Timespan
Q4b. I think there are too many rules that prevent innovation and hinder experimentation	Rules & procedures
Q4c. I do not innovate because I do not want risk failing	Risk-aversion
Q4d. I think that too little is rewarded for innovation or experimentation	Incentives and rewards
Q4e. There is too much pressure on my regular work that I feel I do not have time for innovation / experimenting	Workload
Q4f. I think that I have too little knowledge or skills to innovate	Skills and training
Q4g. I find my network too small to find the right people to experiment	Network
Q4h. I want to innovate, but I do not know where to start	Guidance
Q4i. I think that management has too much control, which hinders innovation	Red-tape & control
Q4j. Enough money has been made available for innovation and experimentation	Money
Q4k. I believe that more contact should be made with surrounding universities in order to gather knowledge	Universities
Q4l. I find it difficult to approach the right people who can do something for me in the process of innovation	Network
Q4m. I think that innovating and experimenting is prevented too much by the hierarchy	Hierarchy
I-awareness	
Q5a. I am aware of general technological developments	General interest
Q5b. I know all 5 themes of the I-strategy	Pro-activity
Q5c. I visit the I-strategy pleio website to find out what is going on in the field of technological developments	Pro-activity
Q5d. I think these technologies can be used more to improve my work processes	Openness to change
Q5e. The offer (training, courses, workshops) for creating I-awareness is sufficient	Training

Q5f. I think my I-awareness is limited by delays from the Cloud workplace	Finger pointing
Q5g. I think that working together can be smarter than is currently happening	(smarter) network
Q5h. I need a way to get in touch with colleagues faster than via e-mail	Communication
Q5i. In my private life I am more “I-aware” than at work	Awareness

APPENDIX C. III. QUESTIONNAIRE FEEDBACK

Feedback
Additional feedback on stimulating innovation
My advice is to organize a meeting (once every month?) where colleagues can spill out ideas. Such a session needs to be well prepared for the people with questions to have the right conversation.
It is not part of our mission. Too much focus on security.
There is often positive feedback on innovation, but it requires a lot of perseverance to achieve something within all rules.
I can write a whole epistle about this. Within our management, innovation is still “a neglected child”. The team of the I-strategy on innovation, where I am part of, has almost no strength because it has the least focus. There is therefore no ‘innovation experience’ within the management, and limited attention is paid to innovation. Innovation must be taken seriously, and that is why people and energy are needed. Innovation is not something ‘extra’, it has to become an integral part of the management.
Experimenting is not the most difficult part of the process, the most difficult is to broaden and perpetuate the successful experiments in the organization. This requires implementation power, which is sometimes missing.
If you find your way and know the right people, then much is possible. If that is not the case, then it can be very difficult, and more guidance can certainly help.
Brainstorming together about innovation within a person's field of expertise, instead of trying to incorporate outside technologies in the current working methods. Within one theme, innovation is simply more self-evident than with the other theme.
The most important question here is "what is innovation?". There are many different views about the meaning and in general we use the wrong meaning within the government. Also, the definition differs per person. That is why I entered a relatively high percentage, because others probably think it is innovative, but I do not. The question regarding prestige / money is irrelevant to me, it is about the EZK / LNV organization and society getting better. This cannot be yielded in either money or prestige. What are "innovative skills"? Within the KD, a Word course is already seen as innovative. More interesting is Blockchain: this is touted as the holy grail while applications are actually limited and is often not applicable to what we do as a government. It is precisely because of this that these kinds of "innovations" are not useful to us, for example. For me this is something what is missing.
There is little room for experiment within the ministry. This may be increased, for example by setting up an innovation space in which experimenting in short sprints with a small budget is made possible.
I like to innovate and get the idea that colleagues want it too. I am a “techie” myself and therefore have more skills than colleagues that makes things easier.
Discuss innovation and innovative ideas.
As a trainee, stimulating (and responding to possibilities for) innovation is not such a big problem. We often bring innovation as a new generation. This is more of an issue with the 'elderly' I think.

I don't do much about innovation in my work, the subject is not really present at this moment in this phase either.

Especially at the Ministry of Economic Affairs where innovation is part of policy, we must "practice what you preach".

Structurally assign budget to innovation is an important condition for stimulating innovation.

More interdepartmental collaboration

I have an intrinsic motivation to be engaged in innovation and to make it part of the organisation. I am convinced that our organization/government must renew and experiment where possible without neglecting the basic tasks. I am less sensitive to the opinion of others about me or my work, but a little appreciation and sometimes a pat on the back is always nice!

Additional feedback on barriers of innovating and experimenting

The obstacle to innovation is partly caused by the fear of failure by the government, which has expressed itself with the report of the Elias Committee. After all, innovation can go wrong, but nobody can afford a failed ICT project.

Too often the current frameworks block the innovation.

Barriers are: too little attention (unless something is politically important), and processes that are geared towards efficiency rather than effectiveness.

It is not always the case that the rules & procedures hinder innovation; it is more the experience of the rules that do that. Innovation in the government depends for a large part on people; I spent three quarters of a year trying to push through an 'innovation' that everyone was excited about. Only the right people did not want to stand up for it. Now I finally found someone who wanted us. It seemed to him in the first place to be in the rules, but in the end, it turned out to be the experience of this.

The most important barrier that I see to do with technical innovations and experiments is the public procurement policy. It is very difficult to temporarily purchase certain tools for an experiment. But if it has to, it can be done. But in order to be able to expand for the continuation with the same tools, that often does not work because you first have to do a (European) tender and then another tool can come out of the selection.

I experience a lot of space within the CIO office, but I also know that it is not the case for every department. This may give a (too) positive picture.

I actually do not see any obstacles. I think we stand in the way of ourselves, it is even difficult for everyone to know and find the right path for each new 'field' of theme where you need to find your way. We have to find the right approach and routes. We should be more patient and not blame the organization's current arrangements and kick against it. This makes innovation aggressive.

Which universities? At the moment we are very limited to Delft, Amsterdam and Wageningen. There are so many more.

The bureaucracy within the organization and the many layers through which people must move. Everyone has something to say about everything.

Innovation increases costs, causing jeopardizing the operational security of the government processes. That is why we often aim at using well-known technology.

Chat does not really want to get off the ground, people call and mail rather.

Continuity is difficult to experiment.

Helping each other with obstacles and experimenting.

Knowledge and skills are present, but it is about behaviour and habits. People are not used to it, find it scary or difficult. That can never be stimulated too much. Does not have to be heavy or big; baby steps.

Important to seriously look at barriers and commitment (including top-management) to address these issues.

Due to the size of the organization, the hierarchical stratification and the amount of procedures, the process has become very stiff in the past 8 years. Everything is dominated by control (= distrust).

There is no real innovation-culture.

Government (partly rightly because of society and politics that 'settles' rather than encourages) often shows risk-avoiding behaviour, innovations could be better 'defined', creating more space and a greater sense of security and control (and thus more room for experimentation)

Additional feedback on I-awareness

I honestly do not know exactly what digital training-selection consist of. Several times I have tried to follow courses myself via online sources at work (I bought self-learning packages). However, the PCs could not handle programming programs/Blockchain programs. So, I had to give up quickly. In addition, there are few good software packages, so that people are challenged to get more out of their PC. For example, there is no Adobe to create infographics. I understand that that is a very expensive license, but it can probably be purchased for a number of PCs. Now there is a minimum offer, and you need to ask permission from your supervisor and explain what you need. I do not know what it is and therefore not what I need until I have discovered it. So, you never get there.

I find the concept of I-awareness difficult to address. I see three more or less independent sides: familiarity and understanding of the opportunities and threats of developments in the ICT domain for society; insight into the changes in the role of the government, and in this way in our own work, as a result of these opportunities and threats; and being able to actually act from that insight. For the government, however, I think the threats are greater than the opportunities (which does not mean that it makes sense to act on both).

I-awareness also has to do with the extent to which you are able to assess the opportunities of new technology and translate them into your own work.

It is interesting to know whether people actually apply their "I-knowledge" and I-awareness.

More can be done from within the ministry with respect to I-awareness. This also counts for information security, privacy, security, etc.

Always alert, sometimes it takes time to find out but certainly no difference between private or work.

Sharing knowledge and information with each other.

Using the cloud and other working methods / resources will be a big step forward. But again, it's about more than the means. It is a piece of culture (behaviour), structure and management that also play roles.

Working on I-awareness is certainly needed within the EZK / LNV department.

Would like to have an internal chat app like Skype for Business.

I experience that there is too 'official' thinking about being I-aware, i.e. it is assumed too much that everyone is interested in “I” and I-awareness (private maybe a bit earlier than at work?) and is competent in “I” and I-awareness. I do not want the rules to be only imposed but also enter into the discussion and experience what I-awareness means.

I-awareness is still insufficiently embedded in the organization.

The question about Cloud Workplace is noticeable: I-consciousness is actually disconnected from this, it happens more in your head, but a malfunctioning workplace does indeed not really stimulate…

Barriers of innovation (per interview)							
Interviewee A	*Interviewee B*	*Interviewee C*	*Interviewee D*	*Interviewee E*	*Interviewee F*	*Interviewee G*	*Interviewee H*
Missing process of innovation	Missing structure or process	Unorganised process of innovation					
Limited budget for experimenting	Unplanned budget for experimenting	Limited budget	Lack of funding	Limited space (budget) can hinder innovation		Limited budget, focusing on straightening past decisions instead of future innovations	Budget is limited due to centralisation; European tender further hinders larger projects
Prioritise on *daily* activities because of time pressure		Prioritise *daily* activities	Prioritise *daily* activities				Time pressure, prioritising *daily* activities
Prioritize activities coming from political pressure			Political accountability issues				
Bureaucratic organisation/ hierarchy		Too many paths to walk, layered hierarchy	Too many opinions		Too many layers and opinions	Bureaucratic organisation slows down initiatives: chain of approving is too long	Too many people have to approve a certain project
Resistance to change from public servants		Resistance to change due to different personalities	Too many opinions	Resistance to too radical changes	Resistance to radical changes		Resistance of public servants due to missing knowledge
Rules and procedures hindering innovation	Rules and procedures, e.g. procurement	Rules and procedures ending or slowing down experimenting			Rules of procedures, e.g. European tender border	Rules, e.g. conditions before experimenting	Rules and procedures hinder innovation
Risk-aversion			Afraid to make mistakes	Missing view that experiments can and may fail		Risk-averse mind-set, view that experiments must be applicable immediately	Risk aversion because of opinion of the public
Innovation is not integrated as *daily* activity		Not structurally innovating or experimenting			Missing interest to integrate innovation as *daily* activity	Limited intrinsic motivation to deal with innovating and experimenting	
Missing sight on how to translate technologies into own work	Missing sight on fit with *daily* activities	Missing translation to own work	Translating technologies such as Siri to government			Question how to translate technology to own work/ministry	Difficulties in translating radical innovation to own work
	Missing synergy with other departments ("cross-fertilisation")	Limited "cross-fertilisation"					

	Management hindering innovation, focusing on control			Management may not prioritise innovation	Management's mindset hindering innovation, missing stimulant for experimenting	Managers do not prioritise experimenting
Missing flexibility of rules and procedures	Limited space	Missing space (i.e. in time)	Limited space (time) can hinder innovation		Speed of action (i.e. very slow) hindering the start of an experiment	Current governance reduces manoeuvrability
		Slow process of scaling-up		Missing ability to scale up, e.g. because of European tender border		Scale-up difficulties due to portfolio management
		Missing compatibility for e.g. sharing files between ministries		Missing compatibility between experiment and current working processes (e.g. IT infrastructure)	Compatibility is challenging	
		Missing joint goal for government, goals are ministry specific				
				Training of public servants focuses on laggards (uninteresting)		
				Missing insight on running experiments	Experiments are run double, i.e. limited learning from each other	
						Current governance is not geared towards promoting innovation

Drivers of innovation (per interview)							
Interviewee A	*Interviewee B*	*Interviewee C*	*Interviewee D*	*Interviewee E*	*Interviewee F*	*Interviewee G*	*Interviewee H*
Willingness to innovate	Intrinsic motivation to experiment				Intrinsic motivation and willingness to innovate	Intrinsic motivation to innovate	
Support through a standardised experimenting process	Support in executing experiments			Create a standardised process	Structure process of innovation		
Communicate importance of experimenting through I-strategy	Address innovation and experimenting	Communicate importance of experimenting			Communicate success stories	Develop an IT-strategy to communicate importance	"Support and direction table" is set up to stimulate innovation
Building a network for support	Find the right people to join the experiment	Support from network promoting the experiment		Cross-organisational networks for knowledge exchange	Find support in innovation centres to help with the experiment	Innovation networks supporting knowledge transfer	Involve network in process of innovating
Smaller experiments reduce risk/budget/ etc.	Smaller projects		Short-cycle experiments		Downsize experiments to reduce rules/ conditions		
Support in risk taking	Allow for mistakes, as long as learnt from		Allow for mistakes and learn from these mistakes	Acknowledge that experiments can "fail"	Change mindset to: failure of a project is less important than support during experimenting	Acceptance of failure, reduce risk aversion through change in organisational culture	
Experimental space (in time, rules and procedures, budget, resources)	Support space: material, budget, and content	Trying to stretch rules and procedures	Create space (in time, budget, and mistakes) to experiment	Create space (time, resources, budget) to offer opportunities	Create space for experimenting in an innovation lab/centre	Free up space to experiment combined with a clear focus/ goal, decentralise budget	
Increase awareness through training and workshops	Offering training, courses, and workshops	Offer training to increase awareness		Training/ workshops to present new developments	Ease user interface so training to use e.g. new software is limited	Lectures and workshops on innovative concepts	
	Create challenges or competitions			Competitions to challenge experimenting		Competitions to increase knowledge	
	Appreciation when working on experiments			Rewards in the form appreciation	Rewarding initiatives by assigning *fun* innovation projects		

(Top) management commitment				Top management commitment through alignment to increase success rate	Change top management's view on innovation: from barriers to opportunities	Innovation Expedition: change top management's view on innovation
Increase contact with other departments, universities, etc.	Increase contact with universities and other departments	Stimulate open innovation	Stakeholder involvement/ commitment			Learn from universities or businesses supplying technologies
	Innovation teams executing experiments		Innovation teams executing experiments	Innovation centres executing experiments	Innovation centres or clubs focusing on innovation (full time)	
	Focus on effectiveness of a technology/fit with organisation			Focus on effectiveness of a certain technology		Focus on effectiveness, regardless of fit with current infrastructure: more radical innovation
		Political incentives (during elections)				
		Change focus to "citizen centred" and adjust experiments to this goal				Shift focus from "*for* citizen" to "*with* citizen"
		Create insight through an innovation portfolio		Insight of innovation: Innovation Monitor (i.e. a database)		Insight of innovation: inventory of performed experiments; include innovation in portfolio
		Focus on both incremental (optimising) and radical (transforming)	Define type of innovation: social innovation or technological innovation	Focus on incremental innovation to reduce resistance to change		Define innovation: must include a technical aspect to be an innovation (instead of renewal)
			Innovation labs: protective environments to experiment	Innovation centre: experiment 'outside' of the hierarchy		
					Innovation coaches supporting innovative projects (through Design Thinking)	Innovation ambassadors (derived from the Innovation Expedition)

APPENDIX E. EVALUATION INTERVIEW

After the governance framework had been developed, it needed verification. This was done through interviewing experts and asking for their opinion on the framework. The experts received a document explaining some background information on the progress of the research, then the framework was presented and some background information on the framework was given (explaining the five key decision-making assets) The experts were asked to provide feedback on the model and to give insights on assigning responsibilities within the organisation.

Note: The interviews were held in Dutch, since the interviewer and interviewees were both speaking Dutch.

Beste collega,

In februari ben ik mijn afstudeeronderzoek begonnen met het idee een innovation governance op te zetten. Dit idee is ontstaan omdat er ‘overheid grote pet’ veel geïnnoveerd wordt. Dit houdt in dat de overheid, en met name Economische Zaken en Klimaat, actief bezig is met het stimuleren van innovatie binnen de private sector. Echter, als er gekeken wordt naar ‘overheid kleine pet’, oftewel de interne werk en/of IT-processen, loopt de overheid achter. Nu hoeft dit geen probleem te zijn, de overheid hoeft niet voorop te lopen, maar ze moet ook zeker niet achter de feiten aanlopen.

Er heerst een tweedeling wat betreft de visie op innoveren binnen de overheid. Men is het ermee eens dat er geïnnoveerd moet worden, maar het wordt vaak gezien als “iets voor erbij” in plaats van geïntegreerd onderdeel van de werkzaamheden. Daarnaast nodigt de cultuur niet per se uit om te innoveren. De andere kant erkent de belangen van overheidsinnovatie, maar merkt dat er te veel obstakels zijn. Ondanks dat de intrinsieke motivatie er is om zich bezig te houden met innoveren en experimenteren, wordt men tegengehouden. Zulke obstakels ontstaan door bijvoorbeeld de hiërarchie, (te weinig) budget, of het gebrek aan structuur binnen het proces van innoveren.

Hierdoor ontstond het idee om een governance (framework) op te zetten. Dit zou houvast moeten bieden aan de mensen die zich bezig zouden willen houden met innoveren en experimenteren, waardoor een project gestroomlijnder zou moeten verlopen. Het idee is dat met meer houvast en support voor innovatieve projecten, men zich sneller bezig zou houden met het innoveren en experimenteren. De houvast en support werden verwacht als belangrijker gezien te worden dan het feit of een project een positieve uitkomst heeft of niet.

Met deze input heb ik literatuuronderzoek gedaan en ben ik bij verschillende ministeries/ uitvoeringsorganisaties gegaan om te vragen of ze mij nog meer input wilde geven. Deze input bestond uit barrières, obstakels en drijfveren voor het proces van experimenteren en innoveren. Met deze informatie heb ik het governance design framework van Weill & Ross (2004) gebruikt om zo’n zelfde framework te maken voor publieke sector innovatie. Dit framework wil ik graag verifiëren en daar zou ik graag jouw kennis en expertise voor willen raadplegen. Ik zou je willen vragen om dit framework te bekijken en hier feedback op te geven door middel van het beantwoorden van de volgende vragen (bij voorkeur in een persoonlijk gesprek):

1. Is het framework (op de volgende pagina) te begrijpen? Wat klopt er wel/niet?
2. Heb je feedback op de beslissingen van de ‘governance mechanismen’? Welke onderdelen zouden eventueel ergens anders geplaatst moeten worden? Of welke beslissingen moeten er worden toegevoegd?
3. Wie is er verantwoordelijk voor welke beslissingen (tabel op de laatste pagina)?

Alvast bedankt! Groeten, Lizzy Brantsma

Van links naar rechts: wat te harmoniseren? En van boven naar beneden: hoe te harmoniseren?

Informatie over het model

Een governance draait voornamelijk om het toewijzen van verantwoordelijkheden. Deze het toewijzen hiervan is afhankelijk van de beslissing die wordt genomen. De beslissingen worden onderverdeeld in de volgende onderdelen:

- Innovatieprincipes: verduidelijking van de rol van innovatie in de organisatie
- Innovatiearchitectuur: definiëren van integratie- en standaardisatievereisten
- Innovatie-infrastructuur: bepalen van gedeelde en activeringsdiensten
- Innovatie-applicatiebehoeften: specificeren van de behoefte van de organisatie aan gekochte of intern ontwikkelde innovatietoepassingen
- Innovatie-investeringen en prioritering: bepalen welke initiatieven te financieren en hoeveel te besteden

De volgende beslissingen vallen onder deze onderdelen:

1. Innovatieprincipes
    I. Definiëren van het type innovatie wat plaatsvindt: incrementeel, of *optimaliseren*, of radicaal, of *transformeren* (of een andere vorm van innovatie)
    II. Het communiceren van het belang van innoveren en experimenteren
    III. Het opzetten van innovatiewedstrijden om: de incentive te vergroten om bezig te zijn met innoveren en experimenteren, om ideeën die door de organisatie zwerven te verzamelen, om je netwerk te vergroten, etc.
    IV. Extra:
2. Innovatiearchitectuur
    I. Inventariseren van alle uitgevoerde en lopende experimenten
    II. Het ontwikkelen van een gestandaardiseerd proces van experimenteren met innovatieve technologieën
    III. Extra:
3. Innovatie-infrastructuur
    I. Experimenteerruimte uitgedrukt in: tijd, budget, middelen, regels en procedures, en/of een fysieke ruimte (innovatie lab)
    II. Innovatie moet plaatsvinden binnen een netwerk van verschillende (kern)departementen, uitvoeringsorganisaties, universiteiten en/of de bedrijven/startups uit de private sector
    III. Extra:
4. Innovatie-applicatiebehoeften
    I. Specificeren van het doel van de technologie om vervolgens op basis van tijd, kennis en budget *etc*. te beslissen of technologieën/applicaties in huis worden ontwikkeld of worden uitbesteed

II. Compatibility (verenigbaarheid) van de nieuwe technologie en de huidige werkprocessen

III. Extra:

5. Innovatie-investeringen en prioritering

I. Het vaststellen van een bepaald budget voor experimenteren met innovatieve IT via portfoliomanagement

II. Extra:

Daarnaast is het de bedoeling van de volgende tabel om verantwoordelijkheden toe te wijzen. Deze verantwoordlijkheden zijn afhankelijk van de hiervoor besproken innovatie principes, architectuur, infrastructuur, behoeften, en budget en prioritering. Het is de bedoeling dat per beslissing wordt gekeken wie er verantwoordelijk zijn, hiervoor zijn meerdere antwoorden mogelijk. Ook is het mogelijk om een extra partij toe te voegen, mocht deze nog missen.

Beslissing / Archetype	Innovatie principes	Innovatie architectuur	Innovatie infrastructuur	Applicatie-behoeften	Innovatie budget en prioritering
Bestuursraad					
CxO-raad					
Topmanager					
Middelmanager					
Innovatieteam					
Individueel					
Inkoop					
DICTU/SSC-ICT					
Anders:					
Weet ik niet					

APPENDIX F. RECOMMENDATIONS FOR IMPROVEMENTS PER INTERVIEWEE

Recommendations per interview				
Interviewee V	*Interviewee W*	*Interviewee X*	*Interviewee Y*	*Interviewee Z*
Adjustments				
1) Clearly define the scope of the framework: IT or innovation in general	1) Innovation should come from the public servants with an intrinsic motivation, assigning responsibilities creates an inverse reaction of "how can I get rid of this responsibility"	1) Focus on the problem, not the solution: state the question and come up with a bunch of solutions through experimenting, instead of aiming at a certain application of a certain technology	1) Innovation can also be social innovation instead of solely IT innovation	1) Alignment of what IT can and wants and of what de organisation can and wants
2) Make a distinction between the size of the budget: a budget of 5000 euros leads to a different look than an experiment requiring a budget of 50 million euro	2) Compatibility can become a limitation of the innovation strength, aiming at experiments needing to be successful	2) Focus on architecture once the experiment can become a business case, it is not necessary in the process of innovation	2) Use 'digitalised' instead of digitalisation	2) Adjust 'governance arrangements' to 'management controls', where decision-making is one of the management controls
	3) Architecture and application needs: afterwards decision-making a responsibility to reduce expectations	3) Stay away from terms as "standardised", this contradicts with the freedom that is required for innovation	3) Public sector innovation: do not do things better or different, the government has to do other things	3) Innovative projects also need an evaluation of a independent ethical committee
	4) One goal should be to spend all the money assigned for innovation, focus on more short-term goals for innovation	4) Do not put pressure on innovation by saying an x percentage of innovation should be implemented	4) Top management has to learn how to manage in a completely different way	4) Strategy: the use of IT will develop into new public tasks, current strategy is focused on incremental innovation
	5) Trial and error in the process of innovation and select the most promising projects			5) Do not forget the middle management as the switch between top management and the public servant
				6) Define application needs: is it focused on the ICT-needs?
				7) Compatibility is a difficult issue
				8) Scaling up changes responsibilities, which makes it more convenient to let projects fail and keep on experimenting (which is more fun)
				9) Innovation budget is not the same as experimenting budget

Confirming			
	1) Top management's risk-aversion affects innovation done by public servants, and should therefore stimulate innovation and risk taking	1) Release the view of "it cannot happen, it is not allowed" and just do	1) Effectiveness: experiment to understand essential value and the applicability
	2) Small-scale experimenting with an iterative innovation portfolio	2) The development of a kick-start-platform to reduce bureaucracy	2) Small-scale experiments are a little more viable
	3) Experiments with a different outcome than expected should not be seen as failed		3) Portfoliomanagement helps top management to make choices on projects
	4) Short-cycle projects under the tender boarder		