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Public-Private Partnerships for Innovation and Sustainability Transformation: An Embedded, Comparative Case Study of Municipal Waste Management in England And Denmark

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PUBLIC-PRIVATE PARTNERSHIPS FOR INNOVATION AND SUSTAINABILITY TRANSFORMATION

PhD Series 19-2015

Sofie Dam

PUBLIC-PRIVATE PARTNERSHIPS FOR INNOVATION AND SUSTAINABILITY TRANSFORMATION

AN EMBEDDED, COMPARATIVE CASE STUDY OF MUNICIPAL WASTE MANAGEMENT IN ENGLAND AND DENMARK

PhD School in Organisation and Management Studies | **PhD Series 19.2015**

CBS COPENHAGEN BUSINESS SCHOOL
HANDELSHØJSKOLEN

PUBLIC-PRIVATE PARTNERSHIPS FOR INNOVATION AND SUSTAINABILITY TRANSFORMATION

An embedded, comparative case study of municipal waste management in England and Denmark

PhD thesis submitted by

Sofie Dam

Main supervisor: Professor Carsten Greve, Department of Business and Politics, Copenhagen Business School

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Doctoral School of Organization and Management Studies

Copenhagen Business School

Sofie Dam
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Preface

This PhD dissertation concerns the potential and challenges of conducting innovation in public-private partnerships with the objective of sustainability transformation of waste management systems. The dissertation is based on a comparative, embedded case study of the role of public-private partnerships in municipal waste management in two countries, England and Denmark. The thesis includes two parts: PART I: Introductions and Conclusions and PART II: Research Articles. Part I introduces the themes, theories, empirical field and methods of the PhD and draws a general conclusion. Part II consists of the following three independent, but interlinked research articles:

- Article 1: The Potential for Conducting Innovation in Public-Private Partnerships (submitted to *International Public Management Review*)
- Article 2: The Prominent, but Contested Role of Public-Private Partnerships in Sustainability Transformations of Waste Management Systems – Comparing English and Danish experiences (to be submitted to *Environment and Planning A*)
- Article 3: Network, Hierarchy and Market: Managing Mixed Governing Strategies for Innovation in Public-Private Partnerships (to be submitted to *Public Administration*).

The dissertation was conducted between September 2011 and March 2015, where I was employed at the Department of Business and Politics (DBP), Copenhagen Business School. The PhD was financed by Copenhagen Municipality, Aarhus Municipality and Vestforbrænding to whom I am immensely grateful for this opportunity. This dissertation has been born with 'blood, sweat and tears' but also tremendous joy and excitement. I could not have done it without the support of my

two supervisors, Professor Carsten Greve and Associate Professor Sine Nørholm Just from the Department of Business and Politics at CBS. I would also specifically like to thank the Manchester Institute of Innovation Research (MIoIR), where I spent three interesting months between March and May 2013, and especially to my host, Dr. Sally Gee, for many good questions and conversations. Also thanks to the EU-SPRI for granting financial support to this research stay.

Furthermore, I would like to acknowledge the good people at Liverpool University, and especially Dr. Mike Rowe, for hosting the Public Management and Public Administration Postgraduate Conference in 2013 and 2014, which provided me with two wonderful opportunities to discuss my work in a crowd of English researchers. On the same note, I would also like to express my gratitude to Professor Jacob Torfing and Professor Eva Sørensen from Roskilde University and Associate Professor Karl Löfgren from Victoria University of Wellington as well as their group of PhDs for interesting PhD courses and valuable comments to some of the early drafts towards this PhD. Furthermore much appreciation goes to the two discussants from my second work-in-progress seminar in September 2014, Associate Professor Holger Højlund, Department of Management, Politics and Philosophy, CBS, and Associate Professor María José Zapata Campos, Department of Organization, CBS, for excellent comments towards the finish line.

Lastly, a warm thanks to all of my good colleagues at DBP – you have truly been an inspiration to me. Special thanks goes to Christiane Stelling for taking this PPP journey along with me, Sofie Blinkenberg-Federspiel for immense moral support especially in the last hard-working months and Lasse Folke Henriksen for sharing his office with me. On a personal note, I would like to thank my family and

friends for bearing with me through this intense period and especially Andreas, for coming into my life at the most insane time and staying put.

Thank you.

Sofie Dam
Copenhagen, March 2015

English Abstract

This PhD concerns the potentials and challenges for conducting innovation in public-private partnerships (PPPs) towards the objective of transforming municipal waste management towards more sustainable systems. In recent years, local authorities have been met with intensified demands from the EU and national governments to change existing waste management systems from solutions based on disposal and recovery towards more recycling and prevention and at the same time deliver more efficient waste management services through the inclusion of private businesses. These two demands may to some degree be mutually supportive, but may also lead to challenges in the prioritization and development of new solutions.

Alongside changes in waste management systems from simple, local 'collect-and-throw-away' systems towards more sustainable, complex socio-technical networks, where various types of waste are collected, transported and treated in separated streams between a net of public and private actors, private actors have gained more influence in the management of municipal waste. Private businesses participate as waste collectors, technology developers, managers of treatment plants and end-receivers of municipal waste and are also co-producers of this waste through the design and production of goods consumed in households. Thereby public and private actors have become gradually more interdependent and increasingly need to work together to develop more sustainable waste management solutions. Concurrently, however, the movement towards privatization of waste management services also creates increasing competition between public and private actors in waste management, which may lead to the opposite effect and result in tensions between these groups. This dilemma frames the role of public-private partnerships in municipal waste management.

The dissertation is based on an embedded, comparative and explorative case study of public-private partnerships, innovation and sustainability transformation in municipal waste management in two countries, England and Denmark. The data collection includes 43 in-depth, semi-structured qualitative interviews with experts and public and private managers with concrete experiences of public-private partnerships, and also includes experiences from non-partnership arrangements (in-house, traditional contracting out). The interviews are supplemented and triangulated by various written material such as regulations, policy strategies, contracts, websites, reports, etc. Interviewed respondents and partnerships were identified in a qualitative, bottom-up process through networking, 'snowballing' and observation from several events and fora in the waste management sector.

The dissertation shows that public-private partnerships play a prominent, but also continuously contested role in sustainability transformations of English and Danish waste management systems. There is a unique potential for conducting innovation in PPPs through a mix of hierarchical, market-based and networked governing strategies, which in the right balance may lead to both organizational and service innovations in municipal waste management. A broad palette of partnerships from more networked to more tightly organized types may contribute to a gradual sustainability transformation through the development of innovative solutions in 'patchworked' experimentation between actors with different positions in the waste system, for example focusing on policy development, testing of new technologies and implementation of market mature solutions.

However, the dissertation also points towards a number of challenges for public-private partnerships. Especially contractual partnerships may entail a tension between hierarchy, competition and collaboration, where hierarchical public organizations may tend to over-regulate partnerships and thereby deprive

themselves from private input, where after inflexible, long-term contracts may lock-in the public organization to an insufficient solution, if the organization of the partnership and especially the economic incentives does not adequately support gradual improvements, flexibility and collaboration. Ultimately, the key is that both organizations show a willingness to collaborate, build trusting relationships and jointly develop solutions.

EU regulation has been criticized for providing a sub-optimal framework for public-private cooperation, but the new public procurement directive now points towards more innovative partnerships in the future. It will be interesting to observe how this opportunity will be used in waste management, where this need is particularly outspoken. Whereas this dissertation has mainly focused on the ongoing sustainability transformation from disposal and recovery towards recycling, future waste policies will increasingly focus on the prevention of waste, which will pose new challenges to the understanding and organization of waste and bring forward new actors and forms of cooperation.

Dansk resume

Denne ph.d. fokuserer på potentialer og udfordringer i forhold til at skabe innovation i offentligt-private partnerskaber med det formål at bevæge sig mod en bæredygtig omstilling af den kommunale affaldshåndtering. Der har i de senere år været et øget pres på kommunerne fra EU og nationale regeringer for dels at gøre affaldshåndteringen mere bæredygtig ved fx at flytte affald fra deponi og forbrænding mod mere genanvendelse og forebyggelse, dels at gøre affaldshåndteringen mere effektiv gennem en øget inddragelse af private virksomheder. De to krav spiller til en vis grad sammen, men kan også skabe udfordringer i prioriteringen og udviklingen af nye løsninger.

I takt med at affaldssystemerne ændres fra simple 'indsaml-og-smid-væk' systemer til mere bæredygtige komplekse, socio-tekniske netværk, hvor forskellige typer af affald indsamles, transporteres og behandles i separate strømme mellem et net af offentlige og private aktører, har private aktører fået en større rolle i affaldshåndteringen. Private virksomheder deltager som indsamlere, teknologileverandører, behandlere og modtagere af kommunalt affald og i høj grad også som med-producenter af affaldet gennem design og produktion af varer og emballage, der ender i husholdningsaffaldet. Dermed skabes en øget afhængighed mellem offentlige og private aktører, der i stigende grad må samarbejde om at skabe mere bæredygtige affaldsløsninger. Samtidig skaber bevægelsen mod privatisering af affaldshåndteringen dog også en stigende grad af konkurrence om affaldet mellem offentlige og private, der kan have den modsatrettede effekt og give spændinger mellem aktørerne. Dette dilemma sætter rammen for offentligt-private partnerskabers rolle i affaldssektoren.

Afhandlingen er baseret på et indlejret, komparativt og eksplorativt case studie af offentligt-private partnerskaber, innovation og bæredygtig omstilling i den

kommunale affaldshåndtering i to lande, England og Danmark. Dataindsamlingen inkluderer 43 dybdegående, semi-strukturerede kvalitative interviews med eksperter samt kommunale og private aktører med erfaringer fra offentligt-private partnerskaber og inkluderer også interviews med aktører fra alternative organiseringsformer (in-house og traditionelle kontrakter). Interviewene er suppleret og trianguleret med tekstmateriale fra lovtekster, politiske strategier, kontrakter, hjemmesider, rapporter, etc. Interviewpersoner og partnerskaber er identificeret gennem en kvalitativ, bottom-up tilgang via netværk, 'sneboldsmetoden' og deltagelse i forskellige arrangementer og fora i affaldssektoren.

Afhandlingen viser, at offentligt-private partnerskaber spiller en væsentlig, men også omdiskuteret rolle i den bæredygtige omstilling af kommunal affaldshåndtering i England og Danmark. Der er et særligt potentiale i partnerskaber for at skabe innovation gennem et mix af hierarkiske, markedsbaserede og netværksbaserede strategier og styringsformer, der i et afbalanceret samspil kan lede til innovation i både organiseringen af affaldshåndtering og i de konkrete services. En bred pallette af partnerskaber fra mere netværksbaserede til mere tæt organiserede former kan bidrage til en gradvis bæredygtig omstilling ved at udvikle innovative løsninger gennem et kludetæppe af eksperimenter i samspil mellem aktører fra forskellige positioner i affaldssystemet, fx med fokus på policy-udvikling, test af nye teknologier og implementering af markedsmodne løsninger.

Afhandlingen peger dog også på en række udfordringer for offentligt-private partnerskaber. Især de kontraktbaserede partnerskaber indeholder en spænding mellem hierarki, konkurrence og samarbejde, hvor hierarkisk styrede offentlige organisationer kan have en tendens til at overregulere partnerskaber og dermed

udelukke sig fra muligheden for private input, hvorefter lange, ufleksible kontrakter kan fastholde den offentlige organisation i en utilstrækkelig løsning, hvis organiseringen af partnerskabet og især de økonomiske incitamenter ikke i tilstrækkelig grad understøtter løbende forbedringer, fleksibilitet og samarbejde. I sidste ende er hovedsagen, at begge organisationer viser en vilje til at samarbejde, opbygge tillid og skabe løsninger i fællesskab.

EU-lovgivningen kritiseres for ikke at skabe de optimale rammer for offentligt-privat samarbejde, men nu peger en ny udbudslov mod mere innovative partnerskaber i fremtiden, og det bliver interessant at se, hvordan denne mulighed håndteres i affaldssektoren, hvor dette behov er meget udtalt. Mens denne afhandling især har fokuseret på den igangværende omstilling fra deponi og forbrænding mod genanvendelse, vil fremtidige affaldspolitikker i stigende grad fokusere på affaldsforebyggelse, der stiller nye udfordringer til forståelsen og organiseringen af affaldshåndtering og bringer nye aktører og samarbejder på banen.

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PART I: INTRODUCTION AND CONCLUSIONS

Chapter 1: Introduction

In 2011, this project's main supervisor, Professor Carsten Greve, was contacted by three of the most prominent actors in the Danish waste management sector. Copenhagen Municipality, Aarhus Municipality and the publicly owned company Vestforbrænding I/S were interested in a political scientist's view on the changing conditions for delivering waste management services, which they experienced in their daily work. These local waste managers experienced a number of dramatic changes in the regulation and organization of municipal waste management, such as higher demands for environmental sustainable solutions, internationalization of waste regulations and markets, a growing pressure for externalization of waste management services to private providers and an increased focus on citizen service, innovative design and new technologies. As they experienced challenges in meeting these new demands within the current regulatory framework and traditional contracting out practices in waste management, they posed the question, if and how their role as municipal managers was changing? In line with this, they were considering new forms of contracting out and cooperation with private sector actors, such as public-private partnerships.

These initial discussions led to the launching of this PhD project in September 2011 as a co-financed project between CBS and these three organizations. As such, the PhD has taken its starting point in empirically experienced challenges in a field that has been - and continuously is - undergoing substantial transformation in Denmark, but also in a broader European context. Thus the PhD project began with a strong focus on the regulatory changes and the specific challenges of

contracting out waste collection services. As the project evolved, it became clear that these discussions were embedded in a more far-reaching societal challenge.

The issue of waste management addresses the fundamental construction of our society. Today's capitalist society evolves around the production and consumption of goods. A key consequence of this is the production of waste. We produce goods, we use them and we throw them away. We also discard of the packaging wrapped around our goods, or the leftover food we did not manage to consume after all. Already in the 1960-70'ies, some people began to question this practice. In 1972, the Club of Rome published the now famous 'Limits to Growth' report (Meadows et al 1972), where the authors addressed the issue of scarce world resources in a first attempt to investigate the interdependencies between five global problems: 'accelerating industrialization, rapid population growth, widespread malnutrition, depletion of non-renewable resources, and a deteriorating environment' (p. 21). Their message was that the continuation of current growth trends and resource depletion were leading towards an ultimate limit of growth. However, according to the Club of Rome, this trend could be turned around, if the world's nations developed more sustainable practices of resource use and material recycling:

> "It depends on how the major resource-consuming societies handle some important decisions ahead. They might continue to increase resource consumption according to the present pattern. They might learn to reclaim and recycle discarded materials. They might develop new designs to increase the durability of products made from scarce resources. They might encourage social and economic patterns that would satisfy the needs of a person while minimizing, rather than maximizing, the irreplaceable substances he possesses."
>
> (Meadows et al 1972, p.67-68)

The report was later criticised for its 'doom day' message - after all, the world has not collapsed yet. Essentially, though, we are still facing the same problems that the authors of this report presented more than 40 years ago. The report made an important contribution to our understanding of the crucial interdependencies between systems. Waste generation is closely interlinked with industrial production of goods, population rates and consumption patterns. The easiest way to reduce waste continues to be to reduce economic activity, although this is rarely seen as a favourable solution (Hoornweg and Bhada-Tada 2012). Generating and storing waste products may lead to production of GFC gasses contributing to climate change or pollution of the environment, but produced waste may also be used to deliver energy and heat to citizens and release materials for new production processes. As such, waste management is a crucial part of the challenge of sustainable development.

Waste production and management increasingly take place through local and global networks of various public, private and civil society actors. As with many other complex, global issues, there is not one actor, who controls waste. Accordingly, there will be no one actor, who can solve the challenge of waste either. In these complex situations of interdependency, where knowledge and resources are spread between various actors that are dependent on each other to achieve their goals, public-private partnerships are often mentioned as a useful form of governing (see for instance Osborne 2000, Teisman and Klijn 2002, Kooiman 2003, Bulkeley and Newel 2010). As Teisman and Klijn (2002) directly state: "*Partnerships are seen as the best way, in the end, to govern the complex relations and interactions in a modern network society*" (p.198). Partnerships might connect global organizations to global firms, public organizations to other public organizations, private producers to private sub-producers, civil society actors to local decision-makers or involve a broad range of actors from various

spheres. This PhD dissertation focuses on the role of public-private partnerships (PPPs) between local public authorities and private sector actors in municipal solid waste management.

As such, it is not within the limits of this PhD to deliver a prescription for a global sustainability transformation of waste management. However, the structural conditions for waste management and the aim of sustainability are important parts of the context for the investigated PPPs as these conditions shape the practices and challenges of municipal waste managers. In recent years, sustainability of waste management practices have risen on the political agenda, where seeing 'waste as a resource' has become a new narrative. As such, sustainability continues to be a global guiding principle that frames concrete political targets and local practices of waste management. In this PhD, I will investigate the role of PPPs as policy instruments for conducting innovation towards the objective of moving towards more sustainable waste management systems. The hope is that an in-depth understanding of current practices and challenges may deliver important input and a solid starting point to discuss the next steps towards sustainable waste management.

As such, the perspective of the PhD has broadened over time. From an initial focus on waste collection, the PhD now also includes waste treatment, as these two segments of municipal waste services are hard to separate in the development of sustainable solutions. For example, it might not be very useful to implement separate collections of glass and plastic waste, if there is no treatment facility to prepare them for recycling. Likewise, there is no need for an expensive treatment facility, if your waste is not sorted to fit the chosen technology. Furthermore, as I asked the question of where and how innovative solution entered into these waste management systems, I was also led to various networked forms of PPPs including

a broader range of actors, which more directly aimed at developing new solutions in the forms of new policies and/or technologies. These have also been included in the thesis.

The purpose of the dissertation is twofold; the author wishes both to contribute to current research on public-private partnerships as policy instruments for innovation of sustainable solutions in a broader context of public management reforms and to develop knowledge that might be useful for practitioners in the field of waste management. *Theoretically*, the PhD especially focuses on the development of a theoretical framework for understanding the possibilities and challenges of conducting innovation in PPPs, including the potential role of PPPs in sustainability transformations of waste management systems. More generally speaking, waste management is used as a case to investigate the potential and challenges for conducting innovations in institutionalised cooperation between public and private actors towards complex societal challenges. *Empirically*, the PhD specifically aims to investigate the role of PPPs in municipal waste management. The ambition is to present a thick, context based description of the considerations, experiences and developments of PPPs in this policy field. As such, this PhD also intends to open the field of waste management as a subject of public administration and public management in which it has been largely absent (Dijkgraaf and Gradus 2008b, Campos and Hall 2013).

For these aims, the analytical strategy has been a *comparative case study of PPP practices* in Denmark and England; both to provide a clearer picture of the Danish case through comparison and to draw on experiences from PPPs in the English waste sector, where PPPs have played a much greater role than in the Danish counterpart. Denmark and England are both highly industrialized countries with a large waste generation, but they have handled the challenge of waste differently.

Denmark started to develop more sustainable systems of waste management across the country in the 1960s, and the first incineration plant with energy and heat production was built at Frederiksberg already in 1903 (Kleis and Dalager 2003). England used garbage to fill holes in the ground from the extraction industry until EU regulation pressured them to act in the 1990s (Davoudi and Evans 2005). Since then, England has used PPPs to take a huge step forward towards more sustainable waste systems, which in this short time-span has brought them close to the Danish level of recycling. In comparison, contractual PPPs have played a much smaller role in Denmark, which might be curious compared to the general collaborative structure in the Danish governing tradition. However, partnerships are now 'the talk of the town' in the Danish waste community and a few PPPs have emerged.

As such, these two cases pinpoint the question of the role of PPPs in innovation of waste management systems towards more sustainable solutions. The English case might suggest that PPPs could indeed be an efficient policy tool to provide more sustainable waste systems. However, the Danish case suggests that it was possible to reach the same level much earlier without PPPs, although curiously, the Danes are now considering PPPs for the next steps forward. It might just be a question of managerial 'fashion'. After all, the PFI-style PPP was invented in the UK, whereas it has never had a great breakthrough in Denmark. However, there might also be legitimate and rational reasons why Danish waste managers have not fully embraced PPPs. Perhaps there is a dark side to the apparent English success story?

PPPs have had a rather turbulent life in England, where they have been both broadly celebrated and fiercely critiqued. Furthermore, in both cases there seem to be only a few PPPs in collection of waste, where in-house solutions or traditional contracting out continue to dominate. Why is that, when theory clearly argue for

the advantages of partnerships? Are public authorities wasting opportunities? These two cases provoke a number of questions to the apparently complex interrelationships between PPPs, innovation and sustainability in waste management, which I will attempt to answer in this PhD.

On the background of these questions and considerations, this introductory chapter will outline the main themes and concepts in the PhD. The chapter will begin by introducing municipal waste management as a changing empirical field. This will be followed by introductions to three main concepts in the thesis: public-private partnerships, innovation and sustainability. Lastly, the chapter will present the research questions and the analytical design, which will frame the dissertation and connect the three articles.

Municipal waste management

The changes in waste management experienced by public waste managers today takes place in a historical context of alterations in the way waste has been perceived and organized. Waste has always been a part of society, but the nature of waste has changed along with new patterns of production and consumption. With Industrialisation the amounts and content of waste changed and brought milk cartons, plastic and paper diapers into the daily life's of citizens, where they made redundant old practices of repairing and reusing (Kleis and Dalager 2003). Today, a renewed political and industrial focus on seeing 'waste as a resource' seems to have brought back this former awareness of the value of waste (Corvellec and Hultman 2012).

The legal definition of waste in the EU Waste Framework Directive describes waste as: '*any substance or object which the holder discards or intends to discard'* (EC 2008, Article 3, 1). As such, waste is understood as something that is

‘unwanted’, a leftover from production and consumption no longer of value to the owner (White et al 1995). From the moment products are discarded as waste, they lose their ‘use and exchange value’, and thus their identity as what they were before (Minervini 2013). The definition of waste is dynamic and may include an almost endless list of waste types that are discarded. This dissertation focuses on ‘municipal solid waste’ (MSW), which is waste produced by households or similar waste types produced by small businesses and public institutions that are collected through a municipal collection scheme (EUROSTAT 2011). Municipal waste usually includes waste types such as glass, paper, card, metal, plastics, organic and ‘residual waste’ (mixed ‘non-recyclable’ waste). Accordingly, municipal waste management is the collection, treatment and disposal of municipal solid waste.

Municipal solid waste is considered more challenging and expensive to manage than waste from other sources (Davoudi 2009). The mix of various types of waste complicates the task of collecting and sorting and increase the cost of waste management systems compared to more homogenous waste types (Hoornweg and Bhada-Tada 2012, p.14). A main task for local authorities is *to find the optimal system of bring or kerbside collections for various streams of waste and arrange for them to be transported to different destination points for treatment*. Although municipal waste tends to be a smaller part of the total waste production (in England for example, municipal waste counted for 10,7 % of total waste produced in 2006/7 (Davoudi 2009), the management of this waste is a critical issue for local authorities to secure the functioning and well-being of local communities. Waste management is a public service that affects all citizens on a weekly or perhaps even daily basis, and although waste management is often overlooked, people tend to notice, when these systems break down and waste is suddenly piling up in the streets (Corvellec and Hultman 2013). A scare example is the city of Naples, where pictures of piles of waste were wired around the world in the

1990s and the mafia as recent as last year orchestrated illegal toxic bonfires of industrial waste.

Waste is a social construct. What is waste today may not be waste tomorrow, and what is waste in London may not be the same as waste in Milan (Davies 2007, MacKillop 2009). Accordingly, there is no global recipe for waste management and it has traditionally been considered a subject for local authorities. However, municipal waste management has gradually developed into complex, multi-level governed systems, where the EU and national regulations and targets direct the work of local authorities, who are increasingly dependent on private and civil society actors to achieve their goals (Uyarra and Gee 2012). As a consequence of a growing marketization and upgrading of waste management techniques, private sector actors are gradually taking a more central role in municipal waste management as service providers, developers of new technologies and receivers of recycled products.

In line with this development, there has been an increasing attention towards public-private partnerships in the delivery of waste management services. However, we continue to know little on the organisation, processes and results of these PPPs (Slater 2007). This PhD will explore how waste management PPPs work in practice to investigate the potential, limitations and challenges for these policy instruments in the management of waste. The next section will outline the understanding of PPPs in the dissertation.

Public-Private Partnerships

PPPs may broadly be understood as '*cooperative institutional arrangements between public and private sector actors'* (Greve and Hodge 2005). Whereas

PPPs are more often narrowly defined as long-term infrastructure contracts between public authorities and private companies, this PhD aims to take a broader approach to capture the variety of PPP types in municipal waste management services. The PhD focuses on partnerships between one or more public authorities or public companies delegated the responsibility for waste management services and private sector companies working with them for this purpose. I do not particularly focus on partnerships with the community sector, although these play a relatively large role in the English context (Sharp and Luckin 2006). Neither do I focus on partnerships that are purely public-public or private-private, or partnerships initiated by central governments or other facilitating organizations with local authorities being absent. Whereas the main focus has been on contractual PPPs (PFIs, partnering contracts, joint ventures, etc.), I do, however, also include partnerships of a more networked character, where local authorities participate in cooperations between a broader range of actors. The scope of PPPs investigated changes between the articles in the PhD, which I will return to in Chapter 2.

In line with Greve and Hodge (2005), the PhD focuses on PPPs '*because the concept promises a new way of managing and governing organizations that delivers service to citizens*' (p.2). PPPs may be seen as a '*qualitative jump ahead in the effort to combine the strong sides of both the public sector and the private sector'* (ibid.). In contrast to pure privatization, PPPs should not involve a complete shift of responsibility for public service delivery to the private sector. Rather, the aim is to establish collaborative relations, where public and private sector actors share ideas, resources, risks and costs to jointly develop and deliver public services and thereby improve outcomes (Rosenau 2000, Klijn and Teisman 2005). However, this might not be without challenges, and as we will return to in

Chapter 2, PPPs have also been subject of harsh critiques, and it has been questioned if PPPs in practice deliver on these promises.

PPPs may to some degree be studied isolated as organizational forms and policy instruments in 'whatever' field. However, PPPs do not exist in a vacuum. They are initiated and organized in a current and historical context, and, as Osborne and Murray (2000) recommend, it is important to be aware of the impact of these external factors upon the success of PPPs. This PhD dissertation investigates PPPs in the empirical field of waste management, which brings specific advantages and challenges to PPPs. In both national cases, England and Denmark, waste management policies demand a change in current practices. As such, a main challenge for public waste managers is the pressure towards innovation of current practices and development of more sustainable waste management systems. The question is, if PPPs may be relevant instruments for this purpose. The next section will outline the understanding of innovation in this context.

Innovation

Innovation may be understood as *a creative process of developing new ideas to change existing practices in a specific setting and also involves the implementation and potentially diffusion of these ideas* (Mulgan and Albury 2003, Walker 2006, Van de Ven et al 2008). There are various types and scopes of innovation, ranging from smaller, incremental service changes to more radical, break-through innovations in a sector, or even comprehensive system innovations involving new technologies, organizations and relationships between organizations fuelled by new mind-sets and policies (Mulgan and Albury 2003, Moore 2005).

Innovation has traditionally been connected to the private sector, where the disciplining effect of competition in a process of 'creative destruction' was said to induce companies to innovate in order to survive (Shumpeter 1943). In contrast, the public sector's role has mainly been perceived as one of supporting private sector innovation (Sørensen 2012). However, an increasing body of research has begun to explore innovation in the public sector, which perhaps is not quite as rigid, rule-bound and bureaucratic as its reputation (Hartley 2005, Moore 2005, Osborne and Brown 2011). At least, public innovation scholars have identified a number of innovations in public programs and services (Borins 1998, Albury 2005).

In the 1980s, New Public Management effectively placed innovation on the public sector agenda, and the pressure from the global financial and economic crisis has in many welfare states brought the issue back on top of the political agenda (Sørensen 2012). Today's public sector is met by complex societal challenges such as climate change, poverty or social inequality in an increasingly fragmented and diverse society, where growing citizen expectations to individualized solutions and restrained public budgets place governments in a cross-pressure situation. These developments have led to an emphasis on innovation of public services to deliver 'more for less' (Kooiman 1993, Albury 2005, Sørensen and Torfing 2011, Bekkers et al 2011). There is a growing acknowledgment in the public sector that finding these new solutions demands coordination and cooperation across public sector organizations as well as with a range of actors from the private sector or civil society, for instance through public-private partnerships (Mandell and Steelman 2003, Bommert 2010, Sørensen and Torfing 2011).

However, despite this general agreement, a theoretical base to support the connection between PPPs and innovation seems to be lacking (Leiringer 2006). Innovative results from PPPs are less studied and show mixed results (see for instance Ball et al 2000, Hurst and Reeves 2004, Bovaird 2006, Leiringer 2006, Esteve et al 2012). Accordingly, this thesis aims to develop a theoretically based framework to understand the various results of innovation from PPPs. Furthermore, an increasing body of PPP research has emphasized the importance of the management of PPPs from the establishment of the PPP to the phase after signing of the contract (Osborne and Murray 2000, Fischbacher and Beaumont 2003, Noble and Jones 2006, Ysa 2007, Weihe 2010, Steijn et al 2011). Hence, the PhD aims to investigate the role of management in the PPP process for conducting innovation. The following section will outline the understanding of sustainable waste management applied in the dissertation.

Towards sustainable waste management

Sustainable development was defined in the Brundtland Report 'Our common future' as '*development that meets the needs of the present, without comprising the ability of future generations to meet their own needs*' (WCED 1987). This development outlines trajectories of change, which combines environmental objectives with economic wealth and social cohesion. There has been a lot of enthusiasm about 'win-win' solutions, for instance concerning export opportunities for 'green' technology, but as Kemp, Loorbach and Rotmans (2007) points to, it is important to acknowledge the potential trade-offs between these three goals in any type of development process. In practice, each new technological development brings new social issues to the table, which need to be dealt with politically and organizationally (p.79). In a specific local context, the potential of a new 'green' solution will be weighed against economic costs and social acceptance. As such 'sustainable development' is not a static concept, but a

dynamic transformation process, in which new solutions are developed, tested, discussed and negotiated (ibid.).

Broadly speaking, sustainable waste management concerns the prevention of generation and management of waste from harming the environment and human health, refraining from excessive resource use and the development of closed-loop systems for material recycling (EC 2008). In line with other authors (Bulkeley et al 2005, Corvellec and Hultman 2012), the thesis will take the European Waste Hierarchy as a generally accepted guideline for the transformation towards sustainable waste management. The hierarchy ranks waste management methods according to environmental impact from prevention of waste, preparing for re-use, recycling, and recovery with disposal (landfilling) as the least favoured option (EC 2008, Article 4). As such, sustainability transformation would involve moving up the waste hierarchy. However, the hierarchy does not include for example the environmental effects of waste transport, which link up to the challenge of climate change and has been a focus point of development in many local authorities.

The return to a stronger sustainability concept, where waste is seen as a resource, has brought a new attention to the top layers in the waste hierarchy; waste prevention and recycling. This narrative has been strengthened both at the *European level*, where the most recent waste strategy from the Commission, '*Towards a circular economy: A zero waste programme for Europe*', addresses waste in the context of a broader transformation of production and consumption patterns[1] (EC 2014a), at *the national level*, where for example the Danish government applies increasing pressure on municipalities to increase recycling in favour of incineration in the strategy 'Denmark without waste' (Danish

[1] This strategy has, however, recently been re-drawn by the new Commission and a replacement is expected next year.

Government 2013), and at *the local level*, where for example the publicly owned company Renosyd has implemented a new 'resource' bin for mixed recyclables in Skanderborg and Odder municipalities in Denmark (www.renosyd.dk).

The development is supported by new concepts such as a 'circular economy', developed by the international organization Ellen MacArthur Foundation (2012), which gather actors to change the 'take-make-dispose' and buy-consume' patterns of modern society and strive to provide concrete examples of the possibilities of reducing material use and circulating materials. Industry actors seem to increasingly catch on to this as they begin to develop for example 'industrial symbiosis', where literally one companies waste becomes another company's treasure. The same development seems to spread bottom-up from civil society, where new initiatives to loan, exchange, share or give away instead of buying new products are emerging. As such, this renewed sustainability agenda opens a 'window of opportunity' for a change in current practices.

This PhD dissertation investigates the role of PPPs in waste management within this period of transformation, where innovation and sustainability is brought to the forefront. A changing contextual environment raises some challenges for research, and it might have been easier to study and conclude upon a transformation process that had already taken place, such as the study of the socio-technical transition from horse-drawn carriages to automobiles (1860-1930) (Geels 2005). During this three years period, new policies have been launched, new partnerships have begun and new research papers on these subjects have emerged. As far as possible, the PhD has attempted to capture these changes. Furthermore, most of the PPPs studied have not yet been completed, and it may still be difficult to see their role and contributions in a larger perspective.

On the other hand, studying PPPs in waste management in the midst of a transformation process gives a unique first hand insight into the potential role of PPPs during processes of change. Furthermore, it provides the possibility for research to contribute to these societal developments by creating knowledge to inform the choices of actors and increase their awareness of their own (potential) contribution to sustainability processes. A municipal waste manager once asked me, '*So, all right, I get the whole waste as resources agenda, but who should do it, and what is the municipalities role in this transformation? What can we do?*' Hopefully, this PhD dissertation will provide a few pointers for eager and ambitious municipal waste managers engaging in this challenge.

Research questions

On this background, the PhD dissertation poses the following main research question:

What are the potentials and challenges in public-private partnerships (PPPs) for conducting innovation towards the objective of sustainability transformation of municipal waste management systems?

Accordingly, the research question links the potential for innovating in PPPs with the political objective and demand of transforming waste management in a more sustainable direction, which conditions the successful use of PPPs in this empirical field. In order to provide an answer to this question, the PhD will investigate three research sub-questions that address various dimensions of the main research question:

1) What is the potential for conducting innovation in PPPs?

In the context of the increased demand for innovation in the public sector in general, and in the particular case of waste management, the general idea of PPPs as a good policy instrument to gather actors and resources across publican a

private spheres to develop innovative solution to pressing problems and the underdevelopment of a theoretical basis to support this, the first sub-question addresses the potential for innovation in PPPs. As such, this sub-question opens and explores the two main concepts of PPPs and innovation and their interrelatedness. The question will be answered through a review of existing ideas and empirical investigations of innovation in PPPs.

2) **How may PPPs contribute to sustainability transformations? What is the role of PPPs in English and Danish sustainability transformations of waste management systems?**

From this starting point, the second sub-question focuses on the objective of sustainability change and addresses the theoretical question of how PPPs may contribute to processes of sustainability transformation, supported by an empirical question of the role of PPPs in waste management in two specific cases, England and Denmark. Asking about 'the role' of these PPPs implies an interest in the general use of various types of PPPs in waste management, if and how identified PPPs are used as policy instruments for sustainability transformation and to what extent they contribute towards this aim. The question will be answered through a comparative analysis of the role of PPPs in sustainability transformations of waste management in England and Denmark.

3) **How is innovation conducted in PPP processes, and in what way may public managers support this?**

Based on the theoretical review and conceptual model developed from the first research question and the empirical mapping of PPPs and contextual knowledge of change processes in waste systems from the second question, the third sub-question goes on to inquire into the detailed processes of innovation in PPPs and further addresses the importance of public manager's managerial effort for

successful innovation in PPP processes. As such, the question may reveal both potentials and challenges of PPP innovation. The question will be answered on the basis of selected empirical cases of PPPs in municipal waste management.

These research questions will be answered in the introductory paper on the basis of the analyses in the three articles of the PhD. As the next section will explain, the papers each mainly contribute to a specific sub-question, but may supplement the answers of the other questions as well. As such, all articles feed into a collective answer to the main research question.

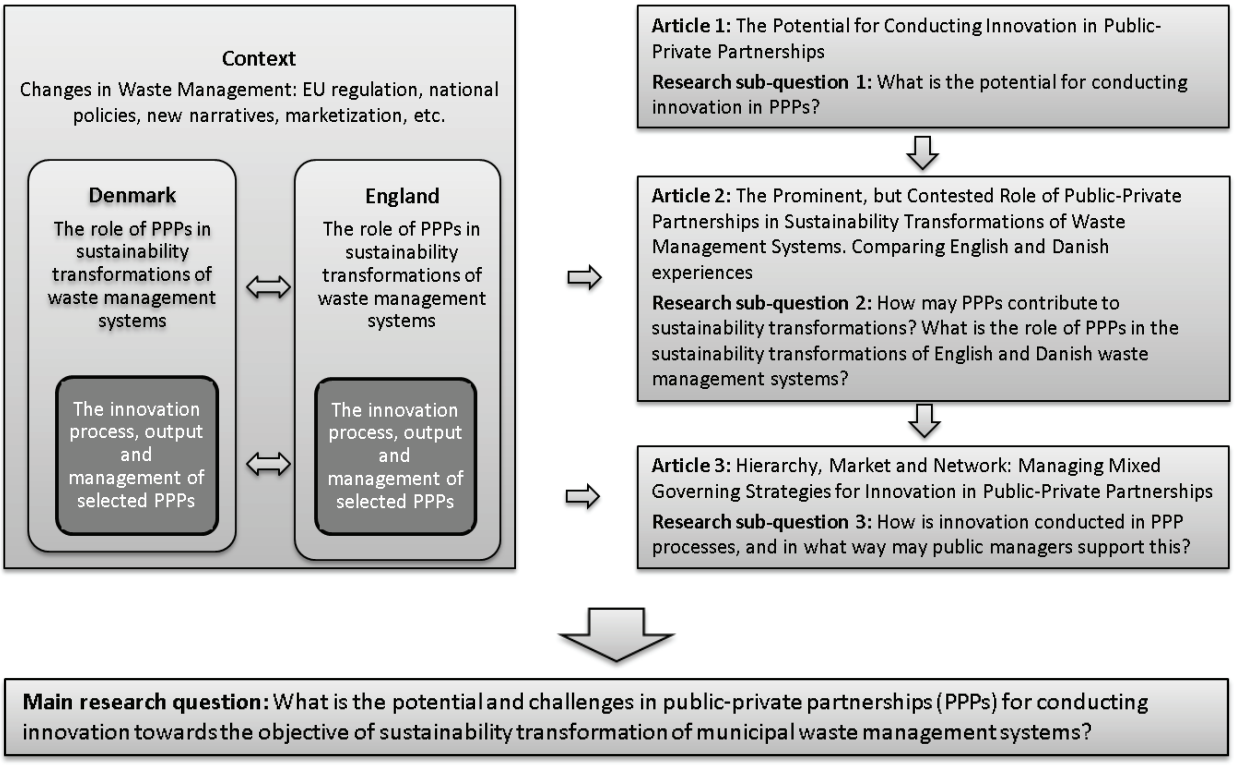
Analytical design

The analytical design of the PhD is built around a *comparative, embedded case study* of PPPs in municipal waste management in England and Denmark (Yin 2009). This approach enables some degree of generalization across cases, without jeopardizing the possibility for a context-based understanding. In contrast to 'holistic' case studies, the embedded design allows the dissertation to examine specific phenomena in operational detail by 'zooming in' on specific sub-units (PPP projects) within a more global approach to the case (PPPs in Denmark and England) embedded in a context (changes in waste management). It has been a purpose of this PhD dissertation to provide both a broader picture of the use of PPPs in two national cases and a more operationally focused study of the dynamics in specific PPP projects, where four innovative PPPs have been selected for more in-depth analysis. Embedded case designs are said to risk getting stuck at the sub-unit level and never returning to the main unit of the case (ibid., pp.46ff), but the reciprocal design of this study, where the focus is shifted deliberately between thorough investigations at each level, should prevent this to happen.

The comparison of multiple cases might provide a more robust ground for generalizations compared to a single case study (Yin 2009). The cases have been selected for analytical purposes on the basis of a 'replication' design, where similar investigations are carried out in a limited number of cases (Peters 1998, Yin 2009). In the choice of the quantity of cases there will always be a trade-off between richness in context and detail versus generalization through experiences from several cases. With the selection of an embedded case study with two cases (England and Denmark) and four sub-units (specific PPPs), the projects attempt to strike a balance between investigating and developing theoretical propositions across a number of cases, while still being able to describe the dynamics in the cases with rich context and detail. The choice of the case study, case selection etc. will be further explained in Chapter 5.

Figure 1 provides a model of the embedded, comparative case study design. The model also illustrates the levels of analysis and focus points in the four articles. As the model shows, the articles correlate to various levels in the case study design.

Figure 1: The analytical design of the PhD dissertation based on a comparative, embedded case study



Source: see Yin 2009, p. 46

Article 1, 'The Potential for Conducting Innovation in Public-Private Partnerships,' establishes the theoretical framework for investigating innovation in PPPs at the sub-unit level. As such, the article mainly addresses the first research sub-question. The article requests a more precise understanding and investigation of the various meanings attached to the ambiguous concepts of PPPs and innovation and provides a review of ideas and empirical investigations of innovation in PPPs from existing literature. On this background, the article develops a first outline of a conceptual framework for investigating innovation processes in various types of PPPs across sectors such as waste management, construction and health care, which is then used to investigate drivers and challenges for innovation in three PPP types: infrastructure PPPs, services PPPs and innovation PPPs. The article suggests that the application of a broad

understanding of innovation may shed light on the value of various types and scopes of PPP innovation.

Article 2, 'The Prominent, but Contested Role of Public-Private Partnerships in Sustainability Transformations of Waste Management Systems. Comparing English and Danish experiences,' is situated at the main case level. This article mainly addresses the second sub-question and focuses on the concepts of PPPs and sustainability. The article investigates PPPs as policy instruments for sustainability transformation with municipal waste management as a case, thus placing PPPs in a theoretical framework of sustainability transformations in socio-technical regimes. The article identifies and categorises PPPs in waste management in two national contexts, England and Denmark, compares the role and use of PPPs in sustainability transformation processes across these cases, and discusses if PPPs should be considered suitable policy instruments in sustainability transformation processes. The role of PPPs is illustrated by examples from specific PPP projects (sub-unit level). As such, the article includes both an independent theoretical contribution by linking sustainability transformation literature to PPP literature illustrated by two empirical cases and an empirical contribution by identifying and categorizing the use of PPPs in English and Danish waste management.

Article 3, '*Network, Hierarchy and Market: Managing Mixed Strategies for Innovation in Public-Private Partnerships'*, draw on, expand and test the conceptual framework developed in the first article. This article moves down to the sub-unit level in the embedded case study and addresses mainly the third sub-question. On the basis of the theoretical framework developed in article 3, this article investigates the management of innovation in PPPs over time in the whole process of the PPPs from pre-contract phase, over the contract design to the post-

contract phase. The article investigates four selected innovative and collaborative PPPs from England and Denmark, one service PPP and one infrastructure PPP from each country. The article provides an empirically tested, theoretically based model for investigating innovation in various PPP types and discusses implications for both theory and practice.

Chapter 2: Public-Private Partnerships

Chapter 2 provides a more detailed introduction to central concepts and theories of PPPs with an emphasis on approaches, suggestions or conclusions, which has served as inspiration to the analytical approach applied in the PhD dissertation. The chapter has also been used as a possibility to provide a little more theoretical background and discussion than possible in the more restricted format of research articles.

PPPs in a historical and dynamic perspective

From the mid-20th century focus on 'nationalization' to the 1980s focus on 'privatization', public-private partnerships (PPPs) seems to have taken over the 21th century with its messianic middle ground slogan of collaboration between public and private organizations (Wettenhall 2005). PPPs are increasingly used all over the world to deliver public infrastructure and services and develop new policies and solutions to public sector challenges (Osborne 2000, Rosenau 2000, Grimsey and Lewis 2005, Hodge et al 2010). Judging the amount of empirical investigations of PPPs in for example the US (Rosenau 2000, Johnston and Romcek 2005), Australia (Hodge 2004, Noble and Jones 2006, Johnston and Gudergan 2007), Canada (Murray 2000), the UK (Falconer and McLaughlin 2000, Bovaird 2006, Reeves 2008), Denmark (Greve 2003, Andersen 2012), Sweden (Almqvist and Högberg 2005), the Netherlands (Klijn and Teisman 2003, Steijn et al 2011), Spain (Esteve et al 2012), France (Sadran 2004), as well as in cross-national comparisons (Hammerschmid and Ysa 2010, Petersen 2011, Stelling 2014), there is definitely an empirical phenomena to study.

The emergence of PPPs is often connected to the New Public Management (NPM) reforms in the 1980s, but the phenomenon of public-private cooperation is not altogether new. As Wettenhall (2005) recalls, various forms of public-private

mixing might be traced all the way back to the beginning of civilization. In the Old Persian Empire, contracting and partnership between government and smaller businesses evolved as government began to use private companies to collect taxes for the construction of roads, bridges and canals. In France, concession contracts for water supply, where public authorities lease out the operation, maintenance and collection of revenue for publicly owned facilities, may be traced back to the mid-1800s (Wettenhall 2005). In more recent history, the idea to the UK PFI contract, which was launched in 1992, was actually adopted from urban regeneration partnerships widespread in the 1970s's USA, where local authorities joined forces with businesses to accelerate urban development (Falconer and McLaughlin 2000, Weihe 2008).

Especially the UK Labour government has embraced the partnership agenda as a central strategy in their 'third way' policy. The Private Finance Initiative (PFI) was introduced in the UK in 1992 by the Conservative government to attract private finance for public infrastructure. The PFI model fitted the Conservative's ideological believes of the private sectors primacy over the public sector and may be seen as an expansion of the private sectors role in society in continuation of the introduction of Compulsive Competitive Tendering (CCT) of public services in the 1980s (Falconer and McLaughlin 2000). From being in strong opposition towards the PFI, Labour turned around in the beginning of the 1990s to embrace the PFI and suggested improvements of the scheme. When coming into office in 1997, Labour effectively re-branded PFIs as a 'public-private partnerships' within a broader partnership umbrella and took efforts to export the idea to create new markets for British companies (Hellowell 2010). As such, the Labour government adopted PPPs as a new approach to the role of government in society (Hodge and Greve 2013).

In contrast, the Scandinavian countries have been more reluctant towards PPPs, at least in the UK PFI-style model. As Greve and Mörth suggest, this might be linked to the Scandinavian corporatist tradition, where close cooperation between public and private actors is deeply rooted in society, but tends to be rather informal and hierarchically based compared to the formal, contract-based relationships in PFIs (Greve and Mörth 2010). In Denmark, PPPs were mentioned for the first time in a Finance Ministry report from 1999 under the social-democratic led government, and it was expected that the new Liberal-Conservative government elected in 2001 would increase focus on PPPs. Nevertheless, the scepticism towards PPPs continued (Greve and Mörth 2010). A recent report from 2012 showed renewed interest in PPP projects listing 14 existing Danish PPP projects and 15 projected projects (KFST 2012).

In Denmark, however, more loosely coupled, network-based partnerships including a broader range of public and private actors are increasingly used for the development of new solutions or policies, for example in Danish environmental politics. Besides networks directly initiated by the government (Danish Government 2013), several network organizations such as Gate 21 (www.gate21.dk), Copenhagen Cleantech Cluster (www.cphcleantech.com) or the Danish GTS institutes (www.gts-net.dk) systematically work on gathering actors to produce and share knowledge. In a Danish government publication from 2010, a variation of this approach was formalized as 'innovation partnerships' and added to existing descriptions of public-private cooperation forms in Denmark (Udbudsportalen/LGDK 2010). A recent report shows that Danish municipalities have increasingly embraced this possibility. The report identified 249 finished and ongoing OPI projects in central welfare areas such as health care, elder care and day care – considerably more than the number of infrastructure PPPs (Petersen and Brogaard 2014a).

Accordingly, whereas governments and researchers have mainly focused on PPPs in the form of the PFI style long-term infrastructure contracts (Weihe 2008) there might be a tendency to overlook the variety of PPP types. As the Danish and English examples suggest, public-private cooperation might serve different purposes and seems to continuously change as well as the political, legal, and cultural context in which they are situated. As old forms such as the PFI are discussed, evaluated and questioned, new 'emerging' organizational forms of PPPs such as the 'innovation partnership' arrives (Greve and Hodge 2013). These dynamics makes it continuously interesting - but also potentially challenging - to grasp and study PPPs.

The definition of PPPs in this thesis

As the introductory chapter stated, the starting point for investigations of PPPs in the PhD has been a broad definition of PPPs as '*cooperative institutional arrangements between public and private sector actors'* (Greve and Hodge 2005). This definition opens for a broad investigation of what is empirically understood as a PPP arrangement in municipal waste management, as it provides a number of possibilities for PPP arrangements with various degrees of closeness and trust in relationships. 'Cooperative institutionalized arrangements' may involve more or less organizational and financial tight relationships between the partners (Hodge and Greve 2007). PPPs can be backed by a contract, but may also be based on a more loose commitment. For example, joint venture companies for design, build, finance and operation of public infrastructure are generally financial and organizational tight, whereas the organization of purely contract-based PPPs integrate the two organizations less financially. In contrast, partnerships for the purpose of policy development tend to have a more networked structure with less organisational and financial integration (ibid.).

Compared to one-time exchange relationships, PPPs involve relatively long-term commitments and as such, they necessarily include some degree of discretion between the partners. PPPs involve binding your organization to another organization in an uncertain future, where external or internal changes might affect the needs of the organizations involved over time (Andersen 2012). Accordingly, PPPs are always more than the wording of a contract or collaborative agreement (Bovaird 2004).

The definition identifies participants as 'public and private sector actors'. This PhD thesis focuses on *partnerships between municipalities, also called local authorities, responsible for waste management services (or publicly owned companies to whom this responsibility might have been delegated), and private companies taking part in the development and delivery of these services*. These local actors need not necessarily be the initiators of PPPs (as in contract based arrangements), but might also be partnership participants included by for instance government or other facilitating organisations.

With a public authority as one partner, PPPs will always have a policy function in a broad sense of the word, in this case to contribute to the provision of waste management services to citizens (Rosenau 2000). This PhD focuses on public-private cooperation in waste collection or treatment or potentially cooperation related to the development of new policies, technologies, products or processes that direct or feed into these services. However, this PhD does not include PPPs for technology development and import to third world countries (see for example Ferroni and Castle 2011, Campos et al 2011) or cooperations that only involves public financial support to private technology development (see for example Drejer and Jørgensen 2005).

The ambiguity of the PPP concept and various categorizations

The most general agreement in PPP literature seems to be that the concept of PPPs is nebulous and ill-defined (Weihe 2008). PPP researchers have debated the definition of PPPs, the historical origins of PPPs and even if PPP could at all be characterized as a distinctive form of governance (Hodge et al 2010). Whereas some have referred to PPPs as a new policy instrument 'blurring the borders' between public and private (Rosenau 2000), others have described PPPs as a more 'easy to swallow' rhetoric for privatization of public services (see Linder 1999). The ambiguity of the concept and its representation in multiple and changing forms means that a conceptual demarcation and identification of PPPs in the studied field continue to be a necessary starting point for analysis, although it has not been a main purpose in itself for this PhD.

In attempts of clearing up the confusion of the PPP variety, researchers have worked on various categorizations of PPP types. PPPs have for instance been categorised according to contractual arrangements (BOT, BOOT, DBFO, etc.) (Savas 2000), purpose (service, infrastructure, policy, etc.) (Bovaird 2004, Brinkerhoff and Brinkerhoff 2010), 'research approaches' (urban regeneration, policy, infrastructure, development) (Weihe 2008), analytical level of study (project, organizational form, policy, governance tool, etc.) (Hodge 2010, Hodge and Greve 2013), ideological commitments (neo-liberal vs. neo-conservative) (Linder 1999), or more recently, according to 'dimensions' of the public-private relationship (co-responsibility vs. relational governance) (Stelling 2014). These categorizations show that various types of PPPs might employ different rationales, suit different purposes and take a variety of forms. In line with Bovaird (2004) and Brinkerhoff and Brinkerhoff (2011), this PhD has applied a categorization based on purpose, which is close to many empirical categorizations and thereby easy operational in empirical analyses.

The variety of PPPs has led some researchers to warn against the tendency to '*draw general conclusions about PPP without specifying what is actually meant by PPP*' (Weihe 2008). As Van der Wel (2004) states, it is '*striking to see how few authors (or for that matter governments and international agencies) seem to be aware of the existences of other interpretations of the term PPP than the one they happen to use themselves*' (p.21, referenced in Weihe 2008). This is hard to argue against since complete confusion arising from a random mix of suggestions and conclusions seems inevitable. On the other hand, studying each PPP type its own might lead to 'water-tight compartments', where researchers are not aware of potential possibilities of mutual learning (ibid.). To break down some of these boundaries in the expectation that fruitful learning might take place across the 'watertight compartments' of PPP research and practice, this dissertation aims to capture and compare different types of PPPs (ie. Infrastructure, service, etc.).

The three articles in the PhD thesis deliberately provide different categorizations of PPP types serving the various purposes of the articles (see *Table 1*). In *the first article*, three PPP types related to service delivery and described in existing literature and empirical reports are selected as potentially relevant in waste management services, infrastructure partnerships, service partnerships and innovation partnerships. Infrastructure partnerships typically involve the joint procurement of a combination of tasks such as design, construction, finance, operation and maintenance of a building or processing facility in a long-term contract of 20-35 years. In this period, the private consortium typically owns or co-owns the facility, which is paid for in instalments by the public authority and may be bought by the authority after an agreed period of time (Yescombe 2007). Service partnerships involve the contracting out of a public service in a contract based on 'partnership principles' such as trust, openness, common values and flexibility (Udbudsportalen/LGDK 2010). *Innovation partnerships* involve "*a*

setting in which public and private players work together to develop innovative solutions targeted the public sector" (Evald et al 2014, p. 34). The 'players' are considered cooperation partners and as such expected to '*develop innovative solutions together through a continuous transfer of ideas and knowledge between the players involved*' (ibid.). These PPP types are used to discuss the potential and challenges of conducting innovation in PPPs as it appears in existing empirical investigations.

Table 1: PPP typologies in the articles

<table>
<tr><th>Article 1</th><th>Article 2</th><th>Article 3</th></tr>
<tr><td></td><td>Policy Partnerships</td><td></td></tr>
<tr><td>Infrastructure Partnerships</td><td rowspan="3">Service Delivery Partnerships (including infrastructure and service partnerships)</td><td rowspan="2">Infrastructure Partnerships (including an innovation partnership)</td></tr>
<tr><td>Innovation Partnerships</td></tr>
<tr><td>Service Partnerships</td><td>Service Partnerships</td></tr>
<tr><td></td><td>Technology Partnerships</td><td></td></tr>
</table>

The second article applies a more explorative approach to investigate the potential variation of partnership types used in waste management. This strategy aligns with the 'policy approach' in Rosenau (2000), where public-private constellations within a specific policy area are described and analysed (Weihe 2008). The second article identifies, categorizes and compares PPP types in waste management in England and Denmark. The article identifies three PPP types that to some degree correspond with the PPP types in the first article, but also adds two 'new' types; policy partnerships, service delivery partnerships (including infrastructure and service PPPs), and technology partnerships. The three identified PPP types correspond with the three levels in the multi-level perspective on sustainability transformation; landscape, regime and niches (see Article 2). Whereas policy

partnerships gather actors and resources to identify solutions towards implementation and development of waste policy and regulation, technology partnerships are more directly focused on technology development and testing. These two PPP types could also be characterized as' innovation partnerships' in a broader sense as these may come in many different shapes (see DECA 2009, Brogaard and Petersen 2014b), but with the coming specific procedure for 'innovation partnerships' in the new procurement directive this could lead to conceptual confusion.

On the background of the empirical categorization in the second article, *the third article* in the dissertation selects two comparable PPP types, infrastructure PPPs and service PPPs, to provide more detailed case studies. These PPP types are based on a contract and may involve monitoring and enforcement of contract specifications, but have been selected as examples of innovative contract-based PPPs displaying 'genuine' partnership features. As such, they pinpoint the interesting tension between competition and collaboration in PPPs. These three categorizations of PPPs thus supplement each other in the investigation of the role of PPPs in waste management and the potential and challenges for innovation and sustainability transformation. In the next section, we will discuss the ambiguity of PPPs and hereunder the meaning of 'genuine partnership'.

The debate on 'genuine' partnerships

As the previous section showed, a central debate on the PPP concept has concerned the question of how to define and demarcate PPPs in relation to other forms of public-private cooperation, such as traditional contracting out. 'Real life' PPPs, especially the infrastructure version, has been accused of not being 'genuine' partnerships - in the sense of being equal, long-term relationships built

on mutual trust and commitment (Klijn and Teisman 2000, Wettenhall 2005). According to Klijn and Teisman (2005), contracting out is characterized by principal-agent relationships, where the agent carries out work for the principal and is assumed to have conflicting interests. Especially when information is limited and close monitoring is difficult the main task for the principal is to provide incentives for the agent to follow the principal's interests (Walls 1995, p.36-38). According to Klijn and Teisman a public tender process might involve some cooperation in the negotiation phase, but after signing of the contract the relationship is characterized by 'regulation' by contract (principal-agent), rather than cooperation. In contrast, genuine partnerships are characterized by principal-principal relationships, where the partners jointly decide on the aims and co-produce solutions with the objective of achieving effective solutions for both partners (Klijn and Teisman 2005).

This demarcation line between partnerships and contracts, or collaboration and 'regulation', has also been drawn in collaboration theory, where Donahue and Zeckhauser (2011) emphasize that collaborative governance:

> "leverages private expertise, energy, and money by strategically sharing control – over the precise goals to be pursued and the means for pursuing them – between government and private players. That discretion simultaneously motivates private collaborators to enter the public arena and empowers them to play their roles as well. Done well, collaboration creates synergies between governments and participants, allowing them together to produce more than the sum of what their separate efforts would yield" (p. 4).

In contrast,

> "[a] municipal government contracting with a private waste management company represents the other end of the spectrum. Discretion rests entirely with the government. The company's charge - to pick up garbage and dump it on the

landfill - is explicit, complete, and geared to the government's priorities." (p. 10-11)

However, this sharp dichotomy might bring only a limited understanding of contractual relationships between public and private actors in general and in waste management. As Klijn and Teisman (2000) also suggest, there is a growing number of situations, where public authorities do not have a clear picture of the policy, product or service they would like to procure, which is a prerequisite for a clear contract. For more complex procurement of infrastructure and services, especially in long-term contracts, it will not be possible for the public authority to describe specifications in detail, leaving a potential contract incomplete (Williamsen 1975). In these situations, there is a need for continuous dialogue and flexibility and hence more collaborative relationships (Klijn and Teisman 2000).

This situation where competitive contracting and collaboration becomes blurred has been captured with the concept of 'relational contracting' from law theory (Macneil 1975, 1980), which has also been used to analyse PPPs (Johnston and Romzek 2005, Reeves 2008). In contrast to the ideal type of the 'discrete' contract from transactions in neoclassical microeconomics that involves a sharp, one-time exchange with no relationship between the parties other than this transaction, the term 'relational contracting' describe a contractual relationship based on personal relations, which tends to involve several people and have a longer life span. These contracts involve '*future cooperation not only in performing what is planned but in future planning*' (Macneil 1980, p.21). As specific exchanges in the future may not be planned in detail, planning rather involves specification of the substance of exchange and of structures and processes of future exchange. To work successfully, these contracts require solidarity and trust between the parties, as they are based on some degree of faith in the other party to continuously deliver

according to the agreement. According to Macneil, all contracts are to some degree relational, as contracts do not exist outside of society. However, the more complex a service agreement might be the more need there will be for extra-contractual relations (ibid.).

In line with this thinking, Andersen (2012) describes PPP contracts as 'second order' contracts or a 'promise of future promises'. He suggests that partnership contracts do not simply demand specified services, but rather the development of new solutions in a framework that allow expectations to the exchange to change over time in line with a turbulent and changing environment. Rather than specifying the demands of the product or service as in a 'discrete' contract, these contracts provide expectations to the form and process of cooperation, where parties are expected to act as 'partners' (pp. 205ff). As such, these ideas relate very obviously to the purpose of service partnerships, but perhaps less obviously to infrastructure partnerships.

Literature investigating empirical examples of public-private relationships in PPPs shows various degrees of genuine partnership relationships. Andersen (2012) provides three illustrative examples from a Danish context of partnership contracts based on flexibility, mutual trust, continuing dialogue and shared responsibility, where initiators explicitly positioned these in contrast to traditional outsourcing. In a UK context, Bovaird (2006) provides an example of a PFI contract on revenue and benefits services in a London borough, where a key selection criterion was willingness to work in partnership with the borough and the relationship was supported by economic incentives for both partners to continuously deliver cost savings.

In contrast, Teisman and Klijn (2002) describes an example from the Netherlands, the Mainport Rotterdam Project, where public authorities supported by environmental organizations chose more traditional procurement procedures over a partnership model to maintain control over revenues and environmental standards. Similarly, Reeves (2008) concludes in an analysis of the first infrastructure PPP in Ireland for the provision of five public schools that the government agency procuring the contract actually preferred a more transactional approach. However, Reeves also shows that the transactional features in this case did not prevent cooperation and trust to develop between the agency and the private partner, although the involved schools wished for a more relational contracting.

Accordingly, although contract-based PPPs may not be purely collaborative, they might display collaborative features. What especially Reeves analysis suggests, and what have been the starting point for this PhD thesis, is that contract based PPPs might involve a mix of governing strategies with elements of collaboration/partnership, competition/market and regulation/hierarchy. The degree of collaboration reflects more or less deliberative *governing strategies* of the public authorities procuring these solutions and thereby having the initiative power to design the procurement process and contract. This design choice might be related to the type and degree of complexity of the task and expectations to contextual changes in the contract period. As chapter 1 indicated, waste management services are facing increasing complexity, which potentially moves this service from being a prime example of 'transactional' contracting to be a potential subject for 'relational contracting'.

The debate on genuine partnership is an important cornerstone in our purpose of investigating innovation in partnerships. If our expectations to the benefits of PPPs

are bound to the idea of them being collaborative and they are not, obviously our expectations might be disappointed. As such the ambiguity of the PPP concept creates and analytical dilemma: Do we investigate empirically labelled PPPs as policy instruments for innovation or do we investigate the concept of 'partnership' - the genuine partnership - as an instrument for innovation? As the previous section showed, the first and second article in this PhD investigates empirically labelled PPPs and from there discuss the degree of genuine partnership, whereas the third article has selected partnerships that display genuine partnership features. We will return to the subject of PPPs and innovation after a short review of promises, critiques and evaluations of PPPs.

PPP promises, critiques and evaluations

Why should public and private actors engage in partnerships? The idea of partnership is widely celebrated as a plus-sum word signalling win-win solutions. A basic idea is that the involved organisation will achieve gains that exceed the benefits form working alone (Rosenau 2000). By pooling resources and sharing skills, expertise and knowledge, the organisation may develop better and more innovative solutions to complex societal challenges (McQuaid 2000, Klijn and Teisman 2005). PPPs might even be considered necessary to coordinate action in an increasingly diverse and networked society, where actors with relevant knowledge and resources are dispersed (ibid.). From a public authority's view, including private partners may bring increased efficiency, market knowledge, reduced risk, new ideas or an innovative approach, or enable the realization of projects that would not have been possible without private investment (Hodge and Greve 2013). PPPs may enable these benefits from a competitive private sector, without relinquishing the control of the public sector (Grimsey and Lewis 2005). From a private point of view, private actors might see a financial benefit from the possibility of expanding their business into new markets, reducing uncertainty and

risk in facility investments or to get public funding for development projects that might be too risky or expensive to undertake alone (Ham and Koppenjan 2001).

However, PPPs have also been criticised from various perspectives. From a 'traditional public administration' perspective, PPPs have been accused of diluting responsibility from the public to the private sector. From a New Public Management (NPM) perspective the often long-term commitment of PPPs has been said to potentially disturb competition (Bovaird 2004). From a 'governance' perspective, as described in the section of PPP ambiguity, PPPs has been accused of being a 'rhetorical scam' for traditional hierarchical relationships rather than actual joint decision-making (Kljin and Teisman 2002). And finally from a 'policy analyst' perspective PPPs has been described as a political trade-off between direct control, flexibility and clear accountability of public services for the potential of increased economic efficiency and service standards (Flinders 2005). These critiques show that there might be trade-offs involved between various objectives, when PPPs are used as policy instruments.

The evaluation of PPPs has been a central discussion in PPP research (Grimsey and Lewis 2005, Hodge and Greve 2009, Hodge 2010, Jeffares et al 2013). As Hodge and Greve (2007) suggest that a good starting point for evaluation might be the specific objectives for the PPP set by the organisations initiating the partnership (p.548). In general, these objectives seem to vary and have changed over time. In the USA, urban regeneration partnerships were often initiated by coalitions of private companies, who believed an urban crisis needed extraordinary action, and decided to mobilize city authorities, universities and non-profit groups to revitalize the city and provide better business environments (Davis 1986). In contrast, the main objective of PFIs have been to provide public infrastructure while getting around restrictions of public sector debt levels, reduce pressure on

public sector budgets and provide better value for money (Vfm) for tax payers (Hodge and Greve 2013). As such, these are rather different objectives and different outcomes may be expected as well.

Evidence to support PPP promises is highly mixed and has concentrated mainly on infrastructure PPPs. In Hodge and Greve's (2007) assessment of the argument and evaluations of these PPP types, they showed firstly, that infrastructure PPPs do not actually reduce pressure on public budgets, but rather move costs into the future, and secondly, that many evaluations of Value for Money (VfM) are methodologically questionable and '*the most optimistic reading of the evidence so far is that it is mixed*' (p.38). Pollitt (2005) argues that a higher percentage of PFIs are now delivered on-time and on-budget, with successful risk transfer and 'considerable design innovation', whereas Shaoul (2005) presents a range of failed PFI projects and general difficulties of getting access to relevant data to evaluate PFIs.

It seems that the popularity of the 'partnership' concept have overcome any harsh critique (Hodge and Greve 2013). The European market for infrastructure PPPs alone peaked in 2007 with approx. EUR 30 billion (EPEC 2011), and despite financial challenges during the financial and economic crisis PPP investments have continued to a level of around EUR 24 billion in 2010 (Connoly and Wall 2013). However, as mentioned in the beginning of the chapter, the enthusiasm for infrastructure PPPs continues to vary across national contexts. PPPs remain '*as much political as they are managerial entities'* (Jefares et al 2013, p.171). The various promises, evaluation and critiques of PPPs may reflect the ambiguity and various meanings applied to the concept (Brinkerhoff and Brinkerhoff 2011). Klijn (2010) suggests that the secret behind the popularity of PPPs might lie exactly in this ambiguity. The various financial and organizational forms attached to PPPs

may exactly allow decision-makers, public and private managers to apply their preferred meaning to the concept. As such, PPPs provide a possibility to connect various actors despite disagreements (Klijn 2010). Whereas the political nature of PPPs is often understated in favour of more technical evaluations, the *second research article* in the dissertation takes the political nature of PPPs into account, describing the 'prominent, but contested role of PPPs' in waste management. The next section will focus more explicitly on innovation as an objective of PPPs.

PPPs and Innovation

As the previous section has shown, innovation may not always be the main objective of PPPs. However, it is an objective that is often implicitly embedded in the idea of PPPs and which is likely to become more prominent in the future. PPPs have been linked both to more innovative outcomes, for instance as design innovation in construction projects, and more generally to encourage 'a more innovative public sector' (Hodge and Greve 2013, p.7). PPPs has also been said to be an innovation in themselves, a 'governance' innovation, that changes not only the outcome or organisation of service delivery, but the whole process of governing services – decision power structures, responsibilities and resources (More and Hartley 2008, Ysa et al 2013).

There has been an increased focus on innovation in the public sector, which compared to the private sector has been perceived as bureaucratic, rule-bound, compromise-seeking, short-term oriented and risk averse, which combined with a lack of competition, would not provide an optimal environment for innovation (Bekkers et al 2011). During the 1980s and 1990s, a number of public management reforms significantly altered the public sector and increased the focus on how various organisations – public, private, civil society – might contribute to solve some of the pressing societal challenges. In the recognition of the limitations

of top down government in dealing with these challenges, researchers have emphasised the need for increased interaction between public and private actors, for example through public-private partnerships (Osborne and Gabler 1993, Rhodes 1996, Mandell and Steelman 2003, Bommert 2010, Sørensen 2010, Sørensen and Torfing 2011).

The idea of PPPs can be connected to two strategies for innovation, which in practice are often mixed. Firstly, PPPs can be connected to the classic New Public Management (NPM) idea of private sector primacy over public sector organisations. Private sector organizations are imagined to be more economically efficient, more innovative, better at adapting to rapid change and faster to adopt best practices and abandon unsuccessful or obsolete activities. By delegating more responsibility to the private sector rather than keeping services delivery and operation in-house, so-called 'steering' rather than 'rowing', the public sector should be getting more value for money (Osborne and Gabler 1992). As Bekkers, Edelenbos and Steijn (2011) phrase it: '*From an NPM perspective, public innovations should be focused on creating a business-like public sector*' (p.11). As such PPPs might be applied as policy instruments to make the public sector more efficient and innovative in line with business logics.

The alternative innovation strategy is that PPPs may connect actors and organizations from various policy perspectives and '*produce greater dynamism through the sharing of ideas, expertise and practice*' (McQuaid 2009). This idea may be linked to the 'shift from government to governance' in public administration, which emphasises the contribution to the governing of society from a wide range of public, private and civil society actors (Rhodes 1996, Bekkers et al 2011). The before-mentioned argument of 'synergy' belongs in this context, where pooling and combining resources, specific expertise and

knowledge from various actors are said to increase the quality and efficiency of solutions and deliver added value (ibid.). Inclusion of various stakeholders in the innovation process is also said to smooth the implementation process, as actors themselves have been involved in the development of the solutions that are to be implemented. In this light, partnerships may bring a more 'transformational' approach to service delivery that do not only focus on efficiency and cost savings, but also on improving service quality for users (Entwistle and Martin 2005).

One of the key arguments in this thesis is the importance achieving clarity over which PPP argument is in play in specific PPP types and empirical examples, as these can be connected to various governing strategies and ideas about how innovation is developed. As we will return to in *chapter 3*, both in the English and the Danish context, partnerships have been linked to ideas of 'modernization' and the development of 'new solutions' (Falconer and McLaughlin 2000, Danish Government 2011). However, despite theoretical and empirical expectations of linkages between PPPs and innovative outcomes, the connection remains diffuse. As the *first article* in this dissertation shows, research-based empirical investigations has been scarce, scattered between various empirical and research fields and shown mixed results. As the PPP literature rarely engages with literature on public sector innovation (an exception being Esteve et al 2012 and Ysa et al 2013), the *first article* will dig into this body of literature in order to provide a more detailed understanding of innovation processes and outcomes in PPPs.

The processual and managerial turn in PPP research

This last section of the chapter on PPPs will describe a 'processual and managerial turn' in PPP research, which has inspired the analytical approach in especially the *third research article*. Whereas much PPP research has focused on describing the various organizational and financial forms of PPP (such as BOT, BTO, DBFO), an

increasing amount of research papers have pointed towards the importance of investigating the processes surrounding PPPs, before or/and after the signing of a contract, and especially how these PPP processes are managed (Osborne and Murray 2000, Fischbacher and Beaumont 2003, Noble and Jones 2006, Ysa 2007, Weihe 2008; 2010, Skelcher 2010, Steijn et al 2011, Gestel et al 2014).

On the basis of an examination of various PPP types in France, Sadran (2004) points towards the importance of managerial effort in designing and achieving good results from PPPs. The paper concludes that although PPPs offer a favourable framework to suit contemporary needs in public policy, "*[g]ood governance, then, is not created by partnership itself: it is the manner in which agents concerned seize it and appropriate it*" (ibid., p.248). In line with this, Hodge, Greve and Boardman (2010) concludes that PPPs do not always lead to synergistic benefits, but may also lead to failures, and that PPPs demand at least as much management as traditional hierarchical or market-based governing mechanisms. Referring to Kettl (1993), they state that '*the strength of governing activities will not diminish when private sector organizations become involved in public infrastructure development. The government activities themselves will just be of a different kind*' (p.595-96).

In contrast to the stated relevance of managerial efforts, several authors have pointed to the lack of empirical investigations of micro-level cooperation and management of PPP processes (Fischbacher and Beaumont 2003, Noble and Jones 2006, Ysa 2007, Skelcher 2010, Weihe 2010). According to Noble and Jones (2006), PPP research has been confined to provide explanations of PPP popularity, discussing PPP outcomes and establishing criteria for PPP success, whereas the micro-management of PPP processes has been overlooked. In line with this, Fischbacher and Beaumont (203) states that: '*One surprising aspect of this [PPP]*

literature is the neglect of key processual aspects of PFI and PPP projects - a criticism which can be made both of academic and policy documents' (p.171). Weihe (2008) suggests that '*future research could appropriately address the character of cooperation beyond the characteristics of the formal contract. At what point is cooperation 'close' and 'trust-based' or 'genuinely collaborative'?*' (p.439).

A number of empirical investigations have begun this explorative journey (Lowndes and Skelcher 1998, Osborne and Murray 2000, Klijn and Teisman 2003, Fischbacher and Beaumont 2003, Teicher et al 2006, Noble and Jones 2006, Reeves 2008, Gestel et al 2014). A starting point for some has been a mapping of the PPP process. For example, Osborne and Murray (2000) analysed the 'collaborative process' in the establishment of a PPP between four voluntary and non-profit organizations (VNPOs), the provincial government and an independent funding organisation in Columbia, Canada, through four stages: 1, the pre-contact phase, 2, the negotiating phase, 3, the implementation phase, and 4, the evaluation phase. The authors highlighted the importance of the pre-contract phase, where the preliminary establishment of trust and respect between the VNPOs laid the ground for collaboration and provided negotiation leverage to these relatively smaller organizations. Similarly, in a case study of infrastructure PPPs in Ireland, Reeves (2008) describes the PPP process in two phases; ex-ante, in terms of the contractual setting and procurement process, and ex-post, in terms of the conduct of partners after the construction phase.

A few studies have focused on 'governance' of PPPs as a means to secure democratic accountability of PPP projects (Skelcher 2010, Hodge 2004). According to Hodge (2004), PPP contracts '*need not only be optimal in the technical sense, but also accompanied by a priority for democratic debate,*

transparency and clarity' (p.47). Although democratic accountability has not been a key focus in this dissertation, this issue touches a main concern in the design and management of PPPs for innovation. As Skelcher (2010) points to, appropriate governance mechanisms may both be way for public authorities to protect public interests despite delegation of authority to private businesses, and work as a constraint on public authorities by '*enabling the private actors to realize the innovative potential that PPPs are intended to promote, by virtue of not being part of the state bureaucracy'* (p.293). As such, governance structures should enable some degree of co-decision and/or 'self-governing' by the private actors involved, but without jeopardizing public interests and clear accountability. This is not an easy balance to strike.

An interesting finding in micro-studies of PPP processes is the repeated tendency and desire of public organizations to 'fall back' on hierarchical governing mechanisms (Teisman and Klijn 2002, Ysa 2007, Reeves 2008). This might be criticized, as governments potentially lose out on the collaborative potential for synergistic effects (Teisman and Klijn 2002). Some studies show that PPPs might change between various forms of governing over time. Ysa (2007) suggests that PPPs may move between three ideal types, 'symbolic' PPPs (hierarchical), 'instrumental' PPPs (market-based) and 'organic' PPPs (network-based), over time, whereas Lowndes and Skelcher (1998) showed different 'modes of governing' in various phases of urban regeneration PPPs. As these studies show, PPPs may not be only hierarchical or collaborative, but can involve several governing mechanisms. However, both studies describe PPPs as moving between phases, 'modes of governing' or 'ideal types', which might lead us to overlook the potential complexity of PPP management. As described in the former section on ambiguity, Reeves (2008) points towards a greater complexity where hierarchical and collaborative elements may co-exist at a given point in time. As such, 'falling

back' to establish some degree of hierarchy in PPP relationships may not completely erode the possibility for synergistic effects or market-based efficiency.

Inspired by this turn towards processual and managerial aspects of PPPs, the *third article* in the dissertation investigates the processes of innovation in four contract-based PPPs from the pre-contract phase to the post-contract phase. In between these two phases, the paper highlights the contract design, which provides an institutional framework for cooperation in the post-contract phase. As Johnston and Gudergan (2007) emphasise, the contract remains the main governing mechanism (in contract-based PPPs), although it's 'incompleteness' makes the PPP dependent on 'actor behaviour' and social relationships (p. 573).

To some degree this approach challenges the message from Steijn, Klijn and Edelenbos (2011), which suggest that organizational form does not matter to PPP outcome, only the intensity of managerial effort. However, this might be a question of definitions. It intuitively makes sense that PPP success is not dependent on the degree of organizational tightness. Steijn, Klijn and Edelenbos compare organizations in projects groups, project organizations and autonomous legal entities, which would probably be used in quite different contexts and for different purposes. However, this thesis suggests that in their admirable effort of highlighting the importance of managerial effort, the authors risk neglecting the likewise importance of specific contract design and partnership organization. Consequently, the thesis aims to bring together 'governing through contracts' and 'governing as more than contracts'. As such, the PhD points towards a managerial model for PPPs encompassing both institutional design and process facilitation embedded in a specific context and history.

Conclusion: Investigating PPPs

With its messianic middle ground slogan of collaboration between public and private organizations, PPPs seems to have taken over the 21 century. However, cooperation between public and private actors is not a new phenomenon, but has roots back to early civilisation. Whereas the current interest in PPPs have mostly directed attention to the PFI-style long-term infrastructure contract, new forms of partnering continue to evolve and challenge the researcher trying to grasp and describe this policy instrument.

The ambiguity of the PPP concept makes a conceptual clarification and demarcation a necessary starting point for analysis. In this dissertation, PPPs are understood broadly as '*cooperative institutional arrangements between public and private sector actors'* (Hodge and Greve 2005). The PhD investigate PPPs between municipalities, also called local authorities, responsible for municipal waste management services (or public companies to whom this task might have been delegated), and private companies taking part in the development and delivery of these services. These PPPs can be more or less formalized and closely knitted and may be based on a contract, joint venture arrangement or a collaborative agreement. As relatively long-term commitments, PPPs will always involve some degree of discretion and thus be more than the wording of a contract or agreement.

Five main points developed from PPP literature will frame the analytical approach in the dissertation:

1) PPPs are situated in a historical, cultural and political context and seems to be changing over time and taking new forms;
2) PPPs have different objectives, which might provide good starting points for evaluation. PPP evaluations show mixed results and might be interpreted

differently according to political attitudes towards the inclusion of private sector actors in service delivery;

3) Although innovation might not always be a main objective for PPPs, it is embedded in the idea of PPPs and likely to become a more prominent argument in the future. In contrast, there is less knowledge on the connection between PPPs and innovation. Two strategies for innovation is often mixed: achieving efficiency from private sector competitiveness and combining resources, knowledge and ideas from various actors to develop better solutions;
4) PPPs can be more or less based on 'genuine partnership' relationships and may be managed through a mix of hierarchical, market-based or networked forms of coordination;
5) The management of the PPP over the whole process from the pre-contract phase, over the contract-design to the management of the contract in the post-contract phase is important for PPP success.

Consequently, the *first article* will review current ideas and empirical evaluation of innovation in PPPs with a focus on three PPP types used in service delivery: Infrastructure PPPs, service PPPs and innovation PPPs. The *second article* will explore the various types of PPPs in waste management and investigate their role in the historical, cultural and political context of the two national cases. The *third article* will investigate four selected innovative, contract-based PPPs that display genuine partnership features, and follow the managerial efforts of the involved public managers throughout the PPP process.

As such, the PhD aims to contribute to PPP research by a) further develop a research-based understanding of innovation in PPPs, b) stress the importance of a processual and managerial perspective on PPPs *as well as* a solid contract design,

c) show that PPPs might not be either contract-based or collaborative, but potentially involve a variety of governing mechanisms, and d) emphasise the neglected influence of the historical, cultural and political context on the role of PPPs in a specific field.

Chapter 3: Public-Private Partnerships in England and Denmark

As a number of international case studies and comparative studies show, the prevalence and organizational form of PPPs varies nationally (see for instance Hodge et al 2010). England and Denmark has had a different PPP history, which only partly seem to be converging. In this short chapter, we will take a closer look at our two cases to investigate the PPP history of Denmark and England, including the various official classifications of PPPs, and a turn in both countries towards seeing PPPs as an approach to societal innovation. As such, this chapter provides an extended background description of the two cases from a PPP perspective and rather elaborated descriptions of some of the PPP types investigated in the articles. For both cases, these classifications may not be representative for the whole range of PPPs, but they do provide a starting point for empirical classifications. This chapter only aims to provide an overview of the most important developments, whereas more elaborate descriptions of the PPP history for England may be found in Falconer and McLaughling (2000), Hellowell (2010) and Connoly and Wall (2013), and for Denmark in Greve (2003), Greve and Mörth (2010) and Petersen (2013).

England

The PPP history of England

As the birthplace of the long-term infrastructure contract, England has used this type of PPP broadly to deliver public infrastructure with private financing in times of pressured public budgets. The idea to the Private Finance Initiative (PFI) contract was developed, when a former environment secretary in Labour visited the USA in 1978 and became inspired by American urban regeneration partnerships. When the Labour government fell in 1979, the idea was taken forward by the Conservatives, who embraced PFIs as a new instrument to include

private sector organizations in the delivery of public infrastructure and services (Falconer and McLaughlin 2000). The Conservative John Major government launched the PFI model in the autumn budget statement in 1992. The main purpose of the programme was to substitute orthodox capital expenditure and thereby release money in the short term and 'hide' capital expenditure from calculations of the UK's national debt. After initial hostility, Labour decided to embrace PFIs and came forward with a critique of the Conservative's 'hands-off' approach to PFI implementation, which led the Conservatives to launch a more interventionist programme in 1995 which became a breakthrough for the PFI model. Whereas only three deals had been signed before this programme, 24 projects were signed between April 1995 and Labours election in May 1997 (Hellowell 2010).

With the Labour party re-entering into power in 1997, the PPP agenda shifted. Labour rebranded PFIs as 'PPP' and as a part of the party's 'Modernization' agenda applied a more pragmatic approach to the inclusion of private actors. Rather than forcing private inclusion in public services, this decision should be taken locally on the basis of a new 'Best Value' regime. In principle, the important matter was not who was delivering public services, but that quality was high for users and projects provided 'value-for-money' (Connoly and Wall 2013). As such, the focus on PFI and private inclusion in service delivery continued, but the rhetoric shifted from being one of downscaling the state in favour of the private sector to being one of' joint working' and 'partnership', with public, private and 'third' sector organizations sharing responsibility for societal developments (Falconer and McLaughling 2000).

PFIs have been criticised for not actually bringing value for money and for shifting the wrong risks to the private sector or not shifting risks at all, but

although the global economic and financial crisis in 2007/8 led to a slowdown in PPP projects due to challenges of achieving private loans, the PFI model is far from dead (Connoly and Wall 2013). By 2009, public authorities and private consortia in the UK had signed 641 PFI contracts with a nominal value to the public sector of £63,8 billion (Hellowell 2010). In 2012, the incoming Conservative led coalition government launched a new PFI programme, the PF2, where the increasingly complicated question of finance was addressed along with other issues to improve the design and management of PFIs (HM Treasury 2012). The UK government continues to have the world's most advanced and supportive PPP/PFI policies and several PPP-support units offering guidelines, financing programs and project approval systems for local authorities (Greve and Hodge 2013b, Verhoest et al 2015).

Partnerships as an approach to innovation in England

From the Conservative government's focus on a streamlining and skimming the public administration through resource constraint and compulsive competitive tendering (CCT), the Labour government changed direction towards community leadership, 'best value' and new political structures with a strong focus on innovation in local governments and services (Newman et al 2001). The overarching 'Modernizing Government' agenda from March 1999 explicitly linked partnership to efforts of societal innovation:

> "Distinctions between services delivered by the public and private sector are breaking down in many areas, opening the way to new ideas, partnerships and opportunities for devising and delivering what the public wants. […] We build on the many strengths in the public sector to equip it with a culture of improvement, innovation and collaborative purpose. […] Some parts of the public service are as efficient, dynamic and effective as anything in the private sector. But others are not. There are numerous reasons for this, and […] to help counter some of these difficulties, the Government is working in

> partnership – partnership with the new, devolved ways of government, and partnership with local authorities, other organisations and other countries."
>
> (CM 1999, p.9-11, referenced from Falconer and McLaughlin 2000)

As such, the government continued the Conservative's focus on learning from the 'innovative' private sector, but rather to assist and strengthen than to minimize the public sector. According to Falconer and McLaughlin, the Labour government displayed '*a highly pragmatic view, acknowledging the need for a flexible system of public sector funding and service provision which makes the best use of what the private, public and voluntary sectors have to offer, through the establishment of various partnership arrangements*' (Falconer and McLaughlin 2000, p. 124). As such, focus has been on including 'stakeholders' as well as actors with relevant knowledge or competences in relation to specific service tasks.

Besides the continuation and improvement of the PFI programme, the PPP umbrella also included 'policy' partnerships to develop specific policies and 'area-based' partnerships competing for funds for local 'regeneration' projects, both including a broader range of public, private and/or voluntary actors, and 'community' or 'user' partnerships between public bodies and service users to develop or provide specific services (Jeffares et al 2013). As such, the Labour government embraced PPPs as a general approach to societal innovation, incorporating a whole range of PPP types. The overview in the next section focuses on partnerships for service delivery in a broad understanding.

Official PPP types in England

The Department for Communities and Local Government (DCLG) has published an oversight of 'service delivery partnerships', which collects descriptions and recommendations from other authorities such as the Office of the Deputy Prime

Minister (ODPM), Partnership UK and 4PS (DCLG 2006). The oversight describes three main forms of public-private partnerships for local authorities: 1) Joint venture companies, 2) Public-private partnering contracts, and 3) PFI and capital investments strategic partnerships (ibid., Jeffares et al 2013).

Joint venture companies are newly established companies co-owned by one or more public and private organizations. The aim of a joint venture is to enable public and private actors to pool assets and resources and work together towards complimentary objectives and optimization of operations. This structure has its own legal identity and may own and deal assets, employ people, enter into contracts, etc. Joint ventures are flexible vehicles that may enable development, investments in assets and service delivery, where authorities may keep the desired level of control through decision processes, as shareholder or through provisions in the legal documents. Usually, the public authority will have a minority share of the company and a contract with the company to provide services, but the company may also be shared 50-50 or be authority controlled. The contract needs to be procured through public procurement mechanisms, but the company need not necessarily. *Joint ventures* may also be contract-based, rather than being established as companies. (DCLG 2006, p.41ff)

Public-private partnering contracts are contracts between a local authority and a partner that envisage a more collaborative relationship than traditional outsourcing contracts. These contracts may be used either for strategic/management advice, be largely operational or something in between. Partnering contracts usually include: 1) a less adversarial approach to disputes, 2) the possibility of redefining operations and costs as circumstances may change over time, 3) a collaborative approach to contract reading emphasising the 'spirit of intention', 4) sharing of gains and risks, and 5) an open book approach to accounting. Services in a

partnering contract may be developed either initially as a 'big bang' or incrementally in the contract period, but the changes need to be advertised in the procurement material. DCLG suggests that the contract should be performance based with the payment made dependent on the achievements towards performance targets. As such, a partnering contract may be a less complex way of achieving joint working compared to a joint venture. The contract may also include a joint venture intermediary between authority and contractor (ibid., p. 101ff).

In the DCLG guide, *PFIs* are categorized as outsourcing arrangements, and more specifically 'capital outsourcing'. These arrangements usually involve the outsourcing of design, build, finance and operations to a private sector provider for a contract period of about 25-30 years. As such, a public authority, either alone or through 'joint commissioning' with other public authorities, procures investments in assets and services related to these. The aim of PFIs is to achieve access to private expertise and funding and transfer considerable risk to the private partner in this process. The private partner will often be a special purpose vehicle set up as a consortium of investors/ service providers, which then sub-contracts the actual construction/refurbishment and service delivery to other companies. In some cases, the authority may also choose to be a part of the special purpose vehicle to be closer involved in service delivery (ibid., p.142ff).

In general, payments are not started before the commencement of service delivery, where after they are dependent on the performance of assets and services. The assets are usually financed through a mixture of debt finance (loans) and equity finance (company investments) (ibid.), and if sufficient risks are transferred to the private vehicle, government regulation dictates that the investment will not score

against an authorities capital spending limits. Public authority funding of the project is usually supported by central government funds.

Capital Investment Strategic Partnerships are more complex variations of capital outsourcing with the aim to deliver a stream of investments and services in specific local areas, for example via a national strategic joint venture that enters into 'sub'-joint ventures with local stakeholders and a private company (p.163ff). Table 2 provides an overview of the three PPP types.

Table 2: PPP types in England

	Structure	**Aim**	**Contract length**
Joint venture company	An established company co-owned by the public authority and private company. May also be contract-based.	To enable joint working and pooling of assets and resources to pursuit complimentary objectives	Long term commitment that may entail serial contracts with the authority
Public-private partnering contract	A 'collaborative' contract between public authority and private company for strategic development or service delivery	To enable joint working and flexibility for service improvements based on a more collaborative and less adversarial approach to contracting	Medium to long term (7-12 years or longer)
PFI/ Capital Investment Strategic Partnership	A contract between one or more public authorities with a private provider for the design, build,	To achieve finance, expertise and risk sharing from private sector actors	Long term (25-30 years)

	finance and operations of assets and delivery of services related to these		

Source: DCLG 2006, Jeffares et al 2013

In relation to the discussions in the former chapter, it is interesting that PFIs here are defined as 'outsourcing' rather than partnering contracts. The guide directly states as a disadvantage that PFIs are '*rather inflexible to secure the best value duty of continuing improvements*' and are '*used merely as a funding mechanism rather than a partnering arrangement*' (ibid., p.155). The PF2 addressed these challenges to some degree. The government aimed at improving flexibility and partnership in PF2's by for example removing 'soft services' (cleaning, catering etc.) from future contracts and making other services voluntary to a fixed price. They also introduced more appropriate risk sharing, 'open book' accounting and sharing of surplus lifecycle funding (HM treasury 2012). Some of these challenges and new ideas are also evident in a number of the waste management PPPs investigated and may provide reason to discuss if PFIs may (in some cases) involve 'genuine' partnership.

Denmark

The PPP history of Denmark

In Denmark, the PPP term has been linked closely to the British PFI contract. In Danish PPP vocabulary, the PPP term is specifically reserved for this type of partnership, whereas other PPP types are referred to as for instance 'service partnership', 'partnering' or 'innovation partnership' (Udbudsportalen/LGDK 2010). In the 1990s, the Danish Social Democrat government began to show interest in the UK PFI model, and PPPs were mentioned for the first time in a Finance Ministry report from 1999. It was expected that the new Liberal-

Conservative government elected in 2001 would increase focus on PPPs, but this far from happened. The new government continued the NPM-inspired modernization agenda and focused on contracting out and consumer choice, but remained sceptical towards PPPs (Greve and Mörth 2010). When eventually a PPP report was launched in 2004, it only suggested a bundle of spread initiatives and proposals and suggested seven pilot projects to be 'tested for PPP relevance'. By 2011, only one of these projects, the Danish National Archive, had been signed (Petersen 2011).

Some of this scepticism was grounded in local experiences with public-private cooperation in the 1990s. A regional hospital in the area of Frederiksborg tried for some time to establish a PPP for a hospital, but did not get enough bidders. Farum municipality, who was known to be a frontrunner 'contracting out'- municipality, began to experience with sale-and-lease back arrangements, but an attempt by the city council to involve private companies in the construction of a new indoor arena and the rebuild of the local football stadium ended in a tremendous failure. A case of mismanagement eventually led to the imprisonment of the former Mayor of Farum. As such, especially the Farum case was not exactly an inspiration for further experimentation with new organizational forms to include private actors. Even though private sector organizations have pushed for PPPs and the national pension fund ATP for example offered to co-finance a renovation of the Danish rail tracks through PPP, the liberal government remained reluctant and doubted the financial benefits of PPPs (Greve and Mörth 2010).

The government delegated the day-to day responsibility for PPPs to a smaller government agency, the National Agency for Enterprise and Construction, which focused on providing tools and guidelines for PPP projects and established a PPP network for public and private organizations engaged in the area. Amogst other

things this resulted in the development of a Danish PPP contract model and a Danish version of a 'Public Sector Comparator' (PSC) (Greve and Mörth 2010). By 2012, 14 Danish PPP projects and 15 projected projects were identified in a government evaluation report which also reported positive evaluations from participants (KFST 2012). In 2014, the 'Productivity Commission' emphasized the innovative potential of PPPs and suggested that Danish competences should be gathered in a central PPP unit as in the UK. The report also stressed that Danish authorities should focus more on total project costs, rather than being caught in the short-term argument of cheaper public loans, which has dominated the Danish PPP debate so far (Produktivitetskommissionen 2014). It remains to be seen, whether this will move the Danish PPP agenda.

The relative absence of PPPs in a Danish context might be considered curious, as cooperative arrangements with the private sector have deep roots in the Danish corporatist tradition and consensus-orientated society. As Greve and Mörth (2010) suggest, an answer might be that the Danish tradition for cooperation is based on hierarchy and informal relations, whereas the PFI-style PPPs are formal, contract-based arrangements between equal partners. Whereas PFI-style PPPs are closely linked to the idea of NPM and the primacy of the private sector, the corporatist tradition is based on a strong state and participatory democracy. As such, although both are cooperative arrangements, the approaches to cooperation might clash (Greve and Mörth 2010). Furthermore, as Petersen (2011) concludes, "*Denmark's strong public finances and well-built infrastructure made private finance through the PPP model largely redundant*" (p.25). As such, another reason why PFI-style infrastructure partnerships have not gained too much prominence in Denmark might be that there has been no 'burning platform' under the Danish tradition for publicly financed infrastructure. This is also reflected in waste management,

where the majority of incinerators have been financed through public interest companies.

Partnerships as an approach to innovation in Denmark

In line with the Labour government, the incoming Social Democratic led coalition government entering into power in 2011 has signalled a broader and perhaps more collaborative approach to contracting out, for example by replacing the council for 'outsourcing' with a council for 'public-private cooperation' in 2013 (rops.dk 2013). The Government programme from 2011, explicitly emphasises a partnership approach to societal reform. The title of the programme, 'A United Denmark' in itself strongly signals collaboration. The programme displays a broad partnership concept linking partnership to objectives of 'modernization', development of 'new solutions', the combination of economic growth with 'a green transformation':

> "We need to modernize Denmark. This demands comprehensive and new-thinking reforms created in partnerships breaking down traditional boundaries. Each and every one of us can contribute."
>
> "The Danish society shall be good and efficient. A society, which uses human and natural resources in a sustainable and cost-efficient manner. The government's growth initiatives and economic policy shall go hand in hand with a long-term comprehensive green transformation of Denmark. There is a need for new solutions. And they shall be developed through dialogue, partnerships and broad cooperation."
>
> (Danish Government 2011, p. 7-8)

The programme also launched a pragmatic approach to the inclusion of private sector actors, and emphasised the opportunities in cooperation and mutual learning:

> "It is time to see pragmatically on the boundaries between public and private. The public sector and private companies should cooperate and learn from each other. This is simply

most efficient, and it may provide new opportunities for growth and new jobs. Partnership between public and private may open new possibilities to commercialize developed solutions." (Danish Government 2011, p. 7-8, 24)

The programme only briefly mentions infrastructure partnerships promising (only) an analysis of economic benefits of infrastructure PPPs (p.14). Instead, the programme suggest several broader partnerships, such as a partnership on public schools where involved actors (pupils, parents, teachers, school leaders etc.) would obligate each other on ambitious demands and specific targets areas' (ibid., p.17). This would be *'(a) partnership, where ideological trademark issues give way for mutual respect, and where the schools' stakeholders are working together*' (ibid.). As such, although this approach does not delegate much attention to contract-based PPPs, it does link broader approach of partnership working to societal innovation.

Official PPP types in Denmark

A guide from the government organization 'Udbudsportalen' lists four PPP types: 1) Partnering and service partnerships, 2) Public-private company, 3) OPP/'OPP' light (PPP/PPP light), 4) Public-private innovation (OPI). This categorization relates to the different phases in a public project (Udbudsportalen/LGDK 2010).Table 3 provides a model to show how various PPP types are related to various phases, from the development to design, construction, maintenance, operation and finance.

Table 3: PPP types in Denmark, related to various phases

<table>
<tr><th>Development</th><th>Design</th><th>Construction</th><th>Maintenance</th><th>Operation</th><th>Finance</th></tr>
<tr><td rowspan="4"></td><td colspan="2">Traditional outsourcing</td><td colspan="2">Traditional outsourcing</td><td rowspan="3"></td></tr>
<tr><td colspan="2">Partnering</td><td colspan="2">Service Partnership</td></tr>
<tr><td colspan="4">Public-private partnership light (OPP light)</td></tr>
<tr><td colspan="5">Public-private partnership (OPP)</td></tr>
<tr><td>Public-private innovation</td><td></td><td></td><td colspan="3">Public-private company</td></tr>
</table>

Source: Udbudsportalen/LGDK (2010), p.4

Partnering expresses a more flexible and collaborative type of public-private cooperation in design and construction. The partnering agreement is a supplement to a traditional outsourcing contract, which outline a number of joint principles for the cooperation and as such relates to the form of cooperation, rather than describing the specific tasks. The aim of this cooperation is to develop a constructive relationship between the municipality, advisors and the entrepreneur, where they jointly may find the best solutions for this specific project (ibid., p.10f).

S*ervice partnerships* are similar contract types focusing on operation and service tasks. The aim of these partnerships is to include the private partner in delivery, development and improvement of efficiency in public services. As such, the partnership may include a range of similar or connected tasks to provide the possibility of prioritization and integration of service tasks. The partnership agreement builds on an open specification of tasks to enable joint development of objectives and methods, an economic model that incentivize gradual improvements in the contract period and principles of mutual trust, common values and the wish to learn together. The length of these contract types is typically 4-6 years (ibid., p.10).

Public-private companies are regulated by law no. 548 of 8 June 2006, which enables public authorities to establish a mixed company with one or more private companies to marketize and sell public know-how and at the same time deliver public services. As such, it is a demand that the developed products and services build on knowledge that is developed within the public sector, and the task may not have been contracted out before. The aim of these partnerships is to achieve synergies from the combination of public and private knowledge and resources and potentially develop new markets for these products. The public authority may outsource the company and operations jointly or establish the company and then bid on the operation along with other bidders (ibid., p.13). The public authority may not have the majority of influence in the company, and if turnover to the private sector exceeds 50% in a three year period, the public authority is obliged to privatize the company (L548 2006).The length of the contract may be around 5-8 years or longer dependent on the development perspectives in the project (Udbudsportalen/KL, p.13).

'Public-private partnerships', or 'OPP', is the joint outsourcing of design, construction, maintenance, operation and finance of a public construction project. In line with the English PFI, the aim is to improve the total economy of the project by delegating risk to the private contractor, including finance and ownership of the facility. The private company is paid through a serial of payments over the length of the contract, where after the facility will usually be taken over by the public authority. Functional or output specifications along with an economic incentive model should increase the possibility of innovative and more efficient solutions from the private contractor. In Denmark, OPP projects are covered by a rule of obligatory depositing of a sum that equals the private investment, which lessen the

economic advantage of private funding, but it is possible to apply for exemption. The length of the contract is typically around 30 years (ibid., p.18-19).

'Public-private partnership light', or 'OPP light', is basically a public-private partnership with public finance.

Public-private innovation, or 'OPI', is a relatively new form of public-private cooperation, where focus is on the development and innovation of public services. The idea is to achieve mutual gains for the public and private actors involved, where the public authority get access to new technology and knowledge, whereas private companies get new information of user needs, which might be used to develop new products either within the project or in the future. As such, these partnerships are based on the idea of synergies from the combination of specific knowledge and competences from public and private actors. Rather than delivering a specific facility or service to a public authority, the private actor participates on equal footing to develop solutions to jointly formulated challenges. OPI projects are not necessarily based on formal contract, and when they are, these are generally very openly formulated as it is not possible to describe the end result. According to this guide, these co-operations tend to be more long term (ibid. p.21-22). However, for example the example of an innovation partnership in this project was less than a year, so this is obviously not always the case. Table 4 summarizes the various PPP types described in Denmark.

Table 4: PPP types in Denmark

PPP types	Structure	Aim	Contract length
Partnering (a) and Service Partnerships (b)	A flexible and collaborative contract between a public authority and private company for either a) design and construction or b) operation and service. The contract is usually supplemented by a 'partnership agreement'.	To a) develop a constructive relationship between the municipality, advisors and entrepreneur to jointly develop the best solutions, or b) include the private partner in delivery, development and improvement of efficiency in public services	Middle length (4-6 years)
Public-Private Company	A mixed company between one or more public authorities and private companies	To achieve synergies from the combination of public and private knowledge and resources and potentially develop new markets based on public know-how	Middle to Long term (5-8 years or longer)
OPP/ OPP light	A contract between a public authority and a private company for the design, construction, operation and finance of a construction project. OPP light	To improve the total economy of the project by delegating risk to the private contractor and achieve more innovative and efficient solutions	Long term (30 years)

	does not include private finance.	through private sector input	
Public-Private Innovation	A contract or 'agreement' between a public and a private company to jointly develop an innovative solution to a public challenge	To achieve mutual gains, where the public authority get access new technology and knowledge, and the private company get information on user needs and potential new markets	Varies, not necessarily a formal contract

Source: Udbudsportalen/LGDK (2010)

The classification of these different partnership types may provide an overview of some of the most used forms of formal public-private cooperation and the structure according to the task of the partnerships is very straightforward logical. However, it may also lead to some confusion on the PPP vocabulary. Especially the attachment of the 'OPP' (PPP) label to construction projects is rather unpractical, as public-private partnerships are actually an umbrella concept that is able to include all these different types of cooperation. As such, the PPP term is reserved for the PPP type that is perhaps most questionable a genuine PPP. In line with the English categorization of PFI, It is also striking that this type of partnership is only described as an economic cooperation to improve total costs and risk sharing, where compared to for example 'service partnerships' the relationship between public and private partners is not mentioned at all.

Furthermore, the categorization may be criticised for focusing narrowly on economically based cooperation, especially recalling the current government's own broader approach to partnership. As Højlund (2014) explains, the Danish

categorization is based on the degree of economic involvement, range and temporal commitment in a classic economic line of thought, where partnership is based on interests. Højlund suggests that PPPs may also be based on values, which may be a more solid commitment ground for flexible and innovative partnerships, where objectives, organisation and governing may evolve over time. This is mirrored in waste management, where the approach in the government strategy overwhelmingly relies on broader stakeholder partnerships to develop specific new solutions. In these partnerships, not only interests, but also values may play a role to push new solutions forward.

Comparing the English and Danish approach to PPPs, the Danish approach may include more 'partnership types, but seems a little narrow and inflexible compared to the more rich variations of partnership working in England. In England, for example, a strategic partnership for development may frame a range of smaller local partnerships on infrastructure investment and services. The joint venture company in an English context also seem to be much less restricted than the Danish L548 companies, which extent the possibilities for English authorities to enter into this most integrated form of cooperation compared to the possibilities for this in Denmark. The partnership types do however suggest some degree of convergence; Danish service partnerships might be compared to English partnering contracts, PFI to OPP and Joint ventures to L548 companies. The English categorization does not include an innovation partnership, but innovation is an explicit part of especially partnering contracts and capital investment strategic partnerships.

This last-mentioned difference may be quite interesting as it might express a difference between Danish and English local authorities in the way public services are developed either through specific innovation projects or as a part of service

delivery. The Danish model of innovation partnerships have recently been formalized in the new EU procedure for 'innovation partnerships' in the revised EU public procurement directive (EC 2014b). Danish municipalities seem to have been frontrunners in adopting this practice in line with the increased focus on innovating public services. The absence of such innovation partnerships in the English classification may be related to the lack of resources for such projects in this context, where local authorities are met by continuous economic cut-downs requiring them to strip down services to the most basic level.

Conclusions: The PPP context in England and Denmark

This chapter has provided an overview of the context of PPP policy and practice in the two cases, England and Denmark. As the previous chapter suggested, this historical, cultural and political context might be important to understand the role of PPPs in waste management. The historic development of PPP policies and practices has been remarkably different in the two cases, but has to some degree been converging resulting in broadly comparable PPP types.

England invented the PFI-style PPP, which was implemented by the Conservative government in 1992 and continued under the Labour government from 1997 and onwards. Labour changed the strong NPM focus on down-scaling the state in favour of the private sector, towards a more pragmatic view on private inclusion as an option for 'Best Value'. With their Modernization agenda, Labour emphasised a broad umbrella of PPPs as an approach to new possibilities of improvement and innovation in public services.

In contrast, PFI-style PPPs was first considered by the social democrat government in Denmark inspired by the UK experiences, followed by a number of liberal-conservative governments displaying a rather reluctant attitude towards

PPPs. The Danish scepticism may be explained by the differences between the Danish and UK approaches to public-private cooperation. The Danish tradition involves a more hierarchical, state-based and informal approach to cooperation compared to the formal, contract-based relationships in UK PFIs, and further, Danish municipalities have had enough resources to continue the practice of authority funding of infrastructure. However, also in Denmark, PPPs have been connected to efforts of innovating society, only based on a broader and more networked approach to PPPs.

In England three main types of PPPs are identified: 1) Joint venture companies, 2) Public-private partnering contracts and 3) PFIs/Strategic Capital Investment Partnerships with some variation in the organization of the various types. These PPP types are broadly reflected in the Danish government guide displaying four PPP types: 1) Partnering and service partnership, 2) Public-private company, 3) OPP/OPP light (PPP), 4) Public-private innovation (OPI). Although the descriptions of the English PPP types seems more flexible and show more variation in organizational form, these PPP types are broadly comparable with the exception of the Danish OPI partnership.

Accordingly, in *article 2*, the role of PPPs in waste management will be analysed within these historic, cultural and political contexts. Obviously, these varied historic backgrounds suggest that PFI style PPPs would play a bigger role in the UK case, whereas Danish waste authorities might have adopted the general Danish scepticism towards these, but on the other hand might emphasise more networked types of PPPs and OPI. The PPP types identified here have been used as a starting point for the categorization of waste management PPPs in the articles. In the *first research article*, infrastructure partnerships, service partnerships and innovation partnerships corresponds to the English PFI and 'partnering contracts' and Danish

OPP/Public-Private Company, service partnership and innovation partnerships. In *the second article*, service delivery partnerships correspond to the PFI/OPP/Public-Private Company whereas policy and technology partnerships do not correspond directly to these categorizations (although these may to some degree be compared to 'innovation partnerships' as they often focus directly on conducting innovation). In *the third article,* a UK partnering contract and a Danish service partnership contract have been selected as examples of service PPPs, whereas an English PFI contract and a Danish public-private company (including an innovation partnership) have been selected as examples of infrastructure PPPs.

Chapter 4: The Public Management of Waste

This chapter introduces the empirical field of waste management. The first section discusses the various meanings of waste and how these frame the management of waste, illustrated by examples of developments in England and Denmark. Thereby, this section also serves as an introduction to waste management in these two contexts. The second section outlines the consequences of these changes for municipal waste managers, who are met by new managerial challenges in the governing of complex, socio-technical waste systems. The third section discusses how these challenges may lead to an emphasis on PPPs as policy instruments for innovation and sustainability transformation, where the following section will describe empirical investigation of waste management PPPs in existing literature. The last section wraps up the chapter by proposing waste management as a most relevant subject of public administration and public management research, where this empirical field has been largely absent.

A number of articles have shown the fast changing English waste management policies and practices from landfilling to towards energy recovery and recycling (Adams et al 2000, Davoudi 2000, Burnley 2001, Davoudi and Evans 2005, Weaver 2005, Bulkeley et al 2005), and a few investigations of waste management in England have also mentioned PPPs (Entwistle 1999, Bulkeley et al 2007, Slater et al 2007, Uyarra and Gee 2012). In contrast, there is hardly any research-based investigations of the organisation and transformation of Danish waste management systems (although see Grønnegård Christensen 2001, Busck 2007, Federspiel 2011) and as such there might be a specific need for describing these processes in Denmark.

What is waste?

"*Waste is no longer a disturbing by-product of consumption that waste producers pay to have removed. It has become an object of both desire and avoidance, open for political determination and everyday attention.*" (Corvellec and Hultman 2013, p.143)

As *chapter 1* showed, waste may be defined legally as: '*any substance or object which the holder discards or intends to discard*' (EC 2008, Article 3, 1). As the citation above points to, however, the meaning applied to the concept of waste has changed over time, which has also brought new attention to the management of waste. In the following we will look at four different meanings of waste: 1) waste as a problem, 2) waste as a market, 3) waste as a resource, and 4) waste as non-waste. These four approaches to waste co-exist in a layered reality of meaning, which frames waste management today and provide new challenges for municipal waste managers.

Waste as a problem

Waste has traditionally been considered as a societal problem related to spatial, health and environmental issues relating to the generation and management of waste. In the EU alone, approximately 2,5 billion tons of waste is produced per year. In many low and middle income countries, waste management is the single largest budget expenditure; however, not dealing with waste in a proper manner tends to be even more expensive and have serious damaging effects on the environment (Hoornweg and Bhada-Tata 2012).

Although we talk about 'throwing away' waste, ultimately there is no 'away' (ibid.). Throwing waste at un-controlled dumpsters may lead to several problems such as downward peculation of waste substance to groundwater reserves, soil

contamination and emission of greenhouse gasses (GHGs) from natural processing of organic waste (Christensen and Kjeldsen 1998). Waste Incineration solves some of the pollution and spatial issues of waste dumps, but the incineration process may produce air polluting gasses and a leftover by-product that needs to be dealt with, although techniques have been improved over time as environmental awareness and regulative demands have increased (Kleis and Dalager 2003). The benefit of incineration is also that it may be used for energy and heat production and thereby replacing other less sustainable sources, such as oil or gas. Likewise, methods of mechanical sorting and preparation for reuse and recycling may reduce energy use for new products, although these processes also involve energy consumption. Furthermore, transporting waste may lead to both energy consumption and emission of GHGs (White et al 1995). As such, new waste solutions may lead to new challenges.

In Denmark, the first waste regulation was developed following the cholera epidemics in the capital city of Copenhagen in the mid 1850'ies, which directed attention to the health hazards of the practice of throwing garbage in the streets. In the beginning, waste was collected and gathered in dumps at the city outskirts, but spatial and health issues from crammed dumpsters led to a search for new solutions. After inspiration from England and Germany, the first incineration plant was established at Frederiksberg in 1903, and the technology was diffused across the country in the 1960-70s following the economic up rise after two world wars (Funch et al 1995). The growing environmental awareness in this period also led to an increasing concern for the environmental consequences of incineration, and the technology was improved along with the introduction of more restricted environmental regulation in the 1970-80s (Kleis and Dalager 2003, Odgaard 2011). From the beginning of the 1990s, the output from waste incineration in terms of heat and energy was integrated with the district heating system (Kleis and

Dalager 2003), and today almost 20% of district heating and 5% of national energy consumption is delivered by waste incineration plants (DME 2013B).

Since then, incineration has been broadly accepted in the Danish population as an efficient and less environmental damaging way of managing waste, which brings less expensive heat and energy to Danish households through district heating systems (DME 2013a). In the 1980s, incineration was supplemented by the first recycling stations (Funch 1995), and in 1992, the first national waste plan introduced targets for recycling, incineration and landfilling. Between 1985 and 1997, landfilling of municipal waste was reduced from 61% to 12% and following to 1,5% by 2013 (EPA 2014a).

In England, the first real regulation of waste was the Control of Pollution Act in 1974, which delegated responsibility for waste management to local authorities (Slater et al 2007). For decades, waste was not really considered a problem. Early practices of incineration and kerbside recycling programmes in urban areas diminished in the 1930s to be replaced by landfilling, which was perceived as a cheaper and more efficient way of dealing with waste and at the same time 'filling holes in the ground' from the mineral extraction industry. The 1970s focus on sustainability led to some political scrutiny, and environmental concerns began to influence the predominantly economical and technical discourse on waste management. This coincided with emerging local challenges of finding new areas for landfilling, as the extraction industry retracted and a newly established Environmental Agency from 1996 was delegated regulatory responsibility for waste management and began to impose stricter regulatory environmental criteria for landfills (Davoudi 2000; 2009).

However, concerns of environmental protection did not have a strong impact in England, before new EU regulation applied pressure on the government to look for new collection and treatment methods (Weaver 2005, Bulkeley et al 2007). The EU regulation was implemented with the 'Waste Strategy 2000' (DETR), which for the first time introduced specific targets for recycling in England (Bulkeley et al 2005). In England, the introduction of incineration as well as other forms of recovery such as Mechanical-Biological Treatment (MBT) has been accompanied with the challenge of finding outlets. The 73 incineration plants in England deliver energy to the national grit, but only five of these with combined heat and power (CHP) (Sheffield, Nottingham, Coventry, Grimsby, Slough) (DEFRA 2013a). By 2013, England recycled 43% of municipal waste[2], incinerated 24% and had decreased landfilling to 31% following one of the fastest transformations of waste management systems in Europe (DEFRA 2014, EEA 2013a).

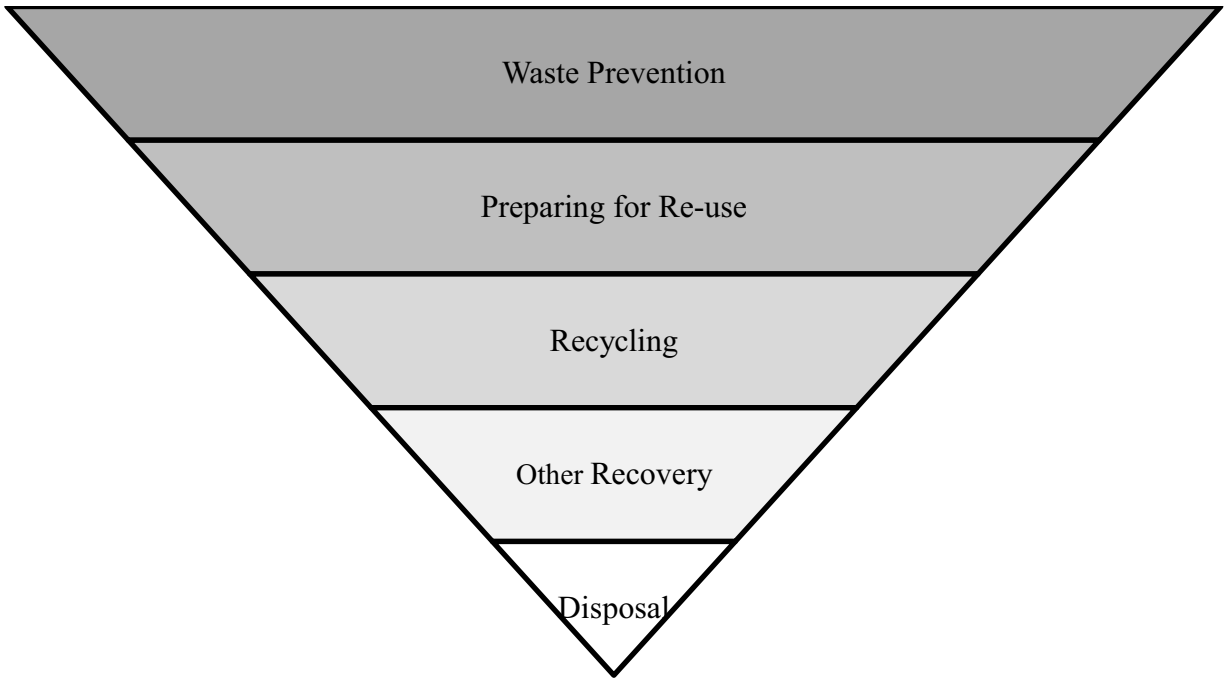
As the case of England shows, the EU has for many member states played an important role in the formulation of the waste problem and the regulation and transformation of waste management towards more sustainable solutions (Campos and Hall 2013). The revised Waste Framework Directive (WFD) determines the objective of EU waste regulation as: "*to minimise the negative effects from the generation and management of waste on human health and the environment. Waste policy should also aim at reducing the use of resources, and favour the practical implementation of the waste hierarchy*" (EC 2008, preamble, Odgaard 2011).

As such, EU regulation is based on the perception of environmental pollution and health issues from waste being a cross-European issue. The waste hierarchy adopted in the WFD as '*a priority order in waste prevention and management*

[2] Here defined as Local Authority Collected Waste (LACW).

legislation and policy' has been a strong narrative for sustainable waste management. The hierarchy ranks five options according to environmental impact from 1) prevention of waste, 2) preparing for re-use, 3) recycling, and 4) recovery with 5) disposal (landfilling) as the least favoured option (ibid., Article 4). As Figure 2 illustrates, the waste hierarchy is often depicted as a triangle.

Figure 2: The European Waste Hierarchy



Source: EC 2008

The waste hierarchy has been implemented in Danish and English legislation and has along with binding targets for an upwards development in the hierarchy applied an increasing pressure for sustainability transformation of waste management practices. In line with the waste hierarchy, the WFD established specific targets for the management of municipal waste: 1) separate collection of at least paper, metal, plastics, and glass by 2015, and 2) reuse or recycling of at least 50% of household waste by 2020 (ibid.). These targets supplement the landfill directive targets of diverting the amount of biodegradable waste going to

landfill to 75% by 2010, 50% by 2013 and 35% by2020 in amounts compared to 1995 levels (EC 1999).

Table 5 shows the EU 2020 targets compared to the current levels of recycling of municipal waste in the EU, United Kingdom, England and Denmark. As the table show, neither Denmark nor England has yet reached the recycling target of 50% by 2020, whereas Denmark is far below the targets for landfilling (EEA 2013b). England is to achieve the EU targets within the United Kingdom (UK) (including also Scotland, Wales and Northern Ireland), where recycling collectively has slightly superseded the Danish percentage. The UK was given a four year derogation period from the landfill targets, but achieved the 2013 target on 50% diversion from landfilling by 2009 and is heading towards the 35% by 2020 target (EEA 2013c).

Table 5: Targets and treatment of municipal solid waste in the EU, UK, England and Denmark, 2012

	Landfilling	Incineration	Recycling and reuse, incl. composting
EU 2020 target	(35% of 1995 level)	-	50%
EU in total	34%	24%	42%
United Kingdom	37%	17%	46%
England	31%	24%	43%
Denmark	1,5%	54%	44%

Source: EC 1999, EC 2008, Eurostat 2014, EPA 2014a, DEFRA 2014

However, the numbers in this table may not be completely comparable, as Denmark and England use various definitions of municipal waste. This is a general problem in the EU, where municipal waste may be calculated differently across member states thus making it difficult to account for and compare the waste

problem. In England, the definition of municipal waste has recently been aligned to the EU's recommendations. From 2010, England's definition of municipal waste was changed to include business waste, also including waste not collected by the municipality. Internally though, England continues to use the previous definition, which they now refer to as Local Authority Collected Waste (LACW). LACW refers to all waste types collected by local authorities, including commercial and industrial waste (DEFRA 2011). To be able to show the historical development of waste management, the thesis uses data for LACW (see also *article 2*).

In Denmark, municipal waste covers all waste collected from households by municipalities or similar waste collected by municipalities from institutions, businesses and offices. A regulative change in 2010, where recycled industry waste was no longer allowed to be collected by municipalities, and thus was removed from municipal waste statistics, led to a decrease in recycling from 49% in 2009 to 42% in 2010. On top of this, a shift to a new waste data system by 2010 has resulted in some irregularities, as for example 6-700,000 tonnes of waste from recycle stations were not reported correctly (EPA 2013). These technical issues significantly increase the distance to the 50% by 2020 EU target.

Adding to this, the Danish government has chosen to calculate recycling og household waste only from certain types of household waste (organic waste, paper, plastics, glass, wood and metal). Accordingly the household recycling percentage reported from the ministry in the new waste strategy was only 22% (Danish Government 2013). The strategy sets the target of recycling 50% of these waste types from households by 2022 (compared to a total of residual waste, bulky waste and recyclable waste types from household waste) (ibid.). This may confuse the debate on recycling in Denmark, where the 22% is often compared to the EU

50% recycling target for municipal waste (see for example Politiken 2014). However, in EU terms Denmark is not less than half way to the 2020 target, but less than 5% from this, which is quite a difference.

In the following Danish 'Resource Plan', the government announced that they would from now on report municipal waste targets according to these specified household waste types as a percentage of potential 'recyclable household waste' (the last part as directed by the EU Commission). Since these new calculations are rather confusing and hard to compare to both other countries and national past performance, the dissertation we will keep to the 'old' data sets for municipal waste. Because of the challenges in data collection systems, the newest adjusted number have been acquired directly from the environmental Protection Agency (see EPA 2014a). If the government keeps to this new calculation method, it will mean that Danish municipalities will be very challenged in meeting these targets.

Waste as a market

Although the EU regulation of waste may have been developed mainly to minimise the negative effects of waste on the environment and human health, the harmonization of waste management also earned a different purpose: to develop a cross-European market for waste management services (Basse 1995). However, it is not necessarily obvious to see waste as a market good. As a by-product of production and consumption, waste has traditionally been perceived as an externality, a market failure, which the public sector needed to take care of for the common good. Although profits and recycling targets may increasingly go hand in hand, it might not be without problems to marketize waste products and services.

Public managers may engage with various waste markets to deliver waste management services to citizens: an *'input' market*, where waste materials are

secured, a *'retail' market* for collection and transport services, a *'processing' market* for waste treatment and disposal, a *'technology' market* for various treatment technologies, vehicles and other equipment and a commercial *'output' market* for recycled or otherwise processed products (Corvellec and Bramryd 2012, Cruz et al 2013). The main focus in this PhD has been on the 'retail' and 'processing' markets, although these are obviously affected by and linked to other markets.

In most European countries, collection and treatment of waste have traditionally been provided in-house by local authorities. The marketization of waste management services started to take of in the 1980-1990s in line with the New Public Management (NPM) ideas and reforms of this period. The evidence of local authority reasons for contracting out is mixed, but most studies show that these are mainly found in more pragmatic considerations of cost concerns and budgetary restraints, rather than political ideology (Hirsch 1995, Dijkgraaf et al 2008, Bel and Fageda 2010, Simoes et al 2012). This might vary across national and local contexts.

In the 1970s, a number of empirical studies argued that waste collection would be a good case for contracting out with prominent efficiency savings for local authorities (Savas 1977, Bennet and Johnson 1979). As a relatively simple, low-tech public service, waste collection was considered an activity that was easy to specify and monitor, had low entrance costs and provided good potential for efficiencies through economies of scale (Domberger et al. 1986, Walls 1995). A study of some of the early waste collection contracts in England showed that contracting to private companies had reduced costs with about 22%, but also that competitive tenders awarded to in-house providers shared almost the same level of

cost reduction, thus suggesting that competition rather than ownership makes the difference (Domberger et al 1986).

In contrast, researchers returning to this subject 30 years later found more mixed evidence. In line with previous research, Dijkgraaf and Gradus (2008c) calculated cost savings of 15-20% in the Netherlands, whereas Simoes et al (2012) suggested that the extra private productivity from contracting out seemed to decrease over time as a monopoly was established in the contract period. Ohlson (2008) calculated public production costs to be 6% *lower* than private production costs in a case study from Sweden. According to these newer studies, cost savings relating to contracting out may vary depending on for example the maturity of the market and historical relationships with private investors (Dijkgraaf and Gradus 2008d, Simoes et al 2012).

In contrast to waste 'retail' markets', waste 'processing' markets are generally considered entailing more market failures. The high asset specificity of waste infrastructure combined with the insecurity of long-term investments leads authorities to enter into 'bilateral monopolies', where they direct a pre-agreed amount of waste to a treatment facility in a longer time period (Cruz et al 2013). According to Cruz et al (2013), contracts in waste treatment tend to be longer than in waste collection, and *whereas traditional outsourcing tends to dominate retail markets, various forms of cooperation in public companies or PPPs are generally more used in processing markets*.

In both England and Denmark, collection and treatment services have increasingly been marketized, and especially in England, through pressure on local authorities from central government. In England, waste service markets were practically non-existent in the beginning of the 1980s. In 1981, only two local authorities had

private contracts, a number that had increased to 29 in 1986 (Domberger et al 1986, p.70-80). In line with the general political NPM agenda, the Local Government Act in 1988 forced open the market with the implementation of 'Compulsive Competitive Tendering (CCT)' (Davies 2007). Further with The Environmental Protection Act in 1990, local authorities were given the choice of contracting out waste treatment services to private providers or forming Local Authority Waste Disposal Companies (LAWDCs) in 'arm's length' of public authorities that would need to compete with private providers for contracts . The compulsive element was removed in 2000 following the shift from Conservatives to Labour, but the focus on private inclusion continued although within the more pragmatic rhetoric of 'best value' (Slater et al 2007). Today, private sector actors are involved in almost all processing services and around 50% of collection services (OFT 2006).

In Denmark, there seems to have been a relatively long tradition for contracting out waste collection services to smaller, local haulier businesses often in a rather informal manner. However, in Copenhagen and Aarhus long term concession contract were chosen over competitive contracting in the 1960s to enable better control over the modernization of waste management services. In the 1990s, these municipalities were pressured by government and private contractors to dissolve these contracts, following the implementation of the EU public procurement directive and a growing political believe in the benefits of competitive contracting (Federspiel 2011). Today, almost all waste collection services are contracted out to private companies (Grønnegaard Chistensen 2001). In contrast, processing markets are generally split between public and private. Processing waste has traditionally been delegated from municipalities to public interest companies, who own the great majority of waste incineration plants. Some of these companies also

have recycling activities, but most of these activities are managed by private companies (ibid., DME 2013B).

In both cases, there is a clear development towards internationalization and condensation of markets for municipal waste management services. Whereas these markets used to consist of smaller, local businesses, many of these have vanished, grown or become acquired by larger, more specialised companies that are now competing across the country or at international markets for waste services. In England, a market consisting mostly of smaller, regional and specialized small or medium sized companies (SME's) has now become dominated by a few large multi-national companies, usually offering a broad range of treatment and collection services. These multinationals were seemingly attracted by the business opportunities in CCT and the prospective of the need for new waste facilities throughout the country (Davies 2007).

The Danish markets are less internationalised, but there are a few international companies. Examples are RenoNorden, operating in the public retail market across the Nordic region, who established themselves in Denmark through an acquisition of the household division of Renoflex A/S, and Marius Pedersen, a Danish based company that expanded their activities in retail and processing waste to Czech Republic and Slovakia in the 1990s and in the period 2001-2014 were 65% owned by the French-based multinational Veolia Environmental Services, until the business was taken back on Danish hands (www.renonorden.dk, www.mariuspedersen.dk). It is likely that the Danish tradition of public processing and the comparably smaller market has not been enticing enough for large multinationals to set up Danish branches.

In the following sections I will shortly present the last three markets, the input market, technology market and output market, as far as their relevance to retail and processing markets. As mentioned before, the '*input' market* has traditionally been dominated by municipal monopoly. EU principles of proximity and self-sufficiency have allowed local authorities to direct, by whom and where locally produced waste should be treated. In general, concerns for the protection of the environment at a reasonable public expense have had a heavy weighing against competition rules (Grønnegaard Christensen 2001). However, recent years have seen this tradition challenged. The revised Waste Framework Directive (2008) opened for a liberalization of industry waste incineration across borders. This might threaten the Danish system, where municipalities have been able to direct waste treatment for both household and industry waste. For the last ten years, there has been a political debate on a potential liberalisation of publicly owned companies, which has not yet been settled (LGDK 2014). The former mentioned prohibition for municipalities to collect and treat industry waste from 2010, which was a result of a political agreement to change the organization of waste from 2007, should also be seen as a part of this marketization (DME 2007). These developments are worth noticing, since they might create tensions between public and private actors, who increasingly compete for waste input.

The 'technology' market has also been increasingly internationalised and local authorities generally turn to at least a European market to look for waste bins, treatment technology or new vehicles. 'Green technology' in waste management is increasingly becoming an export opportunity, as a growing number of countries realize the need for a transformation of these systems (Murray 1999). The first incineration oven was developed in England, where the first full scale incineration plant was introduced in Manchester in1876 (Funch 1995). However, as England shifted from incineration to landfill they seemed to lose this momentum. Denmark

continues to have a strong position in incineration technologies, where public and private companies have engaged with Danish research institutions in the gradual improvement of these technologies (DME 2013B). Danish private companies such as Babcock and Wilcox Vølund Aps and the engineering consultancy Rambøll A/S was engaged in the very first incineration plants in Denmark and have since delivered waste technologies and advisory services to an international customer base (Kleis and Dalager 2003).

The 'output market' tends to be a mix of domestic and international markets, although transport costs and CO2 emissions from these provide domestic markets an economic and environmental advantage, when they exist. Markets for secondary materials have grown along with diminishing material resources and tighter regulation of energy use, which increasingly makes private companies switch from primary to secondary materials (Murray 1999, p.7). Accordingly, price volatility at these markets has become a new risk for waste managers and private companies to handle (Hoornweg and Bhada-Tata 2012).

Waste as a resource

From seeing waste as a problem and a market, recent years have seen the emergence of a new narrative of seeing waste as a resource. This narrative encompasses both the marketization of waste, where waste is seen as something of economic value for new production processes, and a return to the 1970s discussions on sustainable development and the scarcity of world resources. After being largely absent in decades, sustainable development was again placed high on the global agenda with the climate change debates from around 2006-7 after new alarming reports from the International Panel on Climate Change (IPCC) and attention from prominent actors such as former presidential candidate in the US Al Gore, grasping the world's attention with his documentary 'An Inconvenient

Truth'. As a contributor to the emission of ozone depleting GHG gasses, waste management may also be a potential contributor to the reduction of emissions and hence, be a subject of climate change policies. A recent report from ISWA (the International Solid Waste Association) calculated that in the EU region, '*municipal waste management activities alone could potentially account for 18% of the EU Kyoto reduction target*' [20-30% in 2020] (ISWA 2009, p. 4).

However, the resource agenda concerns more than climate change. As the EU Commission begins their strategy, 'Roadmap for a Resource-Efficient Europe' (2011), "*Europe has enjoyed many decades of growth in wealth and wellbeing, based on intensive use of resources. But today it faces the due challenges of stimulating the growth needed to provide jobs and well-being to its citizens, and of ensuring that the quality of this growth leads to a sustainable future. To tackle these challenges and turn them into opportunities out economy will require fundamental transformation within a generation – in energy, industry, agriculture, fisheries and transport systems, and in producer and consumer behaviour*."(EC 2011, p.2)

As such, the roadmap sets the first milestones for a transformation towards a sustainable economy incorporating concerns for environmental protection, economic opportunities and security of supply (ibid.). According to the EU Commission, although some businesses have begun to realize the potential in resource efficiency, many businesses and consumers have not yet realized the urgency or experience barriers for making these changes (ibid.). This kind of transformation would demand a policy framework, where innovation and resource efficiency are rewarded through incentives for product redesign, sustainable resource management, recycling, substitution and resource savings (Ibid., p.2). The Roadmap sets the milestone that by 2020, waste will be managed as a

resource. This implies that 1) waste generation per capita is in decline, 2) recycling and reuse are considered economically attractive options and more materials are recycled, and 3) energy recovery is used only for non-recyclable material and landfilling is virtually eliminated (p.8).

Following the roadmap, a new European waste programme, 'Towards a circular economy: A zero waste programme for Europe', was launched in July 2014 outlining the future of EU waste management (EC 2014a). However, the proposal was ditched by the new EU Commission in December 2012 despite 11 member states urging the Commission to keep the proposal on the work programme. According to First Vice president Frans Timmermann: "*because we want to put something on the table that is better and more ambitious. And that really has a huge contribution on the part of the European economy that really needs a boost which is the circular economy*" (Euranet 2014). Accordingly, it is hard to say what this will mean for the development of EU regulation on waste, but it might be the case that economic concerns may be preferred over environmental concerns.

The waste programme proposed new specific targets for waste management to follow the WFD:

1) To increase recycling and reuse of municipal waste to 70% by 2030;
2) To increase recycling of packaging waste to 80% in 2013, with interim targets of 60% by 2020 and 70% by 2025, including targets for specific materials;
3) A ban on landfilling of recyclable plastics, metals, glass, paper and cardboard by 2025 and virtually eliminate landfill by 2030;
4) Promoting markets for secondary raw materials;
5) To reduce food waste by at least 30% by 2025;
6) A clarification of the calculation method for recycled materials (EC 2014a).

As mentioned before, this last target on clarification is much needed, since the various methods of calculation in member states makes a comparison of recycling and reuse targets quite uneven. These new strategies and targets as well as the strong resource rhetoric points would have strongly increased demands for a transformation of European waste management and applied extra pressure on member states and local authorities already challenged by current targets.

In both England and Denmark, actors in the waste sector have to some degree adopted the 'waste as resource' narrative, but continue to have a grand challenge in front of them. In Denmark, the waste as a resource narrative has been broadly embraced. In the waste community, for example the Danish Competence Centre for Waste, DAKOFA, has held several conferences on the potential consequences of seeing 'waste as a resource' (www.dakofa.dk), and as such the debate seems to be rolling among central actors. The newest government strategy for waste management, 'Denmark without waste – reuse more, incinerate less', is framed as a 'resource strategy' much in line with the rhetoric of former environmental minister, Ida Auken (Danish Government 2013). In the foreword to the strategy she states:

> "We should increasingly see waste as a resource that may be reused and recycled, rather than seeing waste as a residual. (…) With 'Denmark without waste' the governments suggest a new direction. In the last decades, almost 80% of household waste has been incinerated. Despite the fact that this has contributed significantly to deliver green energy, we have also lost materials and resources that could have been reused." (ibid., p.5, authors translation).

As such, the government attempts to push for a radical change away from the current practice of incineration and towards more recycling and reuse. However, although the strategy is called a 'resource' strategy, the strategy and following 'resource plan' mainly addresses traditional waste management and does not

engage in a broader sustainability discussion on resources, besides a short section suggesting a connection between increased ecological farming and nutrition from organic waste and some vaguely formulated future initiatives, such as support for industrial symbiosis (see EPA 2014, p.72-73). In February 2014, a delayed waste prevention plan outlined two cross-going themes, resource-efficient companies and green consumption, and four action areas, food waste, buildings and construction waste, textiles and electronics and Packaging, but did not set specific targets. The strategy has been criticised for lacking tangible instruments and clear direction (Information 2015). Accordingly, the Danish government might still be a bit fumbling in regard to the implementation of the resource narrative.

In England, Bulkeley et al (2007) identified a similar turn towards seeing waste as a resource, but only as a sub-trend to the dominant focus on diversion from landfill. According to the authors, 'waste as a resource' began as a social and economic rationale, but was increasingly linked to '*'stronger' versions of sustainability in which the emphasis is on waste minimization and the reuse of materials*' (Bulkeley et al 2007, p.2749). However, these stronger versions of sustainability were mainly found in the community sector, where organisations such as charity shops, furniture reuse, community projects or informal networks provided alternative waste infrastructures or engaged through mutual learning and support (ibid.).

There are signs, though, that this narrow discourse has been spreading. In 2000, the Waste and Resources Action Programme (WRAP) was created as a private not-for-profit company backed by government funding to help recycling take off in the UK. This organization has strongly embraced the resource agenda and has a stated vision of 'a world without waste, where resources are used sustainably'. In line with this, a new government prevention strategy from 2013, 'Prevention is

better than cure – The role of prevention in moving to a more resource efficient economy'. The strategy aimed to "*improve the environment and protect human health by supporting a resource efficient economy, reducing the quantity and impact of waste produced whilst promoting sustainable economic growth*" (HMGOV 2013, p. 13) and extensively referred to benefits of moving towards a circular economy: "*Moving towards a more resource efficient, circular economy offers scope for innovation, sustainable growth and saving money, as well as reducing the impact on the environment*" (ibid., p.5). The newly appointed Liberal-Democratic Minister for Environment and Resources, Dan Rogersen, emphasised in the foreword that the strategy '*hinges on everyone playing their part'* with the government's role being foremost to '*get out of people's hair'* and '*set the conditions and guidelines that allow the market, businesses, local authorities and people to make the changes that will propel us towards a more circular and sustainable economy'* (ibid. p.3).

In line with these statements, the Minister recently announced that the government planned to refrain from new initiatives on waste and leave the work to relevant businesses and local authorities, since, as the minister states in a 'letter to stakeholders': '*I believe a sustainable and resource efficient economy can and should be delivered with little Government intervention as industry responds to the clear business case for action'* (DEFRA 2013b). The Minister announced that the government would continue to support WRAP, engage in EU negotiations on new waste and resources regulation and run a small prevention programme (ibid.). However, after playing an active role in the first steps towards landfill diversion and increasing recycling, it will be interesting to see, where this new 'non-action' plan will take England in the future.

Waste as non-waste

Lastly, in relation to the new focus on prevention, a smaller but not insignificant meaning of waste is a shift of focus towards 'non-waste'. As Pongráz and Pohjola (2004) points to, the formulation 'intends to discard' in the EU definition assumes that there is waste and that the owner plans to discard it. However, waste prevention, which is the most preferred option according to the EU waste hierarchy, would mean not to produce waste at all (p.142). As such, there might be an underlying challenge towards more sustainable waste practices in the way waste policies and waste management systems are built upon an understanding of 'waste' rather than 'non-waste'. Essentially, waste management systems have been designed to manage waste, rather than preventing waste to be generated in the first place. As Corvellec and Hultman (2012) show in the Swedish context, a narrative shift from 'less landfilling' to 'wasting less' has become a threat to the perception of Swedish public companies as successful recyclers and placed them in an uncomfortable situation with a growing scarcity of waste volumes and increased competition for waste input. Thus the focus on prevention might demand a new strategy for public authorities and public companies.

Waste management systems rely on waste generation. When waste is removed from these systems, it becomes harder to increase recycling according to political targets. To provide a concrete example, the decline in people reading newspapers may be good for the environment overall, but may reflect negatively on paper recycling statistics. Accordingly, a strict focus on recycling targets may have the negative effect that reducing waste is not incentivized. As Local Government Denmark emphasised in a hearing document to the Danish waste strategy, these targets may also lead to some waste types being prioritized for non-environmental reasons:

> ‘Comparison and measurement of goal attainment should include consideration for the environmental effects and not only recycling percentages. The current calculation of the 50% targets applies a pressure on municipalities and might induce recycling of heavier waste types in favour of those providing the greatest environmental or climate change effects. For example plastic waste contributes less to recycling percentages, but significantly to climate change.”
>
> (LGDK 2013, p.2-3, *Authors translation*)

This PhD project mainly focuses on waste management, as in the collection and treatment of waste that has been discarded by its owner. However, as the meaning of waste is changing, the meaning of ‘waste management’ might also be changing. As the EU strategies and the work in WRAP points towards, waste management is no longer only a task for local authorities. As such, these changing meanings of waste as not only a problem, but also a market, a resource or as ‘non-waste’ create a burning platform for change in local authority-based waste management policies and systems in EU member states such as Denmark and England. However, local authorities continue to have a central role to play in waste management. A scenario, where there is no longer produced municipal waste does not seem realistic, although the nature of this waste and the way it is collected and treated continue to change. Accordingly, *there might be a need to specify the role of local authorities versus other actors such as the government, designers, producers, the waste industry and citizens in the transformation towards more sustainable waste management systems and also where results require a joint effort*. The following section will show how modern waste management systems may be understood as socio-technical infrastructure networks in the context of these changes and discuss the challenges of managing such systems.

Waste management systems as socio-technical infrastructure networks

> An empty vine bottle is discarded from a household in southern Italian city. The bottle is delivered at a local bring bank, where the glass is picked up by a garbage truck from the municipal company ASM. The garbage truck delivers the glass to a nearby ASM plant, where it is washed and fine-sorted along with waste from three other neighbouring cities. This glass is forwarded to a private processing plant in a nearby city. Here, it is processed into new raw material for then to be transported to a furnace in another Italian city. (Minervini 2013)

The above story re-told from Minervini (2013) of the travel of a vine bottle shows some of the complexity in modern waste management systems. This vine bottle was mainly transported between neighbouring cities, but even then, the process involved a network of public and private actors as well as individual households, acting on a basis of EU and national regulation. From being a simple, local service of collecting garbage and dumping it on a nearby landfill, waste management systems today involves multiple streams of waste that are transferred between various localities with a number of public and private actors involved.

Modern municipal waste management systems may be characterised as complex, socio-technical infrastructure networks, encompassing not only physical artefacts and technologies, but also social structures such as organizations, regulations and social networks through which they are governed (Hughes 1983, Uyarra and Gee 2012). These infrastructure systems are '*highly durable, path dependent, resistant to rapid change and associated with incremental, rather than radical innovation'* (Uyarra and Gee 2012, p.101-102), and consequently may not be easy to change. The provision of new waste infrastructure tends to involve large-scale investments, which may lead to system lock-ins from sunk costs, vested interests and technical inter-linkages to existing systems (ibid., Corvellec et al 2013). Changes in these systems for example from landfilling or incineration towards

recycling and reusing may require 'active reconfigurations' of existing regimes, rather than just minor technological advances (Uyarra and Gee 2012, p.101).

Waste management systems are increasingly multi-level governed through a mixture of EU, national and local regulation. As the previous section showed, EU directives have formed both environmental and market regulation of European waste and greatly influenced the narratives, discourses and practices for national, regional and local waste management in member states (Campos and Hall 2013). In this more complex situation, municipal waste managers are increasingly dependent on other actors to achieve political targets. Through processes of 'splintered urbanism', former monopolistic, comprehensive and centrally planned service delivery systems have partly been replaced by complex 'patchworks' of private companies (Marvin et al 1999, Graham and Marvin 2001). This marketization of waste has introduced private sector actors in a much higher degree as co-producers of waste management services through the various waste markets. For example, public managers are dependent on the existence of markets for recyclables to introduce increased source separation (Bulkeley et al 2005, p.12). Municipal managers are also highly dependent on the more or less voluntary engagement and 'co-production' (Alford 2002) from citizens in private households, especially in systems relying on source separation (Uyarra and Gee 2012).

Accordingly, as Bulkeley et al (2005) report from the English context: "*Municipal waste, once the province of relatively autonomous local authorities concerned with the most economically efficient collection and disposal of waste, is now a complex process in which a range of international institutions, national, regional and local government agencies and non-state actors have a degree of influence and responsibility*" (p.3). As such, local authorities are facing a dilemma of

increasing sustainability targets and decreasing 'governability' (Kooiman 2003) of waste management systems. As such, the changing field of waste management might lead to new managerial challenges for waste managers, who are increasingly dependent on other actors to develop and deliver more sustainable waste management services. The next sections will discuss why a partnering approach might be relevant in this context and look into the few accounts of PPPs in waste management services.

Towards a partnering approach?

There are at least two interlinked challenges in the described development of waste management that might lead to an emphasis on partnerships as policy instruments. *First*, developing more sustainable waste management systems is not a one actor job, but relies upon coordination and cooperation across networks of public, private and civil society actors. This means that realizing policy objectives may demand the introduction of new forms of interactive governing such as partnerships in which, although local authorities remain principal actors, they will rely upon the resources, knowledge and willingness of other actors to engage in the challenge (Entwistle 1999, Bulkeley et al 2005). *Second*, the turn towards marketization of waste management challenges the governing of waste. Limitations for dialogue and close collaboration in traditional contraction out may lead towards new forms of contracting. According to Bulkeley et al.,'*responding effectively to the fast changing demands of the waste agenda in the context of long-term contracts demands flexibility and a partnership approach between authority and contractor'* (Bulkeley 2007, p. 2748).

On the other hand, the increase of competition, not only between private businesses, but also increasingly between public and private actors might decrease the willingness to collaborate, whereas the sense of a loss of 'governability' may

lead public authorities to hold on to as much decision-power as possible, reduce the influence of private actors and keep to their traditional hierarchical form of governing. As such, there might be a tensions between collaboration and competition in waste management services, where public managers may be torn between an emerging acknowledgement of the need to cooperate and an urge to remain in control, also knowing that they have the responsibility for large scale changes, and private sector actors may have different objectives and not only deliver efficiency and new ideas, but also new obstacles.

Empirical accounts of PPPs in waste management research

Empirical investigations of how waste management PPPs work in practice is few. Evidence from Portugal (Simões et al 2012, Cruz et al 2013) and Spain (Bel and Fageda 2010) show that PPPs in the form of mixed public-private companies and contract-based PPPs play a significant role in waste management services. Whereas Bel and Fageda (2010) suggest that this 'partial' privatization was chosen by public managers as a non-ideological pragmatic middle way between purely public and purely private, Simões et al (2012) and Cruz et al (2013) concludes that these partnerships are not always successful and need more careful contract design and management. Although mixed companies may have a theoretical advantages of enabling a 'relational' approach to contracting, local authorities seemed better able to manage PFI style contract based PPPs, which tended to be more limited in scope.

From England, Slater et al (1997) have provided an overview of various types of partnership working in waste management in England. Their approach was slightly broader than the PhD's, as they included public-public partnerships and public-civil society partnerships, whereas this project mainly concerns partnerships between public authorities and private companies. The authors

describe five types of partnerships: A) A public-public partnership between waste collection authorities (WCAs) and waste disposal authorities (WDAs), B) A partnership between WCAs, WDA and one or more private providers, C) A partnership between a unitary authority (UA) and a private provider on an integrated contract, D) A partnership core between WCAs and WDA with partnership relations to a private provider and potentially community providers, and E) A partnership between a WCA and a community provider (p.648ff). These models especially show the importance and variations of public-public cooperation in the English two-tier system. Especially model B, C and D are relevant in this context. As I will return to in Methods in *Chapter 5*, I have aimed at displaying the variety of partnership arrangements in England.

Slater et al (2007) also conclude on the outcome of these partnerships regarding the development towards more sustainable waste management. The authors stated that all investigated partnerships worked with the adoption of '*so-called sustainable technologies indicating a willingness to move beyond disposal as the only option*'(p.661), but also that partnerships arrangements did not seem to affect the specific technologies applied or be necessary for the adoption of new facilities. Furthermore, the authors warned that the tendency of entering into long-term integrated contracts with a small number of large suppliers might restrict competition, limit flexibility and innovation and delegate disproportionate influence on the choice of sustainable waste solutions to these companies. However, partnership working across WDAs and WCAs towards new procurements did seem to have moved WCAs towards mutual learning and implementation of best practice in waste collection (Slater et al 1997, p.660ff). As such, they concluded that potentially "*partnership working is creating the foundations for a future characterized by a more efficient version of business as*

usual rather than a more effective shift towards sustainable management of resources and waste."(ibid., p.663).

As such, despite the general positive connotations to partnership working, according to Slater et al (2007) partnership working do not seem to make a great difference in relation to the development of innovative sustainable solutions in waste management. In contrast, Uyarra and Gee (2012) describes the process of transformation in a local authority, where a new and more sustainable solution is developed and implemented through a PFI style PPP in Greater Manchester, England. However, their paper mainly focuses on the efforts of the public waste authority in the pre-procurement phase and does not engage with the public-private cooperation in the PPP. As such, it leaves us curious on the cooperation between public and private actors in this very interesting case, which has also been a part of the empirical data in this dissertation.

Accordingly, public-private partnerships are being used in waste management, but seemingly not only with overwhelmingly successful results. This might be curious compared to the high expectations to partnership working both in general and in waste management in particular. It is also puzzling that private influence on solutions in Slater et al (2007) is perceived only as a negative effect, despite the fact that access to private knowledge and ideas should be one of the main objectives of including private sector actors in service delivery. As the last section showed, there may be a number of challenges to partnership working, such as the regulatory restrictions for cooperation and an urge for public managers to stay in control. Nonetheless, PPPs remain a favoured policy instrument in waste management - as in many other policy fields - which in itself justify a further investigation.

More conceptual and empirical research on the role of PPPs in the development towards more sustainable solutions in waste management is indeed needed. This dissertation aims to dig deeper into the cooperation processes within these partnerships, the extent of private influence in partnership processes and the managerial opportunities for public managers to conduct innovation in cooperation with private sector actors in the context of a changing field of waste.

Waste as an empirical field in public administration and public management research

Waste management has traditionally been perceived and described mainly as a technical issue. In consequence, there has been little attention towards waste management in the social sciences. However, this might be changing as scholars from various countries and disciplines have begun to address waste as a subject of social science (Campos and Hall 2013). This section aims to provide a short overview of some of the most relevant research, and proposes on this background an increased focus on waste as an empirical field in public administration and public management research, where this field has largely been overlooked.

As the section on waste as a market in this chapter showed, the 1970s and 1980s saw a wave of political economic studies investigating waste management as a case for contracting out. In line with the growing new public management spirit of those decades, the starting point for these studies was a failing public sector. As Savas (1977) elegantly states in his introduction:

> ”Many Americans feel that government - particularly local government, which is responsible for the daily delivery of highly visible services - is inefficient and ineffective: the disparity between what local government takes and what it gives looms large in the public eye, as manifested by the annual taxpayers' revolt. There is a growing belief that significant and enduring increases in the efficiency and effectiveness of local government can be achieved only by recognizing the

> institutional nature of the basic problems, designing management strategies to overcome them, and building the political support to do so." (p.50).

Back then as well as now, public administration and public management research was concerned with understanding societal governing and investigating potential solutions to improve this.

In contrast to the clear recommendation of contracting out waste collection to increase efficiencies, researchers returning to this subject 30 years later observed that many local authorities had continued to provide waste management services in-house or through public companies (ibid., Dijkgraaf and Gradus 2008b). This led to an interest in the reasons behind contracting out and the expectation that these might be political. However, in 'The Waste Market', an anthology of newer political economy studies on European waste collection markets, Dijgraaf and Gradus (2008a) concludes that the decision of municipalities generally seems to be pragmatic, rather than ideological. High levels of money transfer from central government (less economic pressure) and high local unemployment (fear of losing in-house jobs) tended to lead to in-house provision, whereas small scale municipalities tended to contract out to increase economies of scale (Dijkgraaf et al 2008).

What these studies in general did not include, is that changes in waste management services towards more sustainable practices of recycling and reuse, as described in the previous sections, have complicated the activity of waste management. As such, the assumption that especially waste collection services should be an easy service to contract out might not hold in the 21th century. Walls (1995) made this point in a study of waste management contracts in the USA and also showed that contracts had not been adjusted to these new conditions, but

remained highly specified and did not include incentives to increase recycling in the contract period, thus allowing little flexibility to the contractor. In line with this study, it may be time to re-think the form of contracting out waste management services and in general cooperating with the private sector in the context of a fast changing field of waste management.

The changing field of waste management have been described in a number of studies from various social scientific disciplines. A new landmark in waste management studies, the anthology 'Organising waste in the city' edited by Campos and Hall gathers analyses from 'the sociology of environment and technology, social policy, public administration, political science, management and organization studies, urban studies, geography and urban ecology' (Campos and Hall 2013, p.1). As waste is often considered a subject of urban governance, it is probably not surprising that it is within urban studies and related fields that we find many studies of the governing and organisation of waste management (for instance Davoudi 2000, Bulkeley et al 2005; 2007, Sharp and Luckin 2006, Davoudi and Evans 2009). From a sociological and organizational point of view, researchers have studied the shifting narratives, values and global discourses of waste (Carmo and Oliveira 2010, Corvellec and Hultman 2012, Zapata 2013) and traced the micro-processes of waste management in various contexts (Evans 2011, Minervini 2012, Campos and Zapata 2014). Waste has also been used as a case for the study of sustainability-oriented transition and transformation processes within Science and Technology studies (Geels and Kemp 2007, Kemp et al 2007, Uyarra and Gee 2012).

Whereas a broad range of urban and environmental governance scholars in England has described the changes in English waste management (Davoudi 2000, Bulkeley et al 2005, Weaver 2005), Sweden also seems to be a locus for a

renewed interest in waste management. Large research projects such as 'Organising critical infrastructure services – A case study of waste management' funded by the Swedish Governmental Agency for Innovation Systems (INNOVA) and 'Waste in Translation: How ideas of waste management travel from global to local' funded by the Gothenburg Centre of Globalization and Development have resulted in substantial contributions to the understanding of waste management. Especially relevant in this context is a number of publications on the challenges and contributions of Swedish waste management companies, which provide new insights to modern practices of organisation and management of waste and the challenges ahead for incumbent actors in the transformation towards more sustainable waste management practices, of which several of the resulting articles have also been referred to in this dissertation (see Corvellec et al 2011, Corvellec and Hultman 2012, Corvellec and Bramryd 2012, Corvellec et al 2013).

Adding to these studies, a relatively new PhD from Phillip Karré (2011) from the Netherlands School for Public Administration, 'Heads and Tails: both sides of the coin – An analysis of hybrid organizations in the Dutch waste management sector', investigates hybrid waste organizations in the Dutch context, ie. public waste management companies that increasingly act as private companies and compete with these for waste services. The choice of these 'middle-way' public and private organizations as service providers express the strong public interest in waste management and the reluctance to leave these services completely to the market. This tendency is also evident in both England and Denmark, where municipal 'arms length's' organizations play a prominent role in service delivery. In this context, public-private partnerships may be perceived as another hybrid manner of organizing waste management that also combine public and private characteristics.

However, in public administration and public management research, waste remains relatively unexplored. This is a shame, as waste provides a very interesting case on the transformation of public administration and public management. Perspectives from this broad interdisciplinary field of waste management research may inspire public administration and management scholars to embrace this empirical field. As I have shown in this chapter and similar to results from researchers before me, the changing social narratives of waste influences the way waste is organised and governed; and as such, changes the 'socio-materiality' of waste (Corvellec and Hultman 2012). This change has taken place mainly from the growing environmental awareness in the 1960s, but as this chapter has shown, with different speed and consequence across European countries.

Interlinked with new ideas on sustainability, globalisation and technological innovation, new managerial tendencies such as New Public Management (NPM) and Governance, as well as an increased focus on innovation in the public sector, have had a strong impact on waste management services over the last 40 years, but also continue to be highly debated and contested in this field. This PhD dissertation aims to contribute to the growing amount of social science research in waste management by focusing on public-private partnerships as policy instruments for waste management and thereby, taking a public administration and public management point of view on waste.

Conclusion: New managerial challenges in a changing field

This chapter has described the empirical field in this PhD dissertation and shown how the perception of waste has changed over time followed by new regulation, new practices and new challenges for municipal waste managers. From being considered a spatial, health and environmental problem, waste is now also

perceived as a market, a resource and as 'non-waste'. These different narratives provide a layered reality of meaning that frames the task of waste management. An increasing marketization of waste has introduced private sector actors as important co-producers of municipal waste services, whereas the narrative of seeing waste as a resource has increased the pressure for development of more sustainable waste management solutions. Current waste management systems provide little incentive for the most preferred solution, non-waste - not producing waste at all, which would involve a range over other actors beside local authorities. Accordingly, there might be a need to specify the role of local authorities versus other actors such as the government, designers, producers, the waste industry and citizens in the sustainability transformation processes in waste management systems, and also where results require a joint effort.

In increasingly complex and networked waste management systems, local authorities are dependent on other actors to achieve political targets. Private actors may be engaged in waste collection and treatment services, but also as producers of new technology and receivers of output material. In a situation of decreasing governability of waste management systems, a partnering approach to governing might be a way forward for local authorities. However, partnering may be challenged by a 'competition for survival' between public and private actors and strict regulations of public-private contracts that reduces the possibility for dialogue and collaboration. Empirical investigations of waste partnerships are few and conclude that the investigated partnerships needed more careful contract design and management and at most have resulted in '*a more efficient version of business as usual rather than a more effective shift towards sustainable management of resources and waste'*(Slater et al 2007, p.663). A single case study of a PFI from Greater Manchester in England did provide some optimism

regarding sustainable outcomes, but less concrete knowledge on public-private cooperation.

However, partnerships remain a favoured policy instrument in waste management as well as in other fields, which makes it worth investigating closer the potentials and practices of this policy instrument for the development of more sustainable waste management systems. Whereas public administration and public management research has until recently mainly focused on waste as a good case for traditional contracting out, these large scale changes in the understanding, regulation and organization of waste might give reason to a revision of waste management as an empirical field within this discipline.

In this PhD dissertation, waste management will be explored from a public administration and public management view, and as such, the aim is both to contribute to a growing field of social science research within waste management, and to open - or perhaps return to - waste management as an empirical field within public administration and public management research. The changes and challenges described in this chapter will be used in shortened versions as context in the empirical articles, especially in the *second article*, which specifically investigate the role of PPPs in waste management in England and Denmark in the context of regulative and organizational changes and developments in the sustainability transformations of English and Danish waste management systems.

Chapter 5: Methods

As described in chapter 1, this dissertation is built on an explorative, comparative, embedded case study of waste management PPPs in England and Denmark. Adding to the presentation of the analytical design in chapter 1, this chapter will provide an overview of the methodological considerations, analytical strategies and data collection techniques used in the PhD. As such, some of the information here will overlap with the shorter methods sections in the articles. This chapter will firstly discuss the choice of an explorative case study and the level of conclusions sought through this approach. Secondly, I will extend the discussion on the selection of cases (begun in the introduction) and potential generalizability/comparability of these cases. The last part will concern the data collection process, interviews and the iterative process of data analysis and concept development.

Explorative case studies

George and Bennett (2005) define a case as 'an instant of a class of events' (p.17). As such, a case is one example of a 'phenomenon of scientific interest' in a historically defined period (ibid.). This PhD investigates cases of the phenomenon of PPPs and more specifically the development and implementation of innovation and sustainability change in PPPs. Whereas the second article focuses on the general use of PPPs in sustainability change of waste management systems in two national cases, the third article focuses on specific PPP projects in the two countries within the investigated time period. Case studies may provide '*holistic and meaningful characteristics of real-life events*' and may be used to '*understand complex social phenomena*', especially when '*boundaries between phenomenon and context are not clearly evident*' (Yin 2009, p.4; 18). They are typically based on a variety of data sources, such as interviews, archival data, observations, etc.

(ibid.). The complexity and context-bound experiences investigated in this thesis clearly calls for a case study.

This PhD thesis applies an explorative approach to case studies (Eisenhardt 1989, Yin 2003, Bovaird 2007, Graaf and Huberts 2008). Explorative case studies aims to build theory on the basis of empirical evidence from one or more cases (Eisenhardt and Graebner 2007, Stewart 2012). An explorative approach is typically selected, when less is known about the studied phenomenon or when the phenomenon is so complex that neither the constructs nor relationships between them are fully definable (Graaf and Huberts, p. 639). In this case study, the main concepts, PPPs, innovation and sustainability, are all ambiguous and fluid, which in itself complicates a search for relationships between them and calls for a more explorative approach. Explorative case studies allow researchers to test theories and propositions on real-life situations within the analytic process. As Flyvbjerg (2006) states, "*[t]he advantage of the case study is that it can "close in" on real-life situations and test views directly in relation to phenomena as they unfold in practice*" (p.235). As such, case studies may '*recognize patterns of relationships among constructs within and across cases and their underlying logic*' (Eisenhardt and Graebner 2007). The analytic strategy in explorative case studies may be more or less inductive (Stewart 2012). In this case study, I have taken a starting point in a theoretical review to identify key concepts, proposed relationships and relevant questions to ask (Yin 2009, p. 14), which is then explored and adjusted through an iterative process between theory and data.

As such, the thesis is not only empirically explorative, but also theoretically explorative. The main concepts have been guiding posts for the empirical data collection, but I have kept an open approach to the concepts to explore the meaning of them empirically in this context. The PhD thesis aims to connect these

concepts and suggest possible relations between them, while exploring the relatively new empirical field of waste management. Below I have attempted to describe the relationships between 'variables' and results in the main propositions of the thesis.

In the key conclusions (somewhat simplified), I suggest that:

1) The mix of collaboration, competition and hierarchy (variable A,B and C) in PPPs provide a unique potential for conducting innovation (Y1 output);
2) Managing these processes through hierarchical, network and market governing (D,E and F) over the whole PPP process (G) is key to exploit this potential (Y1 output);
3) PPPs may connect actors between landscape, regime and niches in forums for co-production of innovative solutions (H) to enable sustainability change processes (Y2 outcome).

I do not claim that these 'variables' are necessary or sufficient factors for conducting innovation in PPPs or use PPPs to foster sustainability change, only that the presence of these variables seem to 'favour' or be 'contributing causes' to this output and outcome (George and Bennett 2005, p.26-27). There might be a number of other conditions influencing processes and results in the selected cases. In general, it may be the rich explanations behind these statements that are most interesting, ie. What are the conditions for collaboration, and how may the involved actors collaborate through the PPP process?

Furthermore, the regulative framework as well as the organizational form of PPPs is continuously changing and so must our perception of the potential for innovation and sustainability change in them as well. As stated in the introduction, the potential output, innovation, may take various forms, and the potential

outcome, sustainability, may in itself change as new technologies, methods and perceptions arise. This changing nature of the studied phenomena does not mean that it is not worth searching for regularities, but rather that we, as researchers, must 'stay on our toes' and remain open to the empirical world. The main objective of the PhD is to provide useful information to improve the understanding of these phenomena and their interrelatedness and develop guiding posts of awareness to practitioners working on this in practice. Hopefully, the PhD may also inspire new theory-based empirical investigations and new practical experiments that may alter PPPs as we observe them today.

Case selection

The empirical field of waste management provides the context for the embedded, comparative case study of waste management PPPs in England and Denmark with specific PPP projects as sub-units (see *Figure 1* in *chapter 1*). As described in the introduction, the context of waste management might bring specific challenges for PPPs, especially concerning the demand for innovation of waste management systems, flexibility for continuous improvements and new political targets relating to sustainability change processes. Compared to usage-based PPPs (eg. roads, bridges), which tend to be paid by users, infrastructure PPPs in waste management are process plants (equivalent to water or waste-water processing plants), which in line with accommodation-based PPPs (eg. schools, hospitals) are measured by availability (Yescombe 2007). However, whereas accommodation PPPs may include facilitating services such as cleaning and maintenance, waste management PPPs demand an active participation in the processing of waste, and as such, a direct co-production of the public service. Whereas a public school may implement a new teaching programme without concern of the building, the private partner in a process plant would need to participate directly in the innovation of waste management services. As such, waste management provides an interesting

context for investigating innovation and the possibilities for collaboration and 'genuine' partnership in PPPs, as the need for this might be bigger compared to PPP types in other sectors.

Within the field of waste management, cases were selected for analytical purposes on the basis of a replication design, where similar investigations were carried out in a limited number of cases (Peters 1998, Yin 2009). Article 1 describes considerations in existing research on the potential and challenges for conducting innovation in PPPs in a parallel review of three provisional PPP types related to service delivery, infrastructure PPPs, service PPPs and innovation PPPs. Article 2 focuses on the main case level, where England and Denmark were chosen as comparable, but different cases of using PPPs in sustainability transformation of waste management systems. As mentioned in the introduction, these countries were both in a continuing process of changing waste management practices towards greater recycling and reuse of waste facing the EU 2020 targets and currently have almost equal percentages of recycling. However they have had different trajectories of change.

Denmark has been on the forefront of sustainable waste management for decades, but is now lacking behind the most advanced countries such as Germany, Switzerland and Sweden (EUROSTAT 2014). England on the other hand, has traditionally been 'the dirty man of Europe' relying mainly on landfill disposal up until the 1990s (Davoudi and Evans 2005). As mentioned in *chapter 4*, England has been moving forward and improving recycling rates faster than any other European country. Whereas Denmark increased recycling of municipal waste from 31,5% in 2000 to 44% in 2013 (EPA 2014a), England delivered in the same period a massive step change from 12% to 40% recycling (DEFRA 2014). Preliminary

research showed that in both countries, *efforts of transforming waste management systems to some degree involve public-private partnerships.*

As EU member states, both countries are subjected to EU regulation and hence obligated to fulfil EU targets and principles for waste management as well as public procurement rules. Furthermore, both countries have a large inclusion of private sector actors in waste management compared to other European countries (Dijkgraaf and Gradus 2008a). This provides a reasonable level of comparability between the two cases. In England, around 50% of waste collection services are contracted out to private companies, whereas almost all treatment services are privately provisioned (OFT 2006). In Denmark, at least 80% of collection services are contracted out, whereas most treatment services are provided by municipally owned companies and private companies deliver most pre-treatment of recycling (Grønnegård Christensen 2001, MST 2011). These organizational differences may provide different conditions for the use of PPPs. For example, in Denmark introducing PPPs to a greater extent in waste treatment would be a change from public towards private inclusion in waste management, whereas in waste collection PPPs might just be an adjustment of current cooperation from traditional contracting towards partnering relationships.

In article 3, I shift focus from a country comparison towards a comparison of selected PPP projects (embedded units) within Denmark and England. On the background of the identified partnerships in the two national contexts, two partnerships in each country have been selected for more in-depth analysis; a PPP in waste collection (service PPP) and a PPP in waste treatment (infrastructure PPP). These two PPP types appeared to be the most relevant for municipal waste managers and as they are based on contractual relationships, they pinpoint the interesting tension in PPPs between competition and collaboration. As I explain in

the fourth article, the specific cases were selected according to two main criteria: 1, The PPPs should have an element of 'partnership' rather than being purely adversarial, and 2, the partnerships should be seen as innovative in the broader waste management community. As such, these cases were selected for the analytical purpose of showing the dynamics of innovation in PPPs (output-based), and hereunder investigating the importance of collaboration in PPPs (as one variable).

The selected cases were:

1) The partnering contract for waste collection and street cleansing services between the Royal Borough of Kensington and Chelsea (RBKC) and SITA UK,

2) The PFI joint venture contract for a number of waste processing plants, transfer stations plus communication services and education services between Greater Manchester Waste Disposal Authority (GMWDA) and the private consortium Viridor Laing (Greater Manchester) Limited (VLGM Ltd.), which also included a Special Purpose Vehicle (SPV) with the private company Ineos Chlor,

3) The service partnership contract for waste collection services between the public company Renosyd I/S and the private company Marius Pedersen A/S,

4) The potential joint venture partnership contract for the construction of a new 'resource centre' and a number of administrative and service tasks in Vejle Municipality, which also included an innovation partnership with Marius Pedersen A/S in the development phase.

The four cases were selected for the following reasons. *In England*, the partnership contract on waste collection and street cleansing between the Royal Borough of Kensington and Chelsea (RBKC) in the London Area and SITA UK was mentioned several times in interviews as an example of a partnership contract that did not just talk about partnership, but was really a partnership relationship.

This case did not have the most sustainable system of waste collection, but displayed continuous innovation effort in the contract period, where the partners managed to increase recycling from 16,5% in 2004 to almost 30% by 2011. In waste treatment, a pilot interview in September 2012 with Greater Manchester Waste Disposal Authority (GMWDA) in relation to a research seminar at Manchester University exposed the PFI joint venture contract with the private consortium VLGM Ltd. as an interesting case in at least two ways. First, the public manager described the management of the relationship in partnership terms, and second, the contractual arrangement was in itself innovative with political goals and incentives implemented in the contract to improve recycling.

In Denmark, the service partnership contract between the publicly owned company Renosyd and Marius Pedersen A/S was the first contract of this kind in household waste collection services. The choice of this organizational form was directly related to the public organization's aim of achieving a more productive and less adversarial relationship with a private contractor. Compared to an almost parallel example of a similar service partnership contract in another municipality, Renosyd chose to change their collection system within the contract period. As such, the Renosyd case provided an example of service innovation within a partnership contract.

In waste treatment, there is only one example of a PPP, Vejle Waste and Recycling, which for the first time in Denmark aims to create a closer collaboration with a private company in a joint venture PPP with the objective of providing both an innovative service delivery arrangement and new technology for mechanical sorting of recyclables. This PPP has not reached beyond the procurement process, which limits comparability, but on the other hand provides unique, detailed insight to the pre-contract period that is fresh in mind of the

interviewed managers. Following the data collection process, the Vejle contract was cancelled because of legislative complications, and the case provides a good example of both the appeal and the challenges for PPPs in waste infrastructure in the Danish context.

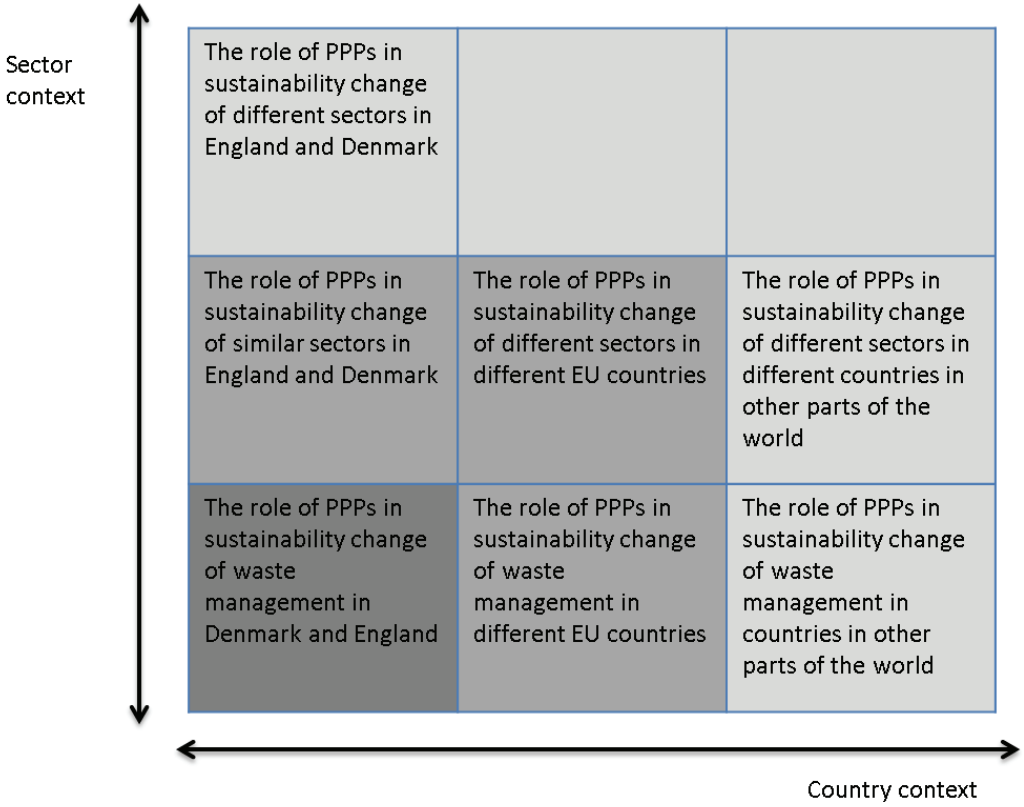
Generalizability and comparability

According to Yin (2009), case studies are '*generalizable to theoretical propositions and not to populations or universes'* (p.15). In this approach, case studies do not represent a sample of populations, which should produce the same results. In contrast, other case study researchers carefully select populations of 'similar' cases, which their cases may represent (Rohlfing 2012).'Similar' does not imply 'exactly the same', but rather that they share relevant scope conditions to provide comparable settings (ibid.).

In this embedded case study, the specific experiences with PPPs from England and Denmark are not samples of PPP experiences in a group of countries. However, the identified relationships are likely to be *comparable* to similar situations. I prefer to use the phrase comparability as this softens the strong claims of generalizability. In article 2, Denmark and England are selected as comparable, but different cases, and the article does not claim that similar patterns should be found in other EU countries. However, similar PPPs types found in other EU countries are likely to have the potential for contributing in similar ways to sustainability change processes in waste management or other similar sectors. In article 3, the cases are selected as specifically collaborative and innovative ('best cases'), and as such the dynamics are not likely to represent a general picture of innovation in PPPs. However, the article shows a potential in PPPs, which should be present in similar PPP types in Denmark and England as well as in other EU countries.

Inspired by the idea of 'layered generalization' in Rohlfing (2012, pp. 204-211), the conclusions from the embedded case studies may be compared to more or less 'comparable' cases as scope conditions are extended. As such, the cases in article 2 may be compared to the role of PPPs in sustainability change of waste management in other countries, the role of PPPs in similar or different sectors in the same country or further even the role of PPPs in different sectors and countries. Similarly, the PPP cases in article 3 may be compared to similar or different PPP projects in waste management in the two countries, similar of different PPP types in waste management in different countries, or similar or different PPP types in different sectors in the same or other countries. Figure 3 and Figure 4 show the comparability of these cases to other cases of the phenomenon.

Figure 3: Examples of the comparability of cases in Article 2



Source: Inspired by Rohlfing 2012

Figure 4: Examples of the comparability of cases in Article 3

Sector context and PPP types		
Innovation in different PPP types in different sectors in Denmark and England	Innovation in different PPP types in different sectors in other EU countries	Innovation in different PPP types in different sectors in other parts of the world
Innovation in different PPP types in waste management in Denmark and England	Innovation in different PPP types in waste management in other EU countries	Innovation in different PPP types in waste management in other parts of the world
Innovation in infrastructure and service partnerships in similar/dissimilar sectors in Denmark and England	Innovation in infrastructure and service partnerships in similar/dissimilar sectors in other EU countries	Innovation in infrastructure and service partnerships in similar/dissimilar sectors in other parts of the world
Innovation in similar cases of infrastructure and service partnerships in waste management in Denmark and England	Innovation in similar cases of infrastructure and service partnerships in waste management in other EU countries	Innovation in similar cases of infrastructure and service partnerships in waste management in other parts of the world
Innovation in four selected infrastructure and service partnerships in waste management in Denmark and England		

Country context

Source: Inspired by Rohlfing 2012

Data collection

The dissertation is based mainly on qualitative, semi-structured in-depth interviews (Kvale 1994; 2006), supplemented by data from other sources such as policy documents, legal documents, websites and observations from participation in conferences, network meetings etc. in both countries. The interviews include four expert interviews and 39 semi-structured, in-depth interviews with private waste managers involved in municipal waste services and public waste managers mainly from local authorities in the two countries. In Denmark, I have conducted 25 interviews with 38 respondents from 20 different organizations. In England, I have conducted 18 interviews with 20 respondents from 16 different organizations. The slight overrepresentation of Danish interviews and respondents does not represent a purposeful distribution of effort, but is rather a consequence

of the higher accessibility to Danish respondents. Interviews with public and private managers were recorded and transcribed for further analysis, except for one where the respondent asked to not be recorded. Expert interviews were either recorded or summarized in notes.

Table 6 and Table 7 provide an overview of the interviews in the two country contexts. The data collection in Denmark took place between October 2011 to February 2013 with a few extra interviews in fall 2013/ spring 2014. Following an exploratory interview in September 2012, the main data collection in England took place in the period between May 2013 and September 2013 during a three month research stay and two extra data collection journeys to England.

Table 6: Interviews in Denmark

No.	Date of interview	Sector	Organisation	Number of respondents	Location
1	24/10 2011	Public	Vestforbrænding	1	Glostrup
2	21/10 2011	Public	Aarhus AffaldVarme	2	Aarhus
3	31/10 2011	Public	Københavns Kommune, Affaldsområdet, Drift og udbud	3	Copenhagen
4	31/10 2011	Public	Københavns Kommune	2	Copenhagen
5	31/10 2011	Public	Københavns Kommune	1	Copenhagen
6	26/3 2012	Public	Renosyd I/S	2	Skanderborg
7	28/3 2012	Public	Frederiksberg Kommune	1	Frederiksberg
8	29/3 2012	Public	Miljøstyrelsen	1	Copenhagen
9	29/3 2012	Public	Miljøstyrelsen	1	Copenhagen
10	30/3 2012	Public	Renosyd I/S	1	Telephone interview

11	12/6 2012	Private (expert)	DAKOFA	1	Telephone interview
12	11/09 2012	Public	Vestforbrænding	1	Glostrup
13	4/12 2012	Private	Stena Recycling	1	Brøndby
14	17/12 2012	Private	HCS	1	Glostrup
15	18/12 2012	Private	M.Larsen	1	Brøndby
16	19/12 2012	Private	Haldor Topsøe	1	Lyngby
17	9/1 2013	Private	Meldgaard Miljø	1	Aabenraa
18	10/1 2013	Private	RenoNorden	2	Herfølge
19	15/1 2013	Private	RGS 90	3	Copenhagen S
20	25/1 2013	Public/ Private	Dong Energy	2	Gentofte
21	15/2 2013	Private	Marius Pedersen	1	Fjerritslev
22	26/2 2013	Public	Favrskov Kommune	2	Hammel
23	5/11 2013	Public	Vejle Waste and Recycling	2	Vejle
24	20/3 2014	Public	Vestforbrænding	3	Glostrup
25	23/4 2014	Public	Amager Ressource Center (ARC)	1	Copenhagen S
In total: 25 interviews, 38 respondents and 20 organizations					

Table 7: Interviews in England

No.	Date of interview	Sector	Organisation	Number of respondents	Location
1	28/9 2012	Public	Greater Manchester Waste Authority	1	Manchester
2	1/5 2013	Public/private (expert)	Partnership UK	1	Telephone interview
3	13/5 2013	Public	East London Waste Authority (ELWA)	1	London
4	21/5 2013	Private	T March Consultants/	1	Telephone

		(expert)	CIWM		interview
5	22/5 2013	Public and Private	Greater Manchester Waste Disposal Authority and Viridor Laing (Greater Manchester) Ltd.	2	Bolton
6	29/5 2013	Public	Blackburn with Darwen UA (GMWDA constituent council)	1	Blackburn
7	13/6 2013	Public	Sheffield City Council	1	Sheffield
8	13/6 2013	Private	Veolia Environmental Services, Sheffield	1	Sheffield
9	21/6 2013	Public	Manchester City Council (GMWDA constituent council)	1	Manchester
10	24/6 2013	Private	SITA UK, RBKC	1	London
11	25/6 2013	Public	English Local Authority (anonymised)	1	-
12	29/7 2013	Public	North London Waste Authority (NLWA)	1	London
13	1/8 2013	Public	North London Waste Authority (NLWA)	1	London
14	12/9 2013	Public	Sommerset Waste Partnership	1	Birmingham
15	13/9 2013	Public	Shropshire Council	2	Shrewsbury
16	13/9 2013	Private	Veolia Environmental Services, Shropshire	1	Shrewsbury
17	17/9 2013	Public	Royal Borough of Kensington and Chelsea	1	London
18	18/9 2013	Private	Private consultancy	1	London

		(expert)	(working with DEFRA)		
In total: 18 interviews, 20 respondents and 16 organizations					

Most PPP projects were identified through a bottom-up approach of networking and 'snowballing' (Pedersen 1998), where I systematically asked contacts and respondents to recommend other relevant projects and contacts. For example, the Greater Manchester case was recommended as innovative by an expert from Partnership UK. To this author's knowledge, there is no authoritative list of all waste management PPPs in either England or Denmark, although DEFRA did have a list of local authority PFI projects in waste management, which counted 29 projects and helped provide an overview of potential cases in this context (DEFRA 2013c). I considered a more quantitative approach, for example through conducting a survey in all local authorities, but the work load of this exercise may have reached beyond the limits of this PhD project compared to the gain for the project, and thus I prioritized the detailed, processual understanding gained from conducting a range of qualitative interviews.

The PhD partner organisations were helpful in pointing out interesting cases and providing contact information on respondents through their networks in both Denmark and England. *Table 7* provides an overview of PPP projects included in the PhD. In Denmark, it was quite easy to get interviews and find the relevant persons in the involved organisations, for example through websites, press stories or the network of my partner organisations. In general, there was great interest in the PhD project, which probably helped me getting into the sector. As the material shows, I did not identify that many infrastructure and service partnerships in Denmark, but in the period of the PhD project there seemed to be a rise of both service partnerships and more networked technology innovation and policy

partnerships. The first example of an infrastructure partnership issued a tender in 2013 and has not been completed.

In England, I started with a pilot interview with Greater Manchester Waste Authority, which confirmed that these PPPs would be interesting in comparison to the Danish case. In general, it was considerable harder to get interviews in England. I made a preliminary list of English projects, which could be interesting, but had difficulties finding the right contact persons and getting people to respond and accept interviews. Therefore, I more extensively used networking and 'snowballing' to get contact information on relevant cases and respondents. This also means that although my first aspiration was to get interviews from the different parts of the country, the interviews tend to cluster around North-West England and the London Area. However, as PFIs are obliged to follow the same government guidelines, this should not matter too much for the results.

There is a great deal of variation in the organisation of waste management PPPs in England, which is caused by the various forms of public sector organisations with split-authorities etc. Through an initial mapping of variations of partnership type and organization, I aimed at including the broadest possible variation. I did not come across policy, innovation or technology partnerships through the interviews in England, but the decision to include these in the Danish context led me to an extra investigation towards the end of the PhD project, where I identified comparable organisational forms through descriptions and evaluation reports on WRAP and DEFRA's websites. I also found out that one of the respondents in the Shropshire interview actually mentioned one of the technology partnerships, but without calling it a partnership. I did not conduct follow up interviews for these projects, as the written material was quite good and I at that point had decided to

focus on service and infrastructure partnerships for the in-depth analysis in article 3.

Table 8: Collected examples of PPP projects

Denmark		
PPP type	Cases (sub-units)	Interview No.
Policy partnerships (G-M-P+)	Government initiated partnerships (incineration residue, shredder waste and mechanical sorting plants), Resursium, Copenhagen Cleantech Cluster's (now Clean) partnership on plastic waste, Copenhagen Municipality transport partnership	1, 3, 8, 9, 12, 25
Infrastructure partnerships (M-P)	Vejle Waste and Recycling (JV)	23, 11
Innovation partnerships (M-P+)	**Vejle Waste and Recycling,** (Vestforbrænding competitive dialogue on PCB in window frames)	23
Service partnerships (M-P)	**Renosyd-Marius Pedersen**, Faurskov-Meldgaard, Vestforbrænding-*HCS*	6, 17, 21, 22, 24
Technology partnerships (M-P+)	Renescience Technology (DONG Energy - Amager Ressource Center, Haldor Topsøe, etc.), hybrid waste vehicle (Meldgaard – *Banke AD - Esbjerg Municipality*, etc.), electronic registration of hazardous waste (*Odense Municipality* - Stena Recycling), *Innosort*	3, 12, 13, 16, 20, 25
England		
PPP type	Cases (sub-units)	Interview No.

Policy partnerships	WRAP initiated partnerships (Metal Matters, Local Reuse Partnerships)	11
Infrastructure partnerships **- For waste treatment (WDA-P)** **- For waste treatment and collection (UA-P)**	- GMWDA-VLGM Ltd. (JV), NLWA, ELWA-*Shanks* - Shropshire-Veolia, Sheffield-Veolia, (Sommerset Waste Partnership – *KIER/ May Gurney* (public partnership with partnership relationship to contractors))	1, 2, 5, 6, 9, 11, 3, 12 14, 15, 16, 7, 8
Service partnerships (WCA-P)	**RBCK-SITA UK**, Trafford Council-*Veolia*, Manchester City Council-*Enterprise* (JV)	10, 17, 11, 9
Technology (innovation) partnerships	Anaerobic Digestion (Shropshire (District) Council - *(Biogen) Greenfinch*), Mechanical Heat Treatment (*Merseyside WDA - Orchid Environmental*)	15

Abbreviations: M: Municipality or municipal company, P: Private Company, G: Government organization, WDA: Waste Disposal Authority, WCA: Waste Collection Authority, UA-Unitary Authority, JV: Joint venture. *Italic*: no interview, **Bold**: selected for comparison in article 3

I did not demand specific respondents when asking for interviews, but sent an outline of the main interview themes and questions to the provided contact, and asked if they or one of their colleagues would be able to assist me. In some cases I talked to Managing Directors or Heads of waste management having an overview of the organisation, in some cases with contract managers designing and operating the contracts in practice and sometimes with both levels. This probably also linked up to the size of the organisations involved. A managing director in a small waste collection company may be closer to the operational process, than a comparable

person in a large multi-national company. In local authorities I sometimes interviewed both Heads of Waste managements and operational staff. In some cases, the public or private contact in the case organisation was helpful in setting up interviews with both partners in the same day. I had one joint interview with the public and private organisations together, GMWDA and VLGM, which was helpful as they could supplement each other's understanding of the process, but I decided to split up future interviews to make sure that the respondents did not feel they needed to dilute their descriptions of experiences and relationships because of the presence of their partner. In the articles I reference to the specific organization or to a 'respondent' from the organization regardless of the specific title of the interviewed to uphold anonymity of the source.

Besides sub-unit cases of specific PPP projects, I also interviewed public and private managers in cases, which were more 'borderline' partnerships or plain traditional contractual relationships to get a fuller picture of partnership choices. I also interviewed one public authority with mostly in-house waste collection and one with some in-house. In Denmark I began by interviewing the three partner organisations and a number of private waste management companies to achieve familiarity with the field and get an impression of the current organisation and main challenges experienced in the Danish waste management sector. A main result was the identification of a general feeling of distrust between public and private actors and an interest from both sides in improving relationships between public authorities and private contractors. As such, this provided the background for understanding the broad interest in service partnerships. The results of the interviews with private actors were collected in an empirical report, which was discussed with the PhD partner organisations.

The inclusion of 'odd cases' was also to assure that I had captured the difference between traditional contracting out, in-housing and partnership arrangements. These cases are not included in the articles, which focus on PPPs, but they provide interesting insights and perspectives on the PPP cases. I will return to the analytic consequences of this in the section on data analysis. Table 9 shows the included alternative organizational arrangements (odd cases).

Table 9: Collected example of alternative organizational arrangements

Denmark		
Organizational form	Examples	Interview No.
In-house	Frederiksberg Municipality (residual waste/recycling), Renosyd (paper)	7, 10
Traditional contracts	Copenhagen - HCS, M.Larsen, RenoNorden, RGS90, Aarhus Municipality - *Miljøteam*, Vestforbrænding - M.Larsen	1, 2, 3, 4, 13, 14, 15, 17, 18, 19
England		
Organizational form	Examples	Interview No.
Traditional contracts	Blackburn with Darwen UA	6

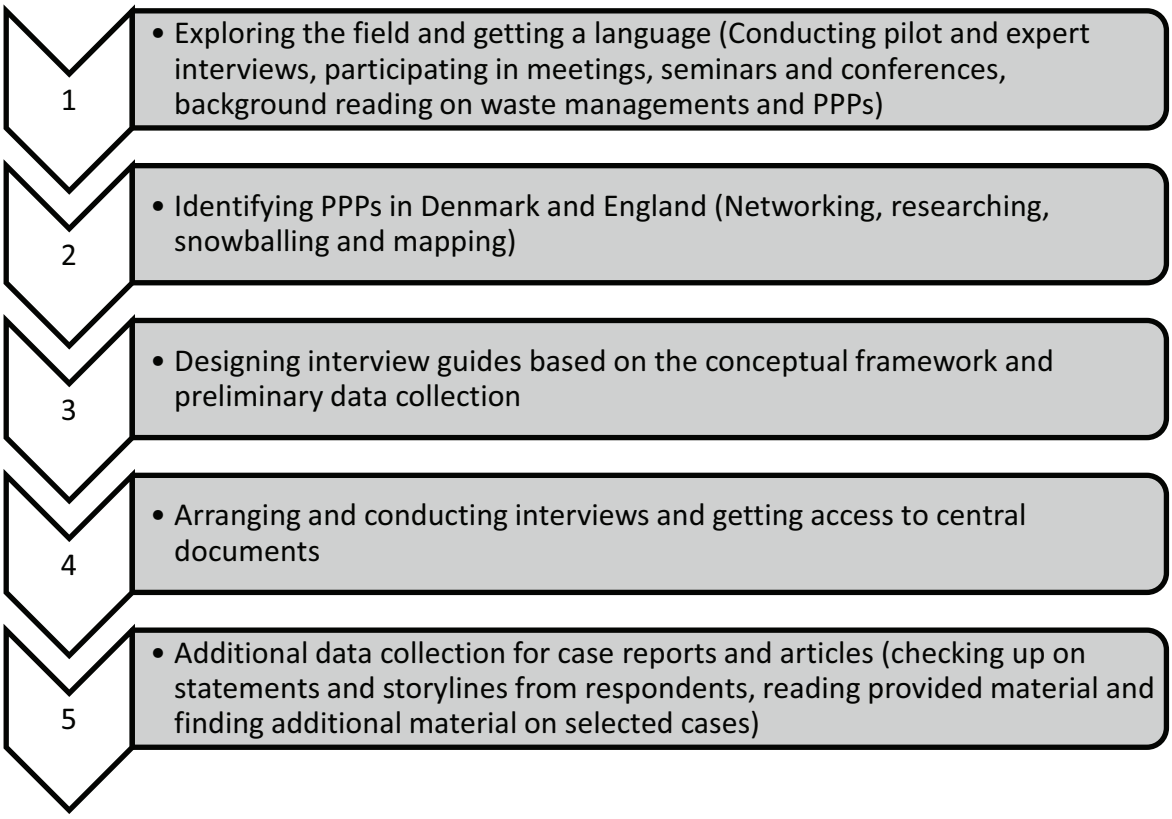
As mentioned, interview data has been supplemented by textual data from websites, procurement material, contracts, policy strategies, reports, legislation etc. as well as observations from participation in meetings, seminars and conferences in both countries. In Denmark for example, I attended several of DAKOFAs conferences (Dansk Kompetencecenter For Affald – Danish Waste Competences Centre), which gathers public and private actors and legislators. I also attended meetings in a public procurement network between some of the large public actors in the sector, which I used to discuss some of my first ideas, and I

was present at various events hosted by the Copenhagen Cleantech Cluster (now 'Clean'), a relatively new networked cluster facilitating innovation partnerships in waste management among other green technology subjects, in order to experience how these events were organised. Furthermore, I was allowed to observe a partnership meeting in a Danish service partnership, which gave me an impression of the ambiance and the type of subjects discussed.

In England, I attended the RWM conference 2013 in Birmingham, a large Waste Industry conference organized on a yearly basis, where I followed the debates and conducted an interview, and I was at a waste seminar at Manchester University, where I conducted the exploratory interview. I had a three month research stay at Manchester Institute of Innovation Research (MIoIR) at Manchester University from primo March to end of May 2013 primarily to begin the collection of data, but also to follow their research in innovative procurement and sustainability transformation. I also attended two academic conferences in Birmingham and Liverpool, the yearly Public Management and Administration Post-Graduate Conferences, to discuss my research with English researcher in the field. Furthermore, I attended the International Solid Waste Association's (ISWA) 2013 conference in Vienna with a paper presentation for an international audience.

Summing up the process of data collection, this process unfolded in five iterative phases (see Figure 5):

Figure 5: The process of data collection



Interviews

As mentioned, the interviews were qualitative, semi-structured, in depth interviews (Kvale 1994; 2006).Most interviews were face-to-face, but some of the expert interviews and one follow-up interview were telephone interviews. Interviews typically lasted between 1-2 hours and were recorded with consent from the respondents, except for one case, where the respondent preferred not to be recorded. Interviews were generally conducted in the respondent's own environment, which also provided the possibility of getting an impression of the organisation and facilities (Cassell 2009, p. 504-5). Interviews were conducted on the basis of interview guides outlining main topics and provisional key questions

constructed on the basis of existing literature and preliminary constructs in the conceptual framework. Although the interviews were structured towards a specific aim, the lines of questioning were fluid to allow openness towards the respondents' answers and storylines (Kvale 1994, p.129, Cassel 2009, Yin 2009). I took time at the end of the interview to check, if we had covered central topics and questions.

Interview guides were evaluated and adjusted over time and altered to fit each interview situation. They tended to follow this general outline:

1. Personal background and organisation
2. The public-private partnership (organisation, process, objectives, relationships, etc.)
3. Innovation (examples, innovation types and scopes, innovation dynamics (competition/collaboration/(hierarchy))
4. Context (sustainability transformation, public/private developments, market developments, external relations/networks, EU/National legislation).

The interviews aimed both at retrieving factual accounts and the opinion and experiences of the respondents (Yin 2009, p.107). The main purpose of the interviews was to get the interviewees to describe PPP and innovation processes, in which they had been personally involved. I also asked about their perception of sustainability as a political objective in the sector and in their own organisations, and how this affected their work. Many of the informants had at least ten years of experience in the waste management sector and were able to provide first hand stories of developments over time and thus place the projects in this context. As such, respondents were interviewed as 'experts' having specific knowledge of these processes, which was not available elsewhere (Gläser and Laudel 2009).

Examples of interview guides for public and private managers in England and Denmark may be found in *Appendix 1*.

However, the interview situation is a constructed situation and the descriptions of processes expressed the respondents' memory and interpretation of the situations and relationships (Cassel 2009). To strengthen the validity of results I aimed at interviewing both public and private actors in a partnership when possible, and supplemented and triangulated interview data with data from other sources (see section on data analysis). Overall there was a good correspondence between interviews from the same cases, which supported the descriptions and interpretations in single interviews.

As some of the themes were abstract theoretical concepts and relationships, I attempted to translate and operationalise these to a practical context in interview questions. For example, I could not ask a public waste manager: 'Did competitive drivers lead to innovation?' Instead I might ask, a) if there had been competition for the contract, and b) if the private bidders brought new ideas in the procurement process or c) initiated or contributed to improvements in the contract period? Sometimes I would get the answer that it was not possible for private actors to bring new ideas because of the procurement rules, or that they weren't usually expected or asked to do so, which potentially led to a discussion of the legal framework. As such, I allowed the interviews to take different turns.

The other way around, I also had to build up a language to talk to respondents and understand the 'lingo' of waste management and PPPs (Yin 2009). This was especially a challenge in the first interviews in England, where I was less familiar with the organisation of waste management and the technologies used. For example, Mechanical-Biological Treatment (MBT) technology is well-known in

England, where in some cases it replaced incineration as a treatment technology for residual waste, but is not used in Denmark. Therefore, especially in the beginning, I also asked rather technical questions in the interviews asking for example about the technologies, the English organisation of waste, etc., which I could then follow up on afterwards in my research. Especially since the PhD was concerned with innovation, I needed to understand the basics of standard collection and treatment methods, technologies and forms of organizing to discuss potential innovations with respondents.

Ethical considerations

Two key ethical considerations when conducting interviews is power relations and protecting the interviewee from being abused (Cassell 2009). I have aimed for the interview to be a good experience for the interviewee and for building a professional, but trust-based relation, where informants felt they could share their understanding of both positive and more critical aspects of their experiences to an interested listener. However, building trust also means taking responsibility for the information provided and protecting the respondents personally as well as their organizations from potential harm (ibid.). As Kvale (2006) suggests, the interview might employ an asymmetrical power relationships, where the interviewer both directs the interview and upholds the monopoly on interpretation. I was especially aware of this, when I interviewed private companies, where publicised results could influence a competitive situation. In Denmark, some of the interviewees were contractors to the partner organisations, and since this might be a sensitive situation, where I could be seen as representing the partner organisations, I have not included any of these in the selected cases for the third article.

However, as Lawthom (1998) suggests, power relations in the interview situation may be more complex. In line with her, I went out in the field as a relatively

young woman interviewing typically elder men with more knowledge and considerable power in their organisations. In these situations, I needed to establish myself as a knowledgeable person worth talking to and able to control the interview processes to avoid 'parent-child' like relations. In relation to the before-mentioned task of 'getting a language', the asking of technical questions needed to be balanced with establishing myself as a serious person, and so I spent a considerable amount of time reading up on waste management as an empirical field, following current debates at conferences or in the media, reading relevant regulation and policy strategies, etc.

Whereas anonymity is often used to protect respondents, I have chosen to only anonymize respondents personally and in general not the organisations in the articles. This choice was made to be able to describe the context for and rich details in the cases, which I felt was important to provide in-depth understandings of conditions and processes. The choice was made in conjunction with the analytical choice in article 3 of selecting cases that were considered innovative and collaborative, and as such, may be described as being 'successful' partnerships. In these cases, non-anonymity might actually be an advantage for participants as this grants them 'ownership' of their own work (Patton 2002, p.141). In contrast, I was very careful of mentioning partnerships where relationships could be characterized as more troubled. It could have been interesting to include one or two cases in article 3 that were not innovative or had developed into a conflicted, transactional relationship, but this would most likely have demanded anonymity of the cases. To make up for the lack of anonymity, I have presented respondents represented in the articles with the within-case analysis of their own organizations to provide them the opportunity to correct potential factual mistakes or problematic citations. This resulted in minor alterations and one request for anonymity.

Data analysis and concept development

The process of data analysis has taken place in an iterative process between theory and data. Cases were analysed separately through within-case analysis and afterwards compared to identify variations and patterns through cross-case analysis (Eisenhardt 1989, Stewart 2012). Cross-case analyses were constructed and presented in matrixes (Miles and Huberman 1994). *Article 1* provides a matrix of potential and challenges to innovation in three PPP types derived from existing theories and empirical categorizations (cross-case analysis) and a figure placing these PPP types between NPM/competition and governance/collaboration compared to the scope of innovation (cross-case analysis). *Article 2* provides matrixes of identified PPP types with empirical examples (cross-case analysis) and the role of PPPs in sustainability change in England and Denmark (cross-case analysis). *Article 3* provides matrixes of mixed governing strategies for innovation in each case (within-case analysis) and across cases (cross-case analysis).

I used the qualitative data programme NVivo 10 for some of the first screenings of the material to test and develop the conceptual frameworks. NVivo was helpful in pushing for close 'sentence to sentence' reading of the interviews and development of inductive categorizations. For example, I coded for different types of organization and PPPs, different types of innovation identified in interviews and 'drivers/strategies of innovation'. The last mentioned category was expanded from collaboration and competition to include hierarchy after several statements in the interviews, which directed attention towards the importance of this managerial strategy as well. However, I found the programme less helpful in providing an overview of single cases, and it was often the case that several mechanisms (such as collaboration *and* competition) were at play in one section, which was easier to identify through conventional manual coding (see article 3). Therefore, I also

coded the interviews either manually or in the app 'iAnnotate' (which allows for multi-coloured coding of pdf files).

From this coding I produced case reports (Yin 2009) structured by the main interview topics on each of the cases mentioned in the articles and some of the 'odd cases' for comparison. The case reports also included additional sources, such as websites, contracts etc., which I used to triangulate interview data ,especially regarding factual issues such as the form of the contract, time of procurement, recycling percentages mentioned, political strategies, etc. The case reports provided an overview of the single cases and were very helpful in the writing process. The thesis does not include examples of coded interviews or case reports due to sensitivity issues for the involved organizations.

I began the process with a theoretical review combined with introductory interviews and background reading on waste management. As such, the first draft of article 1 was developed in tandem with the introductory interviews with public and private managers in Denmark, which helped sharpen the constructs and get a 'real-life' picture of how these abstract dynamics might work in practice in the empirical field. From the beginning of the PhD I was especially inspired by Erik-Hans Klijn's (2010) chapter in Hodge, Greve and Boardman's International Handbook of Public-Private Partnerships, 'Public-private partnerships: deciphering meaning, message and phenomenon' on PPPs as hybrid ideas inspired by NPM and Governance, and Vivian Lowndes and Chris Skelchers (1998) article, 'The Dynamics of multi-organizational partnerships: an analysis of changing modes of governing', in which they describe network, hierarchy and market as various forms of social coordination in PPPs and describe competition and collaboration as various organizing principles. Furthermore, the work of especially Steijn, Klijn and Edelenbos (2011) and Weihe (2010) directed my attention to the

potential advantage of a processual approach to studying PPPs and the importance of management. These theoretical considerations directed the first interview guides.

I identified a gap in literature on the process of innovating in PPPs, and also a confusion regarding collaboration and 'synergy', which was the most used argument as to why PPPs should bring 'better solutions', but also criticised by authors stating that this close collaboration did not actually take place. As such, the PhD journey began with the following main puzzles: PPPs are often connected to objectives of innovation, but do they actually bring innovative solutions? Is close collaboration necessary to conduct innovation in PPPs, and are PPPs collaborative? How may managers increase innovation from PPPs? The theoretical review in the first article came out of numerous questions from peers regarding why I investigated innovation in PPPs? Why should PPPs be particularly innovative? Why did I not start by tracing innovations to see if PPPs were the best policy instrument among others? This paper provided the first answers to 'why PPPs should lead to innovation', or as formulated in sub-question 1, 'What is the potential for conducting innovation in PPPs?', which was further developed and adjusted in the data analysis process towards the conceptual framework used in the third article.

Whereas in the first article I identify hierarchy as a potential 'third' driver of innovation in PPPs, the third article expands the conceptual framework to include this aspect as well. I did not change the framework of the first article, as I still believe this was a valid starting point from existing theory. The third article also more explicitly adds management of PPPs as a variable supporting contract and organizational form in getting innovative results. Much of the information on management was derived from the descriptions of the PPP and innovation

processes, but I also specifically asked the respondents how these partnerships were managed between the partners and what elements were important for well-functioning partnerships. In article 2, I identify and categorize various PPP types. These 'ideal types' were constructed partly in an iterative process based on theoretical categorizations from existing PPP literature, the differing roles of actors identified through the sustainability transformation framework, the empirical categorizations in chapter 3 and an inductive categorization of empirically identified partnerships. The sustainability transformation framework was especially useful in showing the structural conditions in waste management systems for the development and implementation of more sustainable solutions, discussing the outcome of innovation processes and the strategic roles of various actor groups in innovation and sustainability processes.

Perspectives from 'odd cases'

Finally, I would like to describe some of the perspectives and considerations, which came from interviewing public and private respondents from other than partnership arrangements, the odd cases. These cases were not directly included in the articles, which focus on PPPs, but they nonetheless were part of the analytical process. One interesting observation was that not only PPPs, but also traditional contracting out arrangements could have more or less 'genuine' partnership relationships depending on the actors involved. The construction of the hierarchy/competition/collaboration framework was actually developed through coding processes that included also more traditional contracts in the Danish context. For example, Copenhagen Municipality had a traditional contract with a private company, in which contract managers on both sides were eager to 'make things work' and described the relationship as 'partnership like'. This supported the initial expectation that management matters a great deal in forming PPPs in practice.

In the in-house example, Frederiksberg Municipality, the municipality had attempted to contract out its waste management services, but for most waste types (except hazardous waste and glass, which were contracted out) only one bidder had emerged and the municipality's control bids were lower priced. The municipality had a separate operational unit, which performed according to the policies decided in the political waste and recycling department, and as such there was an organisational split quite similar to a contractual arrangement. When I conducted the interview in March 2012, the municipality had just announced a saving of 13% of the budget by in-housing compared to the cost in their contract with R98 (dakofa.dk). Thus, despite the fact that most of the respondents recalled budget savings from contracting out, this case showed that a well organised in-house arrangement could bring savings and innovation as well. This confirms the conclusions of Slater et al (2007) that PPPs may not necessarily be more innovative than other organisational forms. In general, the empirical material includes many interesting stories, which sadly could not all be included in the articles.

Conclusions: Exploring through a comparative, embedded case study

The PhD is based on a comparative, embedded case study investigating the development and implementation of innovation and sustainability change in PPPs in two national cases, England and Denmark, and four sub-units, one service partnership and one infrastructure partnership from each country. The selected PPP projects are:

1) The partnering contract for waste collection and street cleansing services between the Royal Borough of Kensington and Chelsea (RBKC) and SITA UK,

2) The PFI joint venture contract for a number of waste processing plants, transfer stations plus communication services and education services between Greater Manchester Waste Disposal Authority (GMWDA) and the private consortium

Viridor Laing (Greater Manchester) Limited (VLGM Ltd.), which also included a Special Purpose Vehicle (SPV) with the private company Ineos Chlor,
3) The service partnership contract for waste collection services between the public company Renosyd I/S and the private company Marius Pedersen A/S,
4) The potential joint venture partnership contract for the construction of a new 'resource centre' and a number of administrative and service tasks in Vejle Municipality, which also included an innovation partnership with Marius Pedersen A/S in the development phase.

The case study is explorative and aims to test and develop theory on the basis of real-life empirical cases analysed through an iterative process of moving between theory and data. The case study is mainly based on qualitative, semi-structured, in-depth interviews supplemented and triangulated by data from other sources such as policy strategies, contracts, websites, etc. The interview respondents were public and private managers involved in PPP projects as well as experts and managers from alternative organisational arrangements. The data includes four expert interviews and 39 interviews with public and private managers.

Chapter 6: Conclusions, contributions and outlook

This chapter concludes the PhD and provides a collective answer to the main research question based on the introductory paper and the three research articles. The chapter also outlines the main contributions from the PhD thesis to various research fields and provides an outlook with suggestions for further research.

Main conclusions

This PhD thesis has taken a journey through recent developments and contemporary challenges in municipal waste management. The thesis has focused on the potential role of PPPs in the development of innovative and more sustainable solutions in municipal waste management. Recent years have shown increasing demands for municipal waste managers to move toward the top levels of the waste hierarchy, while ensuring efficiency in service delivery through contracting out arrangements with private contractors.

In this traditionally strong public service, private businesses are also increasingly involved in the development of new waste technologies and as receivers of recycled products at processing plants and for new production processes. As such, there is an increasing interdependency between public waste managers having 'ownership' of municipal waste and being responsible for service delivery to citizens and private businesses participating in these processes. This interdependency has amplified the attention towards public-private partnerships as policy instruments.

However, theoretically based, empirical investigations of innovation and sustainability changes in PPPs have been scarce, scattered between various sectors and research fields and shown different results. On this background, the thesis has asked the following main research question:

What are the potentials and challenges in public-private partnerships (PPPs) for conducting innovation towards the objective of sustainability transformation of municipal waste management systems?

The main research question was supported by three sub-questions:

1) What is the potential for conducting innovation in PPPs?

2) How may PPPs contribute to sustainability transformations? What is the role of PPPs in English and Danish sustainability transformations of waste management systems?

3) How is innovation conducted in PPP processes, and in what way may public managers support this?

These sub-questions were addressed in three independent research articles, which feed into this general conclusion.

To answer the research question, the PhD has engaged in a focused review of PPP literature, where PPPs are defined broadly as '*cooperative institutional arrangements between public and private sector actors'* (Greve and Hodge 2005). PPPs come in many forms and shapes and continue to evolve as new PPP types emerge and older forms are adjusted to current needs. This created a need to clarify which types of PPPs would be relevant to focus on in municipal waste management (Why is the PPP initiated? Who participates in the PPP? How is the PPP organized? (Glendinning and Powell 2002)). The PhD has mainly focused on PPPs between local authorities responsible for municipal waste management services (or publicly owned companies to whom this task has been delegated), and private businesses taking part in the development and delivery of these services. These PPPs are generally organized through contracts, joint venture arrangements or less formal collaborative agreements. The thesis also includes more networked

forms of partnerships, where local authorities and private businesses take part in efforts of developing or implementing new policies and/or technological solutions.

Furthermore, the review pointed towards the need to understand PPPs in the context of particular historical, cultural and political contexts and revealed a 'processual and managerial turn' in PPP research stressing the importance of investigating the micro-processes of PPPs and especially how these processes are managed. The review suggested that PPPs are not simply collaborative or non-collaborative, but can be more or less based on 'genuine' partnership relationships and managed through a mix of hierarchical, market-based and networked forms of coordination. Although innovation is not always the main objective of PPPs, innovation is often implicitly embedded in the idea of PPPs. Two ideas on PPP innovation risk being mixed up; a) the idea of achieving efficiencies through delegation to private businesses (NPM), and b) the idea of bringing together actors and organisations to pool ideas, resources, expertise and knowledge to develop better solutions to complex societal problems (Governance). The PhD suggests that these arguments should be clearly separated to produce more precise expectations and ensure the application of appropriate governing strategies.

The potential and challenges for the identified PPP types were investigated through an embedded comparative case study of the role of public-private partnerships in sustainability transformation processes of English and Danish waste management systems with in-depth analyses of innovations processes in four selected PPPs. The data collection included 43 qualitative interviews with experts and public and private waste managers involved in different PPP types across England and Denmark, which was supplemented by textual data from policy strategies, contracts, websites, EU and national regulations, etc. The process also involved a longer research stay in England and observations from

network meetings, conferences etc. in the English and Danish waste sectors. Data collection took place between February 2012 and April 2014.

On this background, the PhD thesis concludes that public-private partnerships do have potential to be relevant policy instruments for conducting innovation towards the objective of sustainability transformation in municipal waste management systems, but also that challenges remain. The PhD shows that various forms of public-private partnerships play a prominent, but also contested role in the sustainability transformation processes of municipal waste management in England and Denmark. The thesis identifies a number of different partnerships in waste management with various purposes, such as service delivery, policy development and technology testing. The investigation of these partnerships points towards various potentials and challenges for conducting innovation towards sustainability transformation of municipal waste management.

Public-private partnerships provide a unique potential for conducting innovation through a mix of hierarchical, market-based and networked governing strategies, which in the right balance provides possibilities for both organizational and service innovation. The formation of a public-private partnership in a specific setting may also in itself be considered an innovation, and the thesis shows how the form and specific organization of partnerships continuously evolve. A broad palette of partnerships from more networked types to more tightly organized contractual partnership may contribute to sustainability transformation processes through a patchwork of experimentation in collaborations between actor groups with different positions in the waste system. In these partnerships, policy makers, legislators, knowledge institutions, local authorities and private businesses may engage in reciprocal processes of dialogue and negotiation to align policy development and legislative frameworks with the development and testing of new

technologies and implementation of market mature solutions in practice. The thesis suggests that an overarching strategy for public authorities might be to engage in a broad palette of partnerships to gain from the potential in various partnership types.

However, there are also challenges for conducting innovation towards sustainability objectives in public-private partnerships. Especially contractual partnerships for service delivery may involve inherent tensions between hierarchical, competitive and collaborative strategies conditioned by a restrictive public procurement regulation. A main challenge for public managers to strike a good balance between these various governing strategies, so that unnecessary hierarchy does not block for private input, an intense market-focus does not shift the focus away from environmental concerns and too much collaboration does not lead to standstill. Accordingly, adding to their 'old' role as administrators and service providers, municipal waste managers may need to take on new roles as markets and network managers to mobilize and engage various actors in the resource challenge.

Despite the positive connotations to partnership working, the argument of societal gains from involving private actors more directly in the provision of waste facilities and services to some degree remains unclear. Regardless of new narratives of waste as a market, resource or 'non' waste, waste continuous to be an environmental problem that needs public safeguarding. Partnership contracts provide a monopoly situation, where public authorities are bound to one contractor for potentially 20-35 years. Especially in times of transformation, this lock-in can become a challenge. For partnerships to be potential preferable policy instruments to more flexible and easy controllable in-house solutions, increased flexibility, mutual dialogue and improved incentive systems are strongly needed. Essentially,

for this to work there need to be willingness in the involved organisations to work in partnership. Some of the newer partnerships identified in this PhD do work towards these aims, and the future will show if they will succeed in these efforts through the length of the contracts.

The role of PPPs should be seen in connection to the political, cultural and historical contextual environment, where new waste narratives, political targets of sustainability transformation and shifting public-private relations challenge waste management as we know it today. The thesis revealed waste management as a very competitive sector, where sustainability objectives are interlinked with various potentially conflicting interests. Future solutions are not yet clear, but it is likely that some degree of public-private partnership working will continue to be part of it. However, this will depend on strategic choices in various actor groups. The new public procurement directive points towards more innovative partnerships in the future, but it remains to be seen how this opportunity will be exploited by local actors and how it will work in practice.

Whereas this thesis has mostly considered increasing recycling, which has framed the efforts of sustainability transformation so far, the prospect of moving even further up the waste hierarchy towards waste prevention provide a new challenge for public waste managers and partnership arrangements. Here, public managers may be in lack of viable tools. Waste minimisation campaigns and reuse shops may go some of the way, but eventually this task mainly lies with private design and production companies – or preferably – in dialogue between these two parts of the waste system. Also in waste prevention, different interests may be in play. Preventing waste production may reduce costs of waste management for local authorities, but it also removes waste from waste treatment facilities they have invested in and diminishes their role in waste systems. National governments may

foremost have an interest in reaching EU targets for recycling and diversion from landfilling, whereas prevention might actually decrease recycling percentages. Private companies may have an interest in branding themselves as responsible businesses and see the potential in reducing production costs by safeguarding materials, but such change processes demand resources.

In Denmark, these new actors are increasingly enrolled in networked partnerships such as the plastic waste partnership facilitated by Copenhagen Cleantech Cluster. However, in this case, the former environmental 'laggard' England may point the way with initiatives such as 'metal matters', where the metal industry and local authorities engage in concrete local change processes towards common aims of increasing recycling. Whereas the dialogue between waste producers and waste managers may be manageable in local and national contexts, today's global production systems provide even more challenging conditions for local authority managers and private waste companies searching for better solutions. Why should Adidas choose to collaborate with Næstved Municipality and their private contractor from Denmark? Waste management is essentially a 'glocal' problem and therefore there will also be a need for international and cross-European initiatives. Hopefully, experiences from existing partnerships 'do's and don'ts' may be canalised into future partnerships to increase the possibility for good results.

Contributions from the research articles

The following section will describe the more detailed contributions to the conclusion from the three research articles.

The first research article in the PhD mainly addressed the first research sub-question, 'What is the potential for conducting innovation in PPPs?' The article

suggests that although existing empirical analyses also included less innovative results, the few positive examples show that there is potential for conducting innovation in various PPP types, which may be further explored in the future. The potential for conducting innovation varied between the three investigated PPP types, where they could be connected to the various mixes of competitive and collaborative drivers in the organizational form of these PPPs.

- *Infrastructure partnerships* employed a strong competitive driver for innovation within the public organisations affordability limit, and whereas procurement legislation limits the dialogue between public authorities and private bidders, the introduction and ease of access to 'competitive dialogue' show a realization of the need for more collaborative processes. Because of the risks involved, infrastructure partnerships may introduce innovative technology in a specific local setting, but is less likely to bring radical innovation.

- *Service partnerships* specifically focus on moving away from adversarial contracting towards a more collaborative approach in order to develop more flexible, trust-based and open relationships. These relationships are supported by economic incentive systems that align the interests of finding improvements for public and private organisations and may bring either 'big bang' or more gradual improvements. However, it may be difficult to develop trust-based relationships in practice, where differences in culture and interests remain a challenge.

- *Innovation partnerships* are designed to provide a forum for more radical innovations and tend to be less formal and more collaborative than other partnership types. There is a strong competitive driver for private companies in achieving competitive advantages from the development of new solutions, which are tested and tried on 'customers' in a public organisation. The main challenges

mentioned are the cultural differences, legal complexities and a lack of model procedures, which to some degree might be remedied with the coming EU procedure for innovation partnerships.

Accordingly, it seems that at least some of the experienced challenges of finding innovative solutions in cooperation between public and private actors in PPPs have been improved by the new public procurement directive, and it will be interesting to see how this potential will be exploited and if the future will bring more innovative PPPs in service delivery. Existing results suggest that a broad understanding of innovation, encompassing both radical and more incremental forms as well as combined technological, product, process, organizational and political changes involved in service innovations, is important to shed light on the many possibilities for conducting innovation in PPPs.

The second research article moved on to explore the role of PPPs in waste management in the two national cases, England and Denmark illustrated by examples of identified PPPs. The article mainly addresses the second sub-research question, 'How may PPPs contribute to sustainability transformations? What is the role of PPPs in English and Danish sustainability transformations of waste management systems?' The article shows that three broad types of PPPs are used to develop and implement new solutions as part of sustainability transformation processes in English and Danish waste management, where they contribute to various degrees of sustainability change. The article suggests that PPPs may contribute to sustainability transformation by facilitating interplay between actors across landscape, regime and niche levels to align policies, regulations, challenges and new solutions in processes where more sustainable technologies may be developed, tested and directed into existing regimes. These processes are not without challenges, as new solutions may contest existing systems and actor

positions, where lock-ins due to heavy investments, vested interests, regulation favouring existing systems, interdependencies in complex networks of actors and organisations and old ways of thinking may produce resistance to and difficulties for change.

The article identified three types of PPPs in English and Danish sustainability transformations of waste management systems: policy partnerships, service delivery partnerships (including infrastructure and service partnerships) and technology partnerships.

- *Policy partnerships* were used to develop new solutions nationally or in local contexts to implement sustainability objectives in existing policies. In England, the government facilitated and supported networks and local reuse partnerships between local authorities and private businesses through the arm's lengths organisation WRAP. In Denmark, the government and other facilitating organizations gathered various actors to identify solutions to pressing problems, which supplements a long tradition of incumbent regime actors collaborating to continuously improve and test new waste technologies. Whereas English policy partnerships focus on implementation of new solutions in specific local contexts, Danish partnerships can lead to more or less concrete results, and it may be important for government organisations and other facilitators to remember that solutions need to be anchored locally to reach implementation.

- *Service delivery partnerships* were used especially in England to provide more sustainable waste treatment facilities with private funding, whereas the tradition in Denmark has been that publicly owned companies provide this infrastructure (mostly in terms of incineration plants), whereas private companies have managed facilities for preparation of recyclable products to further use. However, there is a

continuous pressure for privatization of waste treatment in Denmark and the future for publicly owned companies is insecure. PPPs have come into play in relation to the potential establishment of new mechanical sorting plants for recyclables, which are new in a Danish context, but used broadly in England to separate co-mingled collected recyclables. There is reluctance towards PPPs among both public and private actors. Local authorities and public companies have an interest in bringing in private actors to be able to include business waste and thereby increase economies of scale, but are reluctant to enter into stiff contracts that would lock them into solutions for many years that they are less able to affect. They prefer the model of joint ownership in public-private companies, but legislation today prevents this model. Private businesses may see a business potential in new sorting plants, but may be less interested in giving up exclusive right of collecting and treating business waste.

Looking at the experiences in England, especially early PFIs have been challenged by contractual arrangements that prevent them from following new policies of increased recycling. Newer PPPs have worked towards increasing contract flexibility, better risk sharing and providing the right incentives, but the future will show if these PFI/PPP contracts will also lock-in waste management practices. In England, PFI contracts are generally arranged as joint ventures, which co-govern the contract across various levels in the involved organisations. There seems to be a more flexible approach to PPP arrangements in England, which may inspire actors in Denmark. Nonetheless, English PFIs have also been criticized for not being 'value for money', amongst other reasons because the complexity of these large integrated projects increases risks and decreases financial transparency, and for leading focus towards large-scale recovery solutions rather than smaller recycling schemes. There is an irony in the fact that the Danish waste management sector considers PPPs at a time, when the English government have stopped their

PFI programme. However, in England this seems mostly to be a question of the government reducing its spending on waste management as a part of the financial cuts following the global economic and financial crisis.

In both England and Denmark, there has been a move towards more partnering arrangements in waste collection, where 'service partnerships' and 'partnering contracts' have provided new contractual frameworks to improve relationships between authority and contractor and provide greater flexibility for gradual improvements of waste collection systems. In Denmark, these partnerships have arisen on the background of increasingly adversarial relationships in traditional contracting out, where distrust between public and private actors have spread from former bad experiences. In line with increasing competition, prices for waste collection have fallen with some private companies perhaps bidding too low to win contracts, and then hoping to gain extra profit from the contract later on, for example by adding prices for extra services. This has in turn led public authorities to be more aware of the wording in the contracts, and as contracts have gotten longer and longer, flexibility in these cooperations declines. Service partnerships may contribute to breaking this dead still and build trust between public and private organizations. Experiences so far have been good, although the potential for joint innovation could be explored even further.

In England, the introduction of partnering contracts seems to be more connected to the need for flexibility and innovation of waste collection systems in a time of rapid political and systemic change. Local authorities are asked to increase recycling in a time, where they have also been facing continuous economic cut downs in their budgets. However, increasing landfill taxes have made it more expensive for them not to introduce new solutions. An example in the article showed how such a close-knit, open and equal relationship made possible a

change in collection rounds that led to economic savings while safeguarding recycling. Although these partnerships may not necessarily be more innovative than other contracts, English experiences suggest that they seem to increase flexibility and the willingness to find the best solutions for both partners in these change processes.

- Lastly, *technology partnerships* provided incubation rooms for development and testing of new technologies in closed groups of actors including for example local authorities or publicly owned companies, various technology producers and private waste management companies often supported by state funding. In England, DEFRA launched the New Technology Demonstrator Programme to encourage the development of new technologies for waste recovery, which until it was closed in 2009 supported two local partnership arrangements that brought new knowledge on Anaerobic Digestion and Mechanical Heat Treatment and led to the establishment of commercial plants. In Denmark, a number of programmes for technology support exist. The focus on engaging and investing in innovation projects seems more rooted in the Danish waste sector, where a number of technology innovation projects are initiated by either public or private organisations. These differ in size and scope and may even have global outreach such as the REnescience project.

Summing up, the article contributes with a more systemic perspective on innovation and system change, which places PPPs in the political and historical context of complex, interlinked processes of transformation and resistance between various actor groups in socio-technical systems. English and Danish experiences show that a broad palette of partnership types may be mutually supporting in the innovation of waste management systems towards gradual system transformation, although in both countries, especially service delivery

PPPs remain contested as policy instruments for sustainability transformation. The future for PPPs in waste management in England and Denmark depends on strategic choices by central actor groups.

From this overview, **the third research article** zoomed in on four selected service delivery partnerships, an infrastructure PPP and a service PPP in each country, to investigate the processes of innovating in more detail. As such, this article followed down the line of the 'processual and managerial turn' in PPP research to investigate the processes of these PPPs from the pre-contract phase and contract-design to the following post-contract phase. The article mainly addresses the third research-sub question, '3) How is innovation conducted in PPP processes, and in what way may public managers support this?' The articles suggests that PPPs may deliver innovation in terms of the PPP itself or through adjustments to current PPP forms (governance and organizational innovation), and in terms of service innovations, which tends to combine elements of technology, product and process innovation. The four cases all displayed a mix of governing strategies from hierarchy, market and network in all phases of the PPP. The article shows that the main potential for conducting innovation in PPPs lies in this mixing of governing strategies, which in practice were highly interwoven and is not only related to managerial efforts before and after contract signing, but also to the specific contract design and organizational form of the PPP, which frames the possibilities for co-production of innovation in the contract period.

In the four analysed cases, various forms of innovation across the PPP process contributed to objectives of sustainability transformation:

- In *the partnering contract between the Royal Borough of Kensington and Chelsea and Sita UK Ltd* for waste collection and street cleansing, a political pressure for sustainability transformation led the authority to search for a more

collaborative and flexible form of contract, which supported by an agreed profit and a profit sharing mechanism secured an incentive and willingness for both partners to work towards continuous improvements of waste management services. A challenge of finding economic efficiencies was solved by the contractor through a collection process redesign, which secured continuous focus on recycling. This contract was the most collaborative and showed that daring to take a 'leap of faith' rather than constructing control mechanisms could lead to smooth daily problem solving and improvement of collection rates even under challenging conditions.

- In *the PFI joint venture organised contract between Greater Manchester Waste Disposal Authority (GMWDA) and the consortium Viridor Laing Greater Manchester Ltd. (VLGM Ltd)* for the provision and operation of an integrated network of waste treatment facilities, a networked political and market dialogue process led to the decision to procure an innovative solution based on a mix of technologies, which was tried and tested, but had not been seen introduced at this large scale before. The partnership was especially innovative in terms of the organisation, where a solution was found to secure an outlet for the Refused Derived Fuel (RDF) produced in the treatment process. Both partners emphasised the need for 'partnership working' to make this complex contract work in practice. Main challenges overcome was to engage the constituent councils in a common solution, convince the market to take a risk on a more innovative solution and secure funding in times of financial difficulties in the global economy.

- *The service partnership contract between the public owned company Renosyd i/s and the private company Marius Pedersen A/S* for waste collection services was developed on the basis of an adversarial relationship with a former contractor, which led Renosyd to experiment with a more collaborative contract inspired by

partnership contracts in the construction industry. The contract was based on a 'partnership charter' and a 'dynamic budget system' to secure economic incentives for gradual efficiencies and quality improvements. In the contract period, the partners introduced a new collection scheme with a 'resource bin' for recyclables developed in dialogue between the partners. A looming conflict on waste collection in a harsh winter period was solved by holding on to the partnership principles.

- *The joint venture contract in Vejle Municipality* aimed to find a new solution for a rundown optical sorting plant and took inspiration from especially English PFI contracts and Danish service partnerships to develop the outline of a new 'resource centre' contracted out as a collaborative joint venture arrangement (the first of this type in Denmark) including a modern sorting plant, adjacent buildings and a number of administrative and service tasks. The pre-contract phase had also involved an 'innovation partnership' with the private company Marius Pedersen to discuss possible organizational forms (PPP contract, joint venture, pure public or private) in a structured dialogue process to identify a solution suitable to both types of organizations. The procurement process was halted because of challenges in Danish waste and procurement regulation, and the project has not been realized yet.

As such, these contract-based PPPs contributed to national and European sustainability transformation processes through local 'piecemeal' innovation processes involving governance, organizational and service innovations. Hierarchical target setting processes provided direction combined with networking and market outreach processes to identify potential solutions and secure that contracts would be viable at a competitive market, whereas hierarchically organised contracts supported by collaborative forums and market-inspired

economic incentives secured that partners would work in the same direction and have a willingness to work together to find the best solutions in the contract period. The case of Vejle Municipality did, however, show that there are specific legal challenges in Denmark, which may complicate partnership working in waste management.

Returning to the questions raised in the introduction, PPPs in various forms did actually play a prominent role in the sustainability transformations of both English and Danish waste management systems – only in Denmark, more networked PPPs for policy and technology development have until now played a bigger role than contractual PPPs in service delivery. This is not surprising compared to the English and Danish PPP histories. What may be surprising is the differences in governing strategies with the UK government taking a more hands-on approach directing local authorities into PFIs and making available consultants through WRAP to facilitate local change processes, whereas the Danish government has – so far – taking a softer hands-off approach trying to encourage and facilitate the development of new solutions through networked partnerships. There is no recipe for these kinds of transformation processes, and as this PhD has shown there might be advantages and disadvantages in both governing approaches.

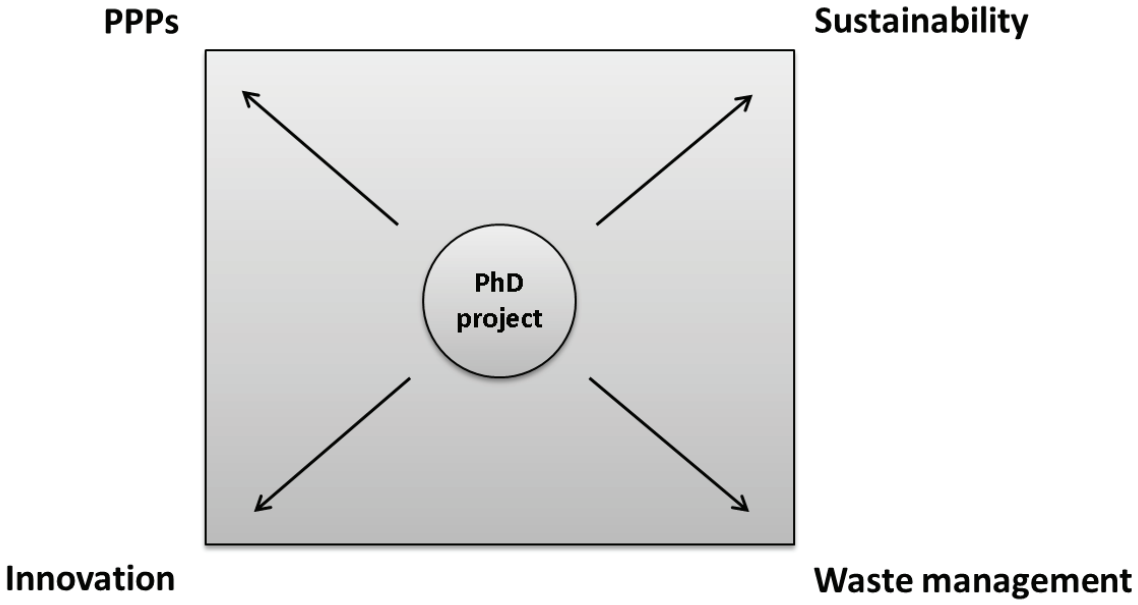
Meanwhile, Danish municipalities remain sceptic towards PFI-like PPPs and the risk of losing control over waste infrastructure. Perhaps with good reasons – the English experiences have shown that lock-ins may become a problem, when policies change. This thesis has indeed shown that there might be both great potential and serious challenges in using PPPs as policy instruments in sustainability transformations of municipal waste management. Perhaps the greatest potential is actually in the less used service partnerships for waste

collection, where local authorities in both countries might be 'wasting' opportunities.

Specific contributions to various research fields

With the above conclusions the PhD delivers contributions and comments to scholarly debates in at least four different research fields: Public-private partnerships, innovation the public sector, sustainability transformation in socio-technical regimes and the empirical field of waste management (see Figure 6). This section sums up these contributions.

Figure 6: Contributions to scholarly debates



In the scholarly debate on **public-private partnerships,** the PhD has contributed mainly by developing an empirically tested conceptual model for investigating innovation in PPPs. In contrast to existing research, this model stresses the importance of a processual and managerial perspective on PPPs *as well as* a solid contract design. The analysis also shows that the idea of PPPs developing through

phases of hierarchy, market and network might be somewhat simplified. Rather, PPPs involve a mix of these governing strategies in the organizational form and management of the PPP over the whole PPP process from pre-contract phase, to contract design and post-contract phase. The PhD also contributed to the debate on 'genuine' partnership by showing how contractual PPPs may be more or less collaborative, whereas it does not make sense to demarcate sharply between 'contract-based' and 'collaborative' PPPs. In line with this, the articles showed that purely contract-based PPPs are not necessarily less collaborative than joint venture PPPs (mixed companies).

Furthermore, the dissertation emphasised the neglected influence of the historical, cultural and political context on the role of PPPs in a specific field, which was addressed by investigating PPPs in the context of shifting public-private relations and sustainability transformation of socio-technical regimes in national and urban contexts. Inspired by Rosenau (2000), Bovaird (2004) and Brinkerhoff and Brinkerhoff (2011), the PhD delivered a unique categorization of PPPs in this context based on purpose and showed how three identified PPP types contributed to sustainability transformation thereby linking sustainability transformation literature to PPP theory. The thesis also showed that there are different, but to some degree converging systems of categorizing PPPs in England and Denmark, where governments have increasingly emphasised partnering as a general approach to policy-making and a relevant policy instrument in local authorities' service delivery.

More broadly speaking, the PhD contributed to efforts of developing theory on PPPs (Hodge and Greve 2013). As Hodge and Greve (2013) suggest, '*there is a real need to articulate the potential causal factors behind why PPPs may be capable of producing superior performance compared to traditional*

arrangements' (p.1). This thesis attempted to contribute to this challenge by showing the unique potential (but also challenges) in PPPs for conducting innovation towards sustainability objectives. Efforts of theory development were based on a cross-national, embedded comparative case study thus answering to 'a growing academic and political interest in comparative issues related to PPPs and their implementation' (Verhoest et al 2015, p.119). Through this comprehensive exploration, the thesis has added to the few existing empirical investigation of PPPs in waste management with descriptions of experiences in England and Denmark.

In the scholarly debate on **innovation in the public sector**, the PhD dissertation especially contributes to efforts of describing the potential and managerial challenges in cross-organizational and collaborative innovation processes, where PPPs are investigated as one policy instrument for conducting innovation in the public sector. The PhD shows that existing research of innovation in PPPs is scarce, scattered and show mixed results and suggests that these variances may be connected to possibilities for 'collaborative competition' in the organizational forms of various PPP types. The PhD also adds to existing attempts of defining and categorizing innovation in a public sector context emphasising the broad range of innovation types relevant to public service innovation.

In the scholarly debates on **sustainability transformation in socio-technical systems,** the PhD aligns with urban scholars critiques of the tendency in this research stream to a) focus mainly on changes at the national level and neglecting place-specific formation, contestation, negotiation and management of socio-technical regimes and transformation processes, b) overemphasizing niches as drivers of innovation and overseeing the interplay between landscape and regime, and c) seeing niches as 'closed incubation rooms' rather than 'open ended'

patchworks of experimentation in the politic-strategic urban regime. The thesis adds to their efforts with a focused analysis of the role of PPPs in sustainability transformation processes, which emphasises PPPs ability to facilitate interplay between various national, local and niche actor groups not only in local contexts, but across all three levels (landscape, regime and niches).

Lastly, the PhD contributes to a renewed social scientist interest in **waste management as an empirical field.** The PhD suggests a renewed attention towards waste management in public administration and public management research, reflecting the tremendous changes in the narratives, organisation and management of waste, which challenges former approaches to contracting out waste management systems and provide an interesting case for studying the hybridity in modern public administration and management. Whereas the developments in English waste management organisation have to some extent been described in existing research, the PhD also specifically contribute with description of these change processes in the Danish context.

Outlook and future research

This PhD has focused on the organisation of waste management in two EU countries, England and Denmark, and whereas this approach was helpful in conducting in-depth case studies, it could be interesting to broaden the scope to other European countries. As the difficulties of comparing municipal waste across EU countries point to, municipal waste management is organised different in different ways across member states. In particular, it might be interesting to investigate and compare the country-specific interplay between competitive, environmental and waste specific regulations and the organisation of new solutions between public and private actors across a broader range of countries.

For example, this dissertation did not include some of the best performing countries in the EU benchmarking of municipal waste such as Austria and Sweden, which may bring new perspective on roads toward sustainability transformation. Such an analysis might contribute to the development of a fairer benchmarking system and provide an important step forward in the comparison and learning across EU countries.

Whereas the identification and categorization of PPPs in this dissertation was based on a qualitative approach, it might be interesting to see a more quantitatively based mapping of partnership working in waste management to provide a more general picture. This could for example be done through web-based questionnaires or telephone interviews. However, a very clear definition of 'partnership' would be necessary, as this concept continue to be ambiguous and loaded with various meanings, which might lead to less comparable results. Further work on the categorization of PPPs might indeed be needed, especially at the empirical level. For example, the presented Danish overview of PPP types from Udbudsportalen remarkably excludes more networked partnership types. Following the 'purpose' of the PPP might provide some direction for future classifications. As the forms and shapes of PPPs continue to evolve, this might be a 'Sisyphus' task, but none the less important.

The thesis briefly comments on the question of joint venture versus pure contract-based PPPs, which at the moment are very pressing in the Danish waste management sector. In contrast to previous research, the most collaborative PPP in the PhD was purely contract based. This indicates that joint venture PPPs might not necessarily be the only road towards collaborative PPP arrangements. However, considerable more research focusing specifically on this subject would be needed to draw any firmer conclusions. In line with this, the PhD did in the

data collection process include non-partnership arrangements, odd cases, to better identify the particular characteristics and potentials of partnerships. Whereas these interviews did not indicate that PPPs should necessarily be more innovative or provide more sustainable solutions than a well-organised in-house arrangement or an innovative, well-functioning traditional contract, this investigation does not permit any stark conclusions. These comparisons are in general hard to make, as the organizational form in itself can be hard to separate from other factors, whereas external factors such as specific market conditions may also influence results. Nonetheless, this is the decision that public legislators and managers are facing and as such, it might deserve more attention.

The first and second articles in the PhD outline a conceptual model for investigating innovation in PPPs on the basis of a review of existing research and explorative case studies. Whereas this model provided a good starting point for investigating this issues the depth and richness in the model might be further developed in the future, for example by engaging in the comprehensive literatures on hierarchical, market and network governing and add more case studies. It might also be interesting to integrate further the concept of 'co-production of services' (Alford 2009) to capture the contributions from various actors in the re-production, innovation and transformation processes relating to public services.

Whereas the transformation from disposal and recovery towards recycling remain a challenge for governments and waste managers, the most pressing future challenge will be the prevention of waste. As described in this thesis, this issue involve new challenges, new actors and perhaps new forms of coordination and new divisions of responsibilities for waste and resources. It will be interesting to follow how the EU, national governments, local authorities and private businesses takes up this challenge following the first national prevention strategies. Most

likely, the nearest future will see a mix of technological solutions to manage waste and easier recyclable products. Research may for example contribute to these processes through critical analyses of words and actions, comparisons of empirical experiences and policy instruments and by offering new perspectives to guide decision-makers and managers in these endeavours.

References

Adams, K.T., Phillips, P.S. and Morris, J.R. 2000: 'A radical new development for sustainable waste management in the UK: the introduction of local authority Best Value legislation'. *Resources, Conservation and Recycling* 30, pp. 221-244

Albury, D. 2005: 'Fostering Innovation in Public Services'. *Public Money and Management* 25, 1, pp. 51-56

Alford, J. 2009: *Engaging Public Sector Clients – From Service Delivery to Co-Production*. Basingstoke/ New York: Palgrave Macmillan

Almqvist, R. and Högberg, O. 2005: 'Public-private partnerships in social services: the example of the City of Stockholm'. In G. Hodge and C. Greve eds. *The Challenges of Public-private partnerships. Learning from International Experience*. Cheltenham/Northampton: Edward Elgar Publishing

Andersen, N. Å. 2012: 'To Promise a Promise: When Contracts Desire a Life-Long Partnership'. In N. Å. Andersen and I.-J. Sands *Hybrid Forms of Governance. Self-suspension of power*. Basingstoke/ New York: Palgrave Macmillian

Ball, H., Heafey, M. and King., D. 2000: 'Private Finance Initiative – A good deal for the public purse or a drain on future geenrations?' *Policy and Politics* 29, 1 pp.95-108

Basse, E.M. 1995: Affaldslovgivningen, et samspil mellem miljø og konkurrenceret. Gad Jura

Bel, G. and Fageda, X. 2010: 'Partial privatization in Local Services Delivery: An Empirical analysis of the choice of mixed firms'. *Local Government Studies* 36, 1, pp. 129-149

Bekkers, V., Edelenbos, J. and Steijn, B. 2011: *Innovation in the Public Sector. Linking Capacity and Leadership*. Basingstoke: Palgrave Macmillan

Bennet, J.T. and Johnson, M.H. 1979: 'Public versus private provision of collective goods and services: garbage collection revisited. *Public Choice* 34, No. 1, pp. 55-56

Bessant, J. 2005: 'Enabling Continuous and Discontinuous Innovation: Learning from the Private Sector'. *Public Money and Management* 25, 1, pp. 35-42

Bommert, B. 2010: 'Collaborative Innovation in the Public Sector'. *International Public Management Review* 11, 1, pp. 15-33

Boras, S. and Edler, J. 2012: 'The Governance of Change in Socio-technical and Innovation Systems: Some Pillars for Theory-Building'. Conference paper for "The Governance of Innovation and Socio-Technical Systems in Europe: New trends, New Challenges", Copenhagen Business School, Denmark, 1st-2nd March 2012

Borins, S. 1998: Innovating with Integrity. How local heroes are transforming American government. Washington D.C.: Georgetown University Press

Bovaird, T. 2007: 'Beyond Engagement and Participation: User and Community Coproduction of Public Services'. *Public Administration Review* 67, 5, pp. 846-60

Bovaird, T. 2006: ‘Developing new forms of partnership with the ‘market’ in the procurement of public services’. *Public Administration* 84, 1, pp. 81-102

Bovaird, T. 2004: ’Public-Private Partnerships: From contested concepts to prevalent practice’. *International Review of Administrative Sciences* 70, 2, pp. 199-215

Brinkerhoff, D.W. & Brinkerhoff, J.M. 2011:’Public-Private Partnerships: Perspectives on Purposes, Publicness and Good Governance’. *Public Administration and Development* 31, pp. 2-14

Brogaard, L. and Petersen, O.H. 2014a: ’Oversigt over offentligt-private innovationspartnerskaber (OPI) på velfærdsområdet’. Copenhagen: *KORA* – Det Nationale Institut for Kommuners og Regioners Forskning

Brogaard, L. and Petersen, O.H. 2014b: Offentligt-private innovationspartnerskaber (OPI) – Evaluering af erfaringer med OPI på velfærdsområdet. Copenhagen: *KORA* – Det Nationale Institut for Kommuners og Regioners Forskning

Bulkeley, F. and Newel, P. 2010: *Governing Climate Change*. London/ New York: Routledge

Bulkeley, H., Watson, M. and Hudson, R. 2007: ‘Modes of governing municipal waste’. *Environment and Planning A* 39, pp. 2733-2753

Bulkeley, H., Watson, M., Hudson, R. and Weaver, P.M. 2005: 'Governing Waste: Towards a new analytical framework. *Journal of Environmental Policy and Planning* 7, 1, pp.1-23

Burnley, S. 2001:'The impact of the European landfill directive on waste management in the United Kingdom'. *Resources, Conservation and Recycling* 32, pp. 349-358

Busck, O. 2007: 'Marketization of refuse collection in Denmark: social and environmental quality jeopardized'. *Waste Management and Research* 25, pp. 384-391

Campos, M.J.Z. and Hall, C.M. 2013: 'Introduction'. In M.J.Z. Campos and C.M. Hall eds. *Organizing Waste in the City*. *International perspective on narratives and practices*. Bristol: Policy Press

Campos, K.D.P, Norman C.D. and Jadad, A.R. 2011: 'Product development public-private partnerships for public health: A systematic review using qualitative data'. *Social Science and Medicine* 73, pp. 986-994

Carmo, M.S.D and Oliveira, J.A.P. 2010: 'The Semantics of Garbage and the organization of the recyclers: Implementation challenges for establishing recycling cooperatives in the city of Rio de Janeiro'. *Resources, Conservation and Recycling* 54, pp. 1261-1268

Cassell, C. 2009: 'Interviews in Organizational Research' in D. Buchanan and A. Bryman eds. *The SAGE Handbook of Organizational Research Methods*, LA, London and New Delhi: SAGE

Christensen, T.H. and Kjeldsen, P. 1998: ‘Deponering: principper og miljøpåvirkninger‘, in T.H. Christensen ed. *Affaldsteknologi*. København: Teknisk forlag

Connoly, C. and Wall, T. 2013: ‘The impact of the global financial crisis on public-private partnerships. A UK perspective’. In C. Greve and G. Hodge eds. *Rethinking Public-Private partnerships. Strategies for turbulent times*. London/New York: Routledge

Corvellec, H. and Bramryd, T. 2012: ‘The multi-market exposure of waste management companies: A case-study of two Swedish municipally owned companies’. *Waste Management* 32, pp. 1722-1727

Corvellec, H., Bramryd, T. and Hultman, J. 2011: ‘The business model of solid waste management in Sweden – a case study of two municipally-owned companies’. *Waste Management & Research* 30, 5, pp. 512-608

Corvellec, H. and Hultman, J. 2013: ’Waste management companies: critical urban infrastructural services that design socio-materiality of waste’, in M.J.Z. Campos and C.M. Hall eds. *Organizing Waste in the City*. *International perspective on narratives and practices*. Bristol: Policy Press

Corvellec, H. and Hultman, J. 2012: ‘From “less landfilling” to “wasting less”: Societal narratives, socio-materiality, and organization’. *Journal of Organizational Change and Management* 25, 2, pp. 297-314

Corvellec, H., Campos, M.J.Z. and Zapata, P. 2013: 'Infrastructures, Lock-in, and sustainable urban development: the case of waste incineration in the Göteborg Metropolitain Area'. *Journal of Cleaner Production* 50, pp.32-39

Cruz, N.F., Simoes, P. and Marques, R.C. 2013: 'The hurdles of local governments with PPP contracts in the waste sector'. *Environment and Planning C: Government and Policy* 31, 2, pp. 292-307

Davies, S. 2007: 'Politics and Markets: the case of UK Municipal Waste Management'. Working Paper 95, School of Social Science, UK: Cardiff University

Davis, P. ed. 1986: 'Public-Private Partnerships: Improving Urban Life'. *Academy of Political Science* 36, Vol.2

Dakofa.dk: 'Nyhed: Frederiksberg Kommune sparer 13 % på at hjemtage affaldsindsamlingen'. 21 March 2012, https://www.dakofa.dk/element/frederiksberg-kommune-sparer-13-paa-at-hjemtage-affaldsindsamlingen/

Danish Government 2013: 'Danmark uden affald. Genanvend mere – forbrænd mindre' (Denmark without waste. Recycle more – incinerate less). Copenhagen: Regeringen (the Danish Government)

Danish Government 2011: 'Et Danmark, der står sammen' ('A Denmark United'). Government Programme 2011. Copenhagen: Regeringen (the Danish Government)

Davoudi, S. and Evans, N. 2005: 'The challenge of governance in regional waste planning'. *Environment and Planning C: Government and Policy* 23, pp. 493-517

Davoudi, S. 2009: 'Scalar tensions in the governance of waste: the resilience of state spatial Kenyesianism'. *Journal of Environmental Planning and Management* 52, No. 2, pp. 137-156

Davoudi, S 2000: 'Planning for waste management: changing discourses and institutional relationships'. *Progress in Planning* 53, pp. 165-2016

DCLG 2006: *Structures for Service Delivery Partnerships*. London: Department for Communities and Local Government

DECA 2009: 'Analyse af offentligt-private samarbejde om innovation'. Copenhagen: Danish Enterprise and Construction Agency (*Erhvervs- og Byggestyrelsen)*

DEFRA 2014: 'Management of Local Authority Collected Waste Statistics – England'. London: Department of Environment, Food and Rural affairs (DEFRA), may be downloaded from: https://www.gov.uk/government/statistical-data-sets/env18-local-authority-collected-waste-annual-results-tables

DEFRA 2013a: 'Incineration of Municipal Solid Waste'. London: Department of Environment, Food and Rural affairs (DEFRA)

DEFRA 2013b: 'Waste stakeholder letter from Dan Rogersen'. London: Department of Environment, Food and Rural affairs (DEFRA)

DEFRA 2013c: 'Local Authority Projects'. DEFRA website archive 21 February 2013, direct link: http://webarchive.nationalarchives.gov.uk/20130221214337/http://www.defra.gov.uk/environment/waste/local-authorities/widp/pfi-projects/, [08.02.2015]

DEFRA 2011:'Local authority collected waste – definitions of terms'. DEFRA website, 23 September 2011. Direct link: https://www.gov.uk/local-authority-collected-waste-definition-of-terms

Dijkgraaf, E. and Gradus, R.H.J.M. eds. 2008: *The Waste Market. Institutional Developments in Europe*, Springer

Dijkgraaf, E. and Gradus, R.H.J.M. 2008A: 'Introduction'. In E. Dijkgraaf and R.H.J.M. Gradus
Eds. The Waste Market. Institutional Developments in Europe, Springer

Dijkgraaf, E. and Gradus, R.H.J.M. 2008B: 'Cost Savings of Contracting Out Refuse Collection in the Netherlands'. In E. Dijkgraaf and R.H.J.M. Gradus Eds. *The Waste Market. Institutional Developments in Europe*, Springer

Dijkgraaf, E. and Gradus, R.H.J.M. 2008C: 'Final comments and Future Research'. In E. Dijkgraaf and R.H.J.M. Gradus Eds. *The Waste Market. Institutional Developments in Europe*, Springer

Dijkgraaf, E., Gradus, R.H.J.M and Melenberg, B. 2008: 'Contracting Out Refuse Collection in the Netherlands'. In E. Dijkgraaf and R.H.J.M. Gradus Eds. *The Waste Market. Institutional Developments in Europe*, Springer

DME 2013a: 'From landfilling to recovery – Danish waste management from the 1970s until today'. The Danish action plan for promotion of eco-efficient technologies, Danish lessons. Copenhagen: Danish Ministry of the Environment

DME 2013b: *Waste Incineration – recovery of energy and material resources*. The Danish action plan for promotion of eco-efficient technologies, Danish lessons. Copenhagen: Danish Ministry of the Environment

Domberger, S. and Fernandez, P. 1999: 'Public-Private Partnerships for Service Delivery', *Business Strategic Review* 10, 4, pp.29-39

Domberger, S., Meadowcroft, S., and Thompson, D. 1986: 'Competitive tendering and efficiency: the case of refuse collection'. *Fiscal Studies* 7, No. 4, pp.69-87

Donahue, J.D. and Zeckhauser, R.J. 2011: *Collaborative Governance. Private roles for public goals in turbulent times*. Princeton and Oxford: Princeton University Press

Drejer, I. and Jørgensen, B.H.: 'The dynamic creation of knowledge: Analyzing public-private collaborations'. *Technovation* 25, pp. 83-94

EEA 2013a: 'Managing Municipal Solid Waste – A review of achievements in 32 European countries'. EEA report No. 2/2013, Copenhagen: European Environment Agency

EEA 2013b: 'Municipal waste management in Denmark'. ETC/ SCP working paper, Copenhagen: European Topic Centre on Sustainable Consumption and production/ European Environment Agency

EEA 2013c: 'Municipal waste management in United Kingdom'. ETC/SCP working paper, Copenhagen: European Topic Centre on Sustainable Consumption and Production/ European Environment Agency

EC 2014a: 'Towards a circular economy: A zero waste programme for Europe'. COM (2014) 398 final, Brussels: European Commission

EC 2014b: 'Directive 2014/24/EU of the European Parliament and of the Council of 26 February 2014 on public procurement and repealing Directive 2004/18/EC'. Brussels: European Commission

EC 2011: 'Roadmap to a Resource-Efficient Europe'. COM (2011) 571, Brussels: European Commission

EC 2008: 'Directive 2008/98/EC of the European parliament and of the Council of 19 November 2008 on waste and repealing certain directives'. Brussels: European Commission

EC 1999: 'Council Directive 1999/31/EC of 26 April 1999 on the landfill of waste'. Brussels: European Commission

Edler, J. and Georghiou, L. 2007: 'Public procurement and innovation – Resurrecting the demand side'. *Research Policy* 36, pp. 949-963

Eisenhardt, K.M. and Graebner, M.E. 2007: 'Theory Building from Cases: Opportunities and Challenges'. *Academy of Management Review* 50, 1, pp. 25-32

Eisenhardt, K.M. 1989: 'Building Theories from Case Study Research'. *Academy of Management Review* 14, 4, pp. 532-550

Ellen MacArthur Foundation 2012: 'Towards the Circular Economy. Economic and business rationale for an accelerated transition'. Ellen Macarthur Foundation, may be downloaded from: http://www.ellenmacarthurfoundation.org/business/reports/ce2012

EPA 2014a: 'EUROSTAT MW indberetning' and supplementing data files (data on municipal waste treatment in Denmark to be reported to EUROSTAT). Required directly from the Environmental Protection Agency, 16 November 2014. Copenhagen: Miljøstyrelsen (Environmental Protection Agency)

EPA 2014b: 'Danmark uden affald. Ressourceplan for affaldshåndtering 2013-2018'. Copenhagen: Miljøstyrelsen (Environmental Protection Agency)

EPA 2013: 'Affaldsstatistik 2011'. Copenhagen: Miljøstyrelsen (Environmental Protection Agency)

Entwistle, T. 1999: 'Towards Sustainable Waste Management: Central steering, local enabling or autopoesis?' *Policy and Politics* 27, 3, pp. 375-388

Entwistle, T. and Martin, S. 2005: 'From Competition to Collaboration in Public Services Delivery: A New Agenda for Research'. *Public Administration* 83, 1, pp. 233-242

Esteve, M., Ysa, T. and Longo, F. 2012: 'The Creation of Innovation Through Public-Private Collaboration'. *Rev Esp Cardiol* 65, 9, pp. 835-842

Euranet 2014: 'Commission ditches controversial rules on waste'. Euronet Plus News Agency, December 16 2014, direct link: http://euranetplus-inside.eu/commission-ditches-controversal-rules-on-waste/ [27.03.2014]

Evald, M.R., Nissen, H.A., Clarke, A.H., Munksgaard, K.B. 2014:'Reviewing Cross-Field Public Private Innovation Literature: Current Research Themes and Future Research Themes Yet To Be Explored'. *International Public Management Review* 15, 2, pp. 32-57

Evans, D. 2011: 'Beyond the Throwaway Society: Ordinary Domestic Practice and A Sociological Perspective on Household Food waste'. *Sociology* 46, 1, pp. 41-56

EUROSTAT 2014: 'In 2012, 42% of treated municipal waste was recycled or composted'. EUROSTAT News Release 48/2014, [25 March 2014]

EUROSTAT 2011: 'Environment in the EU27. Recycling accounted for a quarter of total municipal waste treated in 2009'. Brussels: Eurostat News Release 37/2011, [08.03.2011]

Falconer, P.K. and McLaughlin, K. 2000: 'Public-private partnerships and the 'New Labour' Government in Britain'. In Osborne, S.P. ed. *Public-Private Partnerships. Theory and practice in international perspective*. London/New York: Routledge

Federspiel, S. 2011: *Vi tog skraldet. Renholdning I København 1898-2011*. Copenhagen: R98

Ferroni, M. and Castle, P. 2011: 'Public-Private Partnerships and Sustainable Agricultural Development'. *Sustainability*3, pp. 1064-1073

Fischbacher, M. and Beaumont, P.B. 2003: 'PFI, Public-Private Partnerships and the neglected Importance of Process: Stakeholders and the Employment Dimension'. *Public Money and Management*, 23, 3, pp. 171-176

Flinders, M. 2005: 'The Politics of Public-Private Partnerships. *Political Studies Association*, 7, pp.215-239

Flyvbjerg, B. 2006: 'Five Misunderstandings About Case-Study Research'. *Qualitative Inquiry* 12, pp. 219-245

Funch, E. 1995: Fra køkkenmødding til genbrugsstation. En jubilæumsbog om Vestforbrænding 1970-1995. Vestforbrænding, DK: Glostrup

Geels, F.W. and Kemp, R. 2007: 'Dynamics in socio-technical systems: Typology of change processes and contrasting case studies'. *Technology in Society* 29, pp. 441-455

Geels, F.W. 2005: 'The dynamics of transitions in socio-technical systems: A multi-level analysis of the transition pathway from horse-drawn carriages to automobiles (1860-1930)'. *Technology Analysis and Strategic Management* 17, 4, pp. 445-476

George, A.L. and Bennett, A. 2005: *Case Studies and Theory Development in the Social Sciences*. Cambridge: MIT Press Ltd.

Gestel, K.V., Willems, T., Verhoest, K., Garse, S.V. 2014: Public-private partnerships in Flemish schools: a complex governance structure in a complex context. *Public Money and Management* 34, 5, pp. 363-370

Gläser, J. and Laudel, G. 2009 : 'On interviewing "good" and "bad" experts' in A., Bogner, B. Littig and W. men zeds. Interviewing experts. Basingstoke: Palgrave Macmillan

Graaf, G. and Huberts, L.W.J.C. 2008: 'Portraying the Nature of Corruption Using and Explorative Case Study Design'. *Public Administration Review* 68, 4, pp. 640-653

Graham, S. and Marvin, S. 2001: '*Splintering Urbanism: Networked Infrastructures, Technological Motilities and the Urban Condition*, London: Routledge

Greve, C. and Mörth, U. 2010: 'Public-Private partnerships: the Scandinavian experience'. In G. Hodge, C. Greve and A. Boardman eds. *International Handbook of Public-Private Partnerships*. Cheltenham: Edward Elgar Publishing

Greve, C. and Hodge, G. 2005: 'Introduction'. In G. Hodge end C. Greve eds. *The challenge of public-private partnerships*, Cheltenham: Edward Elgar Publishing

Greve, C. 2003: 'Public-Private Partnerships in Scandinavia'. *International Public Management Review* 4, 2, pp. 59-69

Grimsey, D. and Lewis, M.K. 2005: 'Are Public Private Partnerships value for money? Evaluating alternative approaches and comparing academic and practitioners views'. *Accounting Forum* 29, pp. 345-378

Grønnegaard Christensen, J. 2001: *Affaldssektorens politiske organisering*. Danske Entreprenører, Miljøsektionen

Hammerschmid, G. and Ysa, T. 2010: 'Empirical PPP experiences in Europe: national variations of a global concept'. In G. Hodge, C. Greve and A. Boardman eds. *International Handbook of Public-Private Partnerships*. Cheltenham: Edward Elgar Publishing

Ham, H.V. and Koppenjan, J. 2001: 'Building Public-Private Partnerships: Assessing and managing risks in port development'. *Public Management Review* 3, 4, pp. 593-616

Hartley, J. 2005: 'Innovation in Governance and Public Services: Past and Present'. *Public Money and Management* 25, 1, pp. 27-35

Hellowell, M. 2010: 'The UK's Private Finance Initiative: history, evaluation, prospects'. In G. Hodge, C. Greve and A. Boardman eds. *International Handbook of Public-Private Partnerships*. Cheltenham: Edward Elgar Publishing

Hirsch, W.Z. 1995: 'Factors Important in Local Government's Privatization Decisions'. *Urban Affairs Review* 31, No.2, pp. 226-243

HMGOV 2013: 'Prevention is better than cure. The role of waste prevention in moving to a more resource-efficient economy'. London: HM Government/DEFRA

HM Treasury 2012: 'A new approach to public private partnerships'. London: HM Treasury, may be downloaded from https://www.gov.uk/government/publications/private-finance-2-pf2 [30.03.2015]

Hodge, G. and Greve, C. 2013: 'Introduction: Public-private partnerships in turbulent times'. In C. Greve and G. Hodge Rethinking Public-Private Partnerships. Strategies for turbulent times. London/New York: Routledge

Hodge, G.A., Greve, G. and Boardman, A.E. 2010: 'Conclusions: public-private partnerships – international experiences and future challenges'. In G. Hodge, C. Greve and A. Boardman eds. *International Handbook of Public-Private Partnerships*. Cheltenham: Edward Elgar Publishing

Hodge, G.A. 2004: 'The risky business of public-private partnerships'. *Australian Journal of Public Administration* 63, 4, pp. 37-49

Hoornweg, D. and Bhada-Tata, P. 2012: *What a Waste. A Global Review of Solid Waste Management*. Urban Development Series. Washington DC: World Bank

Hughes, T.P. 1983: *Networks of Power. Electrification in Western Society 1880-1930*. Baltimore: John Hopkins University Press

Hurst, C. and Reeves, E. 2004: 'An economic analysis of Ireland's first public-private partnership'. *International Journal of Public Sector Management* 17, 5, pp. 379-388

Information 2015: ‘Bløde virkemidler skal få danskerne til at svine mindre’. Article by Jørgen Steen Nielsen, 4 february 2015. Copenhagen: Information, direct link: http://www.information.dk/comment/975582

ISWA 2009: *Waste and Climate Change*. ISWA white paper, ISWA – International Solid Waste Association

Jeffares, S., Sullivan, H and Bovaird, T. 2013: ‘The challenge of evaluating the performance (s) of public-private partnerships’. In C. Greve and G. Hodge *Rethinking Public-Private Partnerships. Strategies for turbulent times*. London/New York: Routledge

Johnston, J. and Gudergan, S.P. 2007: ‘Governance of Public-Private Partnerships: lessons learned from an Australian case?’ *International Review of Administrative Sciences*, 73, 4, pp. 569-582

Johnston, J.M. and Romzek, B. S. 2005: ‘Traditional contracts as partnerships: effective accountability in social service contracts in the American States’. In G. Hodge and C. Greve eds. *The Challenges of Public-private partnerships. Learning from International Experience*. Cheltenham/Northampton: Edward Elgar Publishing

Kammeradvokaten 2014: ’Kommuners deltagelse I selskaber der håndterer genanvendeligt erhvervsaffald’. Download: http://mst.dk/media/mst/8873048/Notat%20om%20L548-Kammeradvokaten.pdf, [22.05.2014]

Kappeler, A. and Nemoz, M. 2010: 'Public-Private Partnerships in Europe – Before and During the Recent Financial Crisis'. Economic and Financial Report 2010/04. EIB, may be downloaded from http://www.eib.org/epec/resources/efr_epec_ppp_report1.pdf [30.03.2015]

Karré, P.M. 2013: 'Hybrid organizations in waste management: public and private organizations in a deregulated market environment'. In M.J.Z. Campos and C.M. Hall *Organizing Waste in the City*. *International perspective on narratives and practices*. Bristol: Policy Press

Karré, P.M. 2011: Heads and Tails: Both sides of the coin. An analysis of hybrid organizations in the Dutch waste management sector. Den Hag: Eleven International Publishers

Kemp, R., Loorbach, D. and Rotmans, J. 2007: 'Transition management as a model for managing processes of co-evolution towards sustainable development'. *International Journal of Sustainable Development and World Ecology*, 14, 1, pp. 78-91

Kern, F. and Smith, A. 2008: 'Restructuring energy systems for sustainability? Energy transition policy in the Netherlands'. *Energy Policy*, 36, pp. 4093-4103

KFST 2012: 'Erfaringer fra de danske OPP projekter'. Valby: Konkurrence- og Forbrugerstyrelsen

Kingdon, J.W. 1984: *Agendas, Alternatives, and Public Policies*. Boston: Little, Brown & Co.

Kleis, H. and Dalager, S. 2003: 100 år med affaldsforbrænding I Danmark. Fra forbrændingsanstalter til højteknologiske energiværker. Babcock & Wilcox Vølund and Rambøll

Klijn, E-H. 2010: 'Public-Private Partnerships: Deciphering meaning, message and phenomenon'. In G.A. Hodge, C. Greve and A.E. Boardman *International Handbook of Public-Private Partnerships*, Cheltenham: Edward Elgar

Klijn, E.-H. and Teisman, G.R. 2005: 'Public-private partnerships as the management of co-production: strategic and institutional obstacles in a difficult marriage'. In G. Hodge and C. Greve eds. *The Challenges of Public-private partnerships. Learning from International Experience*. Cheltenham/Northampton: Edward Elgar Publishing

Klijn, E.-H. and Teisman, G.R. 2003: 'Institutional and Strategic Barriers to Public-Private Partnership: An Analysis of Dutch Cases'. *Public Money and Management*, 23, 3, pp. 137-146

Klijn, E.-H. and Teisman, G.R. 2000: 'Governing public-private partnerships: Analysing and managing the processes and institutional characteristics of public-private partnerships'. In S.P. Osborne ed. *Public-Private Partnerships. Theory and practice in international perspective*. New York: Routledge

Kooiman, J. 2003: *Governing as Governance*. London: SAGE

Kooiman, J. 1993: Modern Governance: New Government-Society Interactions. London: SAGE

Kvale, S. 2006: ’Dominance Through Interviews and Dialogues’. *Qualitative Inquiry* 12, pp. 480-500

Kvale, s. 1994: Interview. En introduktion til det kvalitative forskningsinterview. Copenhagen: Hans Reitzels Forlag

Lawthom, R. 1998: ‘What do I do? A feminist in non-feminist research’, *Feminism and Psychology* 7, 4, pp.641-52

Leiringer, R. 2006: ‘Technological Innovation in PPPs: Incentives, opportunities and actions’. *Construction Management and Economics* 24, 1, pp. 35-51

LGDK 2014: *Kampen om affaldet*. Web-article, http://www.kl.dk/Teknik-og-miljo/Kampen-om-affaldet-id153375/?n=0&section=132442, 17-04-2014. Copenhagen: KL (Local Government Denmark)

LGDK 2013: Høringssvar fra KL over Danmark uden affald – ressourceplan for affaldshåndtering 2013-2018. May be downloaded from: http://www.kl.dk/ImageVaultFiles/id_66087/cf_202/H-ringssvar_fra_KL_over__Danmark_uden_affald_-_res.PDF, Copenhagen: KL (Local Government Denmark)

Linder, S.H. 1999: ‘Coming to Terms with the Public-Private Partnership: A Grammar of Multiple Meanings’. American Behavioral Scientist 43, pp.35-51

Loorbach, D. 2010: ‘Transition Management for Sustainable Development: A Prescriptive, Complexity-Based Governance Framework’. *Governance: An*

International Journal of Policy, Administration, and Institutions, 23, 1, pp. 161-183

Loorbach, D. 2004: 'Governance and Transitions. A multi-level policy-framework based on complex systems thinking'. Paper for the Berlin Conference on Human Dimensions of Global Environmental Change

Lowndes, V. and Skelcher, C. 1998: 'The Dynamics of Multi-Organizational Partnerships: An analysis of changing modes of governance'. *Public Administration*, 76, pp. 313-333

MacKillop, F. 2009: 'The construction of 'waste' in the UK steel industry'. *Environment, Planning and Management* 52, 2, pp.177-194

Macneil, I.R. 1980: *The New Social Contract*. New Haven/London: Yale University Press

Macneil, I.R. 1974: 'The many futures of contracts', *Southern California Law Review*, 47, pp. 696-816

Mandell, M. and Steelman, T. 2003: 'Understanding what can be accomplished through interorganizational innovations. The importance of typologies, context and management strategies'. *Public Management Review* 5, 2, pp. 197-224

Markard, J., Raven, R. and Truffer, B. 2012: 'Sustainability transitions: An emerging field of research and its prospects'. *Research Policy* 41, pp. 955-967

Marvin, S., Graham, S., and Guy, S. 1999:'Cities, regions and privatized utilities'. *Progress in Planning* 51, pp. 91-169

McQuaid, R.W. 2009: 'Theory of Organizational Partnerships: Partnership advantages, disadvantages and success factors'. In S.P. Osborne ed. *The New Public Governance. Critical perspectives and future directions*. London: Routledge

Meadows, D.H., Meadows, D.L, Randers, J. and Behrens III, W.W. 1972: 'The Limits to Growth. A report for THE CLUB OF ROME's project on Predicament of Mankind'. New York: Universe Books

Miles, M. B. and Huberman, A.M. 1994: *Qualitative Data Analysis*. 2nd ed. Thousands Oaks, London and New Delhi: SAGE Publications

Minervini, D. 2013: 'Governance in a bottle'. In M.J.Z. Campos and C.M. Hall *Organizing Waste in the City*. *International perspective on narratives and practices*. Bristol: Policy Press

Moore, M. and Hartley, J. 2008: 'Innovations in Governance'. *Public Management Review* 10, 1, pp.3-20

Moore, m. 2005: 'Break-through Innovations and Continuous Improvement: Two different Models of Innovative processes in the Public Sector'. *Public Money and Management* 25, 1, pp. 43-50

Mulgan, G. and Abury, D. 2003: *Innovation in the Public Sector*. London: Cabinet Office

Murray, R. 1999: *Creating wealth from waste*. London: Demos

Murray, V. 2000: 'Evaluating the impact of public-private partnerships: A Canadian perspective'. In S.P. Osborne ed. *Public-Private Partnerships. Theory and practice in international perspective*. New York: Routledge

Newman, J, Raine, J. and Skelcher, J. 2001: 'Transforming Local Government: Innovation and modernization'. *Public Money & Management* 21, pp.61-68

Noble, G. and Jones, R. 2006: 'The Role of Boundary-Spanning Managers in the Establishment of Public-Private Partnerships'. *Public Administration* 84, 4, pp. 891-917

Odgaard, M. 2011: *Affaldsforbrænding. De retlige rammer for en sektor i forandring med fokus på afgiftsreguleringen*. PhD Dissertation, Department of Business Law, School of Business and Social Sciences, DK: Aarhus University

OFT 2006: 'More competition, less waste'. OFT841, Office of Fair Trading, London: UK government

Ohlsen, H. 2008: 'Contracting Out in Sweden: Ownership and Production Costs'. In E. Dijkgraaf and R.H.J.M. Gradus eds. *The Waste Market. Institutional Developments in Europe*, Springer

Osborne, D. and Gabler, T. 1992: *Reinventing Government.* Reading: Addison-Wesley

Osborne, S.P. ed. 2000: *Public-Private Partnerships. Theory and practice in international perspective*. London: Routledge

Osborne, S.P. 1998: 'Naming the Beast: Defining and Classifying Service Innovations in Social Policy. H*uman Relations* 51, 9, pp. 1133-1154

Osborne, S.P. and Brown, L. 2011: 'Innovation, Public Policy and Public Services Delivery in the UK. The word that would be king?' *Public Administration* 89, 4, pp. 1335-1350

Osborne, S.P., and Murray, V. 2000: 'Understanding the process of public-private partnerships'. In S.P. Osborne ed. *Public-Private Partnerships. Theory and practice in international perspective*. New York: Routledge

Patton, M.Q. 2002: Qualitative Research and Evaluation Methods. Newbury Park: SAGE

Peters, B.G. 1998: *Comparative Politics. Theory and methods*. New York: New York University Press

Petersen, O.H. 2011: *Public-Private partnerships: Policy and Regulation. With Comparative and Multi-level Case Studies from Denmark and Ireland*. Doctoral School or Organisation and Management Studies, PhD Series 8.2011, Frederiksberg: Copenhagen Business School

Politiken 2014: *Genbrug. Store ambitioner kræver handling*. Debatsektionen 18 October, ANALYSE af Agnethe Grøn, Copenhagen: Politiken

Pongráz, E. and Pohjola, V.J. 2004: 'Re-defining waste, the concept of ownership and the role of waste management'. *Resources, Conservation and Recycling* 40, pp. 141-153

Reeves, E. 2008: 'The practice of contracting in public private partnerships: transaction costs and relational contracting in the Irish school sector'. *Public Administration* 86, 4, pp. 669-686

Rhodes, R.A.W. 1996: 'The New Governance: Governing without Government'. Political Studies XLIV, pp.652-667

Rittel, H.W.J. and Webber, M.M. 1973: 'Dilemmas in a General Theory of Planning'. *Policy Sciences* 4, pp. 155-169

Rohlfing, I. 2012: *Case Studies and Causal Inference*. Palgrave Macmillian; [online] Available at http://www.palgraveconnect.com/pc/doifinder/10.1057/9781137271327.0001 (Accessed 12 Feb 2015)

Rosenau, P.A. 2000 ed.: *Public-Private Policy Partnerships*. Cambridge/London: MIT Press

Sadran, P. 2004: 'Public-Private Partnership in France: a Polymorphous and Unacknowledged Category of Public Policy'. *International Review of Administrative Sciences* 70, 233, pp. 233-251

Savas, E.S. 2000: *Privatization and Public-Private Partnerships*. New York: Seven Bridges Press

Savas, E.S. 1977: 'Policy Analysis for local government: public vs. private refuse collection'. *Policy Analysis* 3, No. 1, pp. 49-74

Sharp, L. and Luckin, D. 2006: 'The community waste sector and waste services in the UK: Current state and future prospects'. *Resources, Conservation and Recycling* 47, p.277-294

Shaoul, J. 2005: 'The Private Finance Initiative or the public funding of private profit?' In Hodge, G. and Greve, C. *The Challenge of Public-private Partnerships: Learning from international experience*, London: Edward Elgar

Shumpeter, J.A. 1943: *Capitalism, Socialism and Democracy*. London/New York: Routledge

Simões, P., Cruz, N.F. and Marques, R.C 2012: 'The performance of private partners in the waste sector'. *Journal of Cleaner Production* 29-30, pp.214-221

Skelcher, C. 2010: 'Governing Partnerships'. In G. Hodge, C. Greve and A. Boardman eds. *International Handbook of Public-Private Partnerships*. Cheltenham: Edward Elgar Publishing

Slater, R., Frederickson, J., Thomas, C., Wield, D. & Potter, S. (2007): 'A critical evaluation of partnerships in municipal waste management in England'. *Resources, Conservation and Recycling* 51, pp. 643-664

Steijn, B., Klijn, E.-H. and Edelenbos, J. 2011: 'Public-Private Partnerships: Added value by organizational form or management?' *Public Administration* 89, 4, pp. 1235-1252

Stelling, C. 2014: *Public-Private Partnerships & the Need, Development and Management of Trusting. A processuel and embedded exploration*. PhD Series 17, 2014. Doctoral School in Organization and Management Studies, DK: Copenhagen Business School

Stewart, J. 2012: 'Multiple-case Study Methods in Governance-related Research'. *Public Management Review* 14, 1, pp. 67-82

Sørensen, E. 2012: 'Governance and Innovation in the Public Sector'. In D. Levi-faur ed. *Oxford Handbook of Governance*, Oxford: Oxford University Press

Sørensen, E. and Torfing, J. 2011: 'Enhancing Collaborative Innovation in the Public Sector'. *Administration and Society* 43, 8, pp. 842-868

Sørensen, E. and Torfing, J. 2009: 'Making Governance Networks Effective and Democratic through Metagovernance'. *Public Administration* 87, 2, pp. 234-258

Teisman, G.R. and Klijn, E.-H. 2002: 'Partnership Arrangements: Governmental Rhetoric or Governance Scheme', *Public Administration Review* 62, 2, pp. 197-205

Udbudsportalen/LGDK 2010: *Seks modeller for offentligt-private samarbejde – En guide til kommunerne*. Copenhagen: Udbudsportalen/ KL (LGDK)

Uyarra, E. and Gee, S. 2012: 'Transforming urban waste into sustainable material and energy usage: The case of Greater Manchester'. *Journal of Cleaner Production* 50, pp. 101-110

Van de Ven, A.H., Polley, D.E., Garud, R. and Venkatamaran, S. 2008: *The Innovation Journey*. Oxford: Oxford University Press

Verhoest, K., Petersen, O.H., Scherrer, W. and Soecipto, R.M. 2015: 'How Do Governments Support the Development of Public Private Partnerships? Measuring and Comparing PPP Governmental Support in 20 European Countries. *Transport Reviews* 35, 2, pp. 118-139

Walker, R. 2006: 'Innovation Type and Diffusion: An empirical analysis of local government'. *Public Administration* 84, No. 2, pp. 311-335

Walls, M. 2005: 'How local governments structure contracts with private firms: Economic theory and evidence on waste and recycling contracts'. *Public Works Management & Policy* 9, No. 3, pp. 206-222

Weaver, P.M. 2005: 'Innovation in municipal solid waste management in England: policy, practice and sustainability'. *International Journal of Sustainable Development* 1, pp. 21-45

Wettenhall, R. 2005: 'The public-private interface: surveying the history'. In G. Hodge, C. Greve and A. Boardman eds *The Challenge of Public-Private Partnerships: Learning form international experience*, Cheltenham/Northhampton: Edward Elgar

WCED 1987: *Our Common Future*. World Commission on Environment and Development.

Weihe, G. 2010: Towards a process perspective on public-private partnerships. In G. Hodge, C. Greve and A. Boardman eds. *International Handbook of Public-Private Partnerships*. Cheltenham: Edward Elgar Publishing

Weihe, G. 2008: 'Ordering Disorder – On the Perplexities of Partnership Literature'. *The Australian Journal of Public Administration* 67, 4, pp.430-442

White, P.R., Franke, M. and Hindle, P. 1995: *Integrated Solid Waste Management. A lifecycle inventory*. London: Blackie Academic & Professional

Williamsen, O.E. 1975: Markets and Hierarchies. Analysis and Antitrust Implications. New York: The Free Press

WRAP 2011: Working together for a world without waste. Business Plan 2011-2015. UK: Waste & Resources Action Programme

Yin, R.K. 2009: *Case Study Research. Design and Methods*. 4th ed., Thousand Oaks, CA and London: SAGE

Yin, R.K. 2003: *Applications of Case Study Research*, Thousand Oaks, CA & London: SAGE

Ysa, T., Esteve, M. and Longo, F. 2013: 'Enhancing Innovations in Public Organizations through Public-Private Partnerships: The Role of Public Managers'. In G. Hodge and C. Greve eds *Re-thinking Public-Private Partnerships*. London/New York: Routledge

Ysa, T. 2007: 'Governance Forms in Urban Public-Private Partnerships'. *International Public Management Journal* 10, 1, pp.35-57

Zapata, P. 2013: 'Waste in Translation: Global ideas of urban waste management in local practice', in M.J.Z. Campos and C.M. Hall eds. *Organizing Waste in the City*. *International perspective on narratives and practices*. Bristol: Policy Press

PART II: RESEARCH ARTICLES

This second part of the PhD dissertation presents the three articles in the PhD:

- Article 1: The Potential for Conducting Innovation in Public-Private Partnerships (to be submitted to *International Public Management Review*)
- Article 2: The Prominent, but Contested Role of Public-Private Partnerships in Sustainability Transformations of Waste Management Systems – Comparing English and Danish experiences (to be submitted to *Environment and Planning A*)
- Article 3: Network, Hierarchy and Market: Managing Mixed Governing Strategies for Innovation in Public-Private Partnerships (to be submitted to *Public Administration*).

Article 1

The Potential for Conducting Innovation in Public-Private Partnerships

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Abstract

Public service delivery increasingly takes place under challenging conditions of complex societal problems, increasing citizen demands and restricted budgets, which demand innovative solutions. This article investigates the potential for conducting innovation in public-private partnerships (PPPs) for which evidence so far has been lacking. Based on a review of existing ideas and empirical investigations of innovation in PPP research, the article suggests a conceptual approach focusing on two potential drivers of innovation in PPPs: 'competition' and 'collaboration'. This framework is used to identify drivers and challenges for conducting innovation in three PPP types, Infrastructure PPPs, Service PPPs and Innovation PPPs, illustrated by a number of examples. The article suggests that the combination of competitive and collaborative strategies in PPPs forms a unique potential for conducting innovation, whereas challenges tend to arise, when this potential is being limited. Identifying the conditions of 'competitive collaboration' in PPPs may be a useful starting point for further empirical investigations and theory development on PPP innovation.

Introduction

Today's public sector is met by complex societal challenges such as climate change, poverty or social inequality in an increasingly fragmented and diverse society, where growing citizen expectations to individualized solutions and restrained public budgets in austerity times place governments in a cross-pressure situation. These developments have led to an emphasis on innovation in public services to deliver 'more for less' (Kooiman 1993, Albury 2005, Sørensen and Torfing 2011, Bekkers et al 2011). Public-private partnerships (PPPs) have been brought forward as a policy instrument to gather actors and resources to develop new solutions and improve public service delivery (Leiringer 2006, McQuaid 2010, Hodge et al 2010). PPP have been recommended as a strategic instrument for governments to increase innovation and deliver better public services by for example the OECD (OECD 2007; 2008; 2011), whereas the EU recently announced a revised public procurement directive with a new specific procedure for innovation in partnerships (EC 2014).

In contrast to this attention, theoretical and empirical evidence to support innovative results from PPPs seems lacking. Research based investigations of innovation in PPPs remain scarce, scattered between various sectors and research fields such as health care, waste management and construction works, which seldom refer to each other, and show mixed results. Whereas some PPPs are reported to lead only to 'business as usual' (Ball et al 2000, Hurst and Reeves 2004, Slater et al 2007), others document innovative outcomes (Akintoye et al 2003, Bovaird 2006, Esteve et al 2012). Furthermore, there does not seem to have been an attempt to develop a general, theory-based approach to the analysis of innovation across PPP types and sectors. As Leiringer concludes, despite the acceptance and embrace of PPPs as governing instruments for innovation in both

government and industry '*the theoretical basis to support them seems strangely underdeveloped'* (Leiringer 2006).

On this background, this article conducts a review of ideas and empirical experiences on innovation in PPPs to produce a conceptual framework, which are used to identify drivers and challenges for conducting innovation in three PPP types, infrastructure partnerships, service partnership and innovation partnerships. Whereas innovation may also be affected by other factors such as external pressure and individual entrepreneurship (see for example Eaton et al 2006), this article focuses on the influence of organization. The article will ask the main research question: *What is the potential for conducting innovation in public-private partnerships?*

The article is structured as follows. First, the article will present two central research contributions. Second, the article will define the nebulous concepts innovation and PPPs. Third, the article will fold out two ideas and strategies on innovation in PPPs. Fourth, this conceptual framework will be used to investigate drivers and challenges for innovation in three PPP types illustrated by examples from existing literature, before, finally, the article will discuss results and conclude on the innovative potential in PPPs. The article suggests that although competition and collaboration are often seen as contradictive, the potential of conducting innovation in PPPs lies in the unique possibilities of combining these strategies, whereas challenges tend to arise, when these are limited.

Main contributions from existing research

Whereas several articles include innovation as a relevant output and outcome amongst other success criteria (Ball et al 2000, Akintoye et al 2003, Hurst and

Reeves 2004, Bovaird 2006), only few articles have focused more explicitly on innovation in PPPs. This section will shortly present two central contributions.

In the first contribution, Leiringer (2006) investigates the possibilities for technological innovation in infrastructure PPPs. The author identifies and investigates the effect on innovation in four issues of prominence in PPP research: collaborative working, design freedom, value for money and risk transfer. On the basis of a four year multi-methods study of PPPs from 1999-2003, the author concludes that these commonly used arguments are imperfect and provides suggestions towards a more precise understanding. Leiringer concludes that although there is potential for innovation, there also are several challenges for innovation in PPPs. Whereas we will return in more detail to Leiringer's main points in the analysis of infrastructure PPPs, this framework of investigation may also be relevant for other PPP types and, as we shall return to, to a certain degree corresponds with the 'competitive collaboration' framework.

In the second contribution, Esteve, Ysa and Longo (2012) and Ysa, Esteve and Longo (2013) makes a valuable effort in integrating public innovation theory in a PPP framework. The authors argue for a broad understanding of innovation in public services encompassing both product, service and organizational innovation, which has also been the starting point of this article. The authors identify different types of PPPs in a single case study of a best case of collaborative innovation, the Blood and Tissue Bank in Spain, leading to various types and scopes of innovation. The article suggests that there is potential for more radical innovation in PPPs and that actors typically choose closer forms collaboration, when uncertainty and required investments are higher. However, the authors focus mostly on collaboration and overlook the likewise importance of competition.

Innovation in public services

Innovation is *a creative process of developing new ideas to change existing practices in a specific setting and also involves the implementation and diffusion of these ideas* (Mulgan and Albury 2003, Walker 2006, Van de Ven et al 2008). As several scholars emphasize, innovation is not the same as 'invention', but requires the active adoption and implementation of an idea in a specific setting (Mohr 1969, Osborne 1998, Mulgan and Albury 2003). The process of innovating involves generating a new idea, implementing, adjusting and integrating the idea in a specific setting and potentially diffusing the idea to other settings (Rogers 2003, Eggers and Sing 2009). Although there is a general agreement that innovation is something 'new' (Osborne 1998), new ideas are rarely grabbed out of the thin air, but are often piecemeal solutions, where old ideas are connected and re-used in a new context (Rogers 2003).

According to Osborne and Brown (2011), innovation has mostly been perceived as new technologies, products or production processes in a private sector context, whereas this understanding may not fully capture the nature of public service innovations. In public service innovations, the adoption of new technologies or products requires new forms of organizing and delivering public services. Furthermore, public sector innovation takes place in a political and institutional context, where the need for change is articulated through new political discourses, strategies and concepts (Hartley 2005). Whereas the main objective of innovation in the private sector is to gain 'competitive advantage', public sector organisations aim to deliver 'public value' to citizens following politically defined objectives (Moore 1994; 2005).

Innovations can be radical, break-through technologies leading to large-scale changes in public service delivery, but also smaller, incremental changes to

existing services can bring increased public value. In contrast to private enterprises, public agencies rarely capitalize on innovations, which tend to be diffused through the adoption of ideas across agencies, rather than through one agency 'buying' an innovative service from another agency. As such, a main objective in the public sector may be to nurture public agencies that are open, adaptive and attentive to new developments and have the ability to continuously learn and evolve (Moore 2005). The next section will define PPPs and explain the categorizations used in this article, before we outline the potential in PPPs for contributing to a more innovative public sector.

Public-Private Partnerships

Public-private partnerships (PPPs) are increasingly used by governments all over the world to deliver public infrastructures and services in cooperation between public and private sector organisations (Osborne 2000, Rosenau 2000, Hodge et al 2010, Greve and Hodge 2013). PPPs may be broadly defined as '*cooperative institutional arrangements between public and private sector actors'* (Greve and Hodge 2005). These arrangements may provide the opportunity for public and private actors to jointly develop and deliver public infrastructure and services, while sharing risks, costs and resources involved for a time-limited period (Ham and Koppenjan 2001, Klijn and Teisman 2005, Greve and Hodge 2013). PPPs may take many forms and there have been several suggestions towards categorization (see for example Linder 1999, Savas 2000, Weihe 2008, Klijn 2010, Hodge and Greve 2013, Stelling 2014a). This article categorizes PPP based on 'purpose' (see Bovaird 2004, Brinkerhoff and Brinkerhoff 2011) which is a categorization close to practice-based empirical categorizations and thereby easy to operationalize in empirical analyses.

The article focuses on three PPP types, Infrastructure Partnerships, Service Partnerships and Innovation Partnerships[3], which are all relevant for and used in public service delivery. *Infrastructure partnerships* typically involve a bundling of tasks such as the design, construction, finance, operation and maintenance of an infrastructure, for example a school building or processing facility, in a long-term contract of 20-35 years. In this period, the private consortium either owns the facility or share ownership with the authority in a joint venture company, whereas the authority pays for the availability and services delivered in the contract period. Following, the facility is typically transferred to the authority (Yescombe 2007). Infrastructure partnerships originated in the UK with the Private Finance Initiative (PFI) scheme introduced in 1992 by the Conservatives and was expanded and rebranded as 'PPP' by the incoming Labour government. Whereas the UK remain a market leader with 641 signed PFI contracts by 2009 (Hellowell 2010), Kapeller and Nemoz (2010) report a total of 1340 infrastructure PPP projects across Europe reaching financial close between 1990 and 2009 with a capital value of EUR 253 million. In recent years, infrastructure PPPs have been diffused from the traditional sectors of transport (e.g. roads, bridges) and public buildings (e.g. schools, prisons) to the environmental sector (e.g. water processing and waste treatment) (ibid.).

Service partnerships include an often complex bundle of tasks to that are jointly managed in close dialogue between the contractual parties. Service partnership contracts typically outline a less adversarial approach to disputes, a more collaborative approach to contract reading in a 'partnership spirit', sharing of risks and possible gains and an 'open book' approach to accounting (DCLG 2006, Udbudsportalen/LGDK 2010). Whereas the long-term infrastructure PPP has

[3] Brinkerhoff and Brinkerhoff (2011) also mention policy, capacity building and economic development as potential purposes, but the article limits the scope to three types to be able to provide some depth in the analysis.

largely dominated scientific and practitioner debates on PPP, service partnerships have received less attention (although see Domberger and Fernandez 1999, Baker 2007, Stelling 2014b). Compared to infrastructure partnerships the amount of private investment involved is considerable smaller (or non-existent) and service partnerships usually involve short to medium term contract periods of typically 4-7 years (Domberger and Fernandez 1999).

Innovation partnerships involve "*a setting in which public and private players work together to develop innovative solutions targeted the public sector*" (Evald et al 2014, p. 34). The 'players' are considered cooperation partners and as such expected to '*develop innovative solutions together through a continuous transfer of ideas and knowledge between the players involved*' (ibid.). Innovation partnerships are rarely based on a tender and may be organized in more or less formalized contracts and 'collaborative agreements'. The scale of innovation partnership may vary from large scale multiple actor projects to small, local innovation projects with two-three partners (DECA 2009). The process tends to include phases of problem definition, conceptual development, production of proto-types and testing by users, development of the final solution and potentially continuous cooperation and improvement (ibid., Brogaard and Petersen 2014b).

Innovation partnerships may be considered a new subject of study in PPP research as well as a relatively new organizational arrangement (Olesen 2013, Evald et al 2014). This article will mainly draw on experiences from Denmark and other Scandinavian countries, where innovation partnerships have been increasingly popular and a number of helpful evaluation reports are available. A recent mapping from the research institution KORA counted at least 249 finalized or operational innovation partnerships in the Danish welfare sector by the beginning of 2014 (Brogaard and Petersen 2014a). These are mainly situated in health care

and eldercare, perhaps because there is a strong focus on efficiencies and new ways of easing citizens' ability to take care of themselves in these sectors (DECA 2009).

Two ideas to why PPPs should bring innovation to the public sector

In this section, we will explore two ideas and related governing strategies which may show an innovative potential in PPPs. The public sector has traditionally been perceived as almost the opposite of being innovative. In these hierarchical, bureaucratic organizations, ineffective, rule-abiding public servants have been said to resist radical change in fear of the political consequences of failure (Albury 2005, Sørensen and Torfing 2011). Whereas this description may always have been slightly overdramatic, the public sector has changed considerably since the heavy planning regimes of the 1970s. In the 1980s, New Public Management (NPM) reforms increasingly looked to private enterprises and competitive market structures as an ideal for public organizations leading to a disintegration of the public sector through privatization or contracting out public service or placing service delivery in 'arm's length' of bureaucratic mother organizations (Hood 1991, Osborne and Gabler 1992). In the 1990s, these ideas were supplemented by the blooming concept of 'governance', which in opposition to 'government' signalled a more networked form of governing. The attention towards governance may both be seen as an attempt to reconnect the disaggregated public sector and as an acknowledgment of the increasing complexity, diversity and fragmentation in society which demanded a resurrection of the state in a new role as societal coordinator (Kooiman 1993, Rhodes 1996, Kickert et al 1997, Jessop 1998, Stoker 1998).

Accordingly, NPM and governance reforms focused on including a broader range of actors in societal governing, but suggested two different strategies for bringing

innovation into the public sector. Whereas the NPM strategy suggests the introduction of competitive structures to incentivise public and private actors to innovate public services, the governance strategy encourages public and private actors to collaborate to develop new solutions sharing resources, competencies and ideas (Sørensen 2012). Accordingly, 'competition' and 'collaboration' can be seen as two different ideas and strategies for the coordination of interaction between public and private actors to drive forward innovation supplementing the traditional hierarchical form of coordination in the public sector.

In their pure forms, competition and collaboration may also provide challenges for innovation. The contracting out arrangements of NPM typically establish a principal-agent relationship between a public authority and a private contractor, where information is unevenly distributed and the principal risk opportunistic behaviour from the agent (Reeves 2008). In consequence, public authorities may decide to determine objectives and procedures with less input from the agent (Sørensen 2012). Furthermore, public procurement regulation with the aim of ensuring equal competition may force public authorities to provide detailed specifications with restricted possibilities for dialogue in the procurement process, where new solutions begin to take form (Greve 2010). The problem of restricted dialogue has to some degree been remedied with the procedure for 'competitive dialogue' (see EC 2004), which has become easier accessible in the new procurement directive along with the new 'innovation partnership' procedure (EC 2014).

In contrast, governance reforms aims to establish self-governing arenas where public and private actors are motivated to take joint responsibility and collaborate to develop better solutions. However, as Bryson, Crosby and Stone (2006) suggest, cross-sector collaboration is no 'panacea' for developing good solutions.

Collaboration may not solve all the problems that they attempt to tackle and collaborative processes may even create new problems (ibid.). In consensus-oriented innovation processes, more radical ideas can become oppressed, because everyone needs to agree on the solutions, and any clear direction of innovations may be lost (Donahue and Zeckhauser 2011, Sørensen 2012).

Although competition and collaboration strategies may to some degree be in competition, in practice they tend to co-exist in a hybrid 'layering' of various ideas, strategies and governing structures in the public sector (Christensen and Lægreid 2011). Both ideationally and organizationally, PPPs clearly take inspiration from both NPM and Governance reforms (Klijn 2010). As contractual arrangements and arm's length organisations PPPs strongly rely on NPM ideas. However, the idea of mutual added value, joint production of services and developing new solutions together evidently lean towards governance ideas (Klijn and Teisman 2003, Klijn 2010). This article suggests that specific PPP types may to a varying degree take inspiration from NPM and governance ideas, and as such, the specific ways in which PPPs are organized to provide competition and/or collaboration may provide various drivers and challenges for conducting innovation in public services.

Drivers and challenges for innovation in three PPP types

On the basis of the above outline of a conceptual model for understanding the potential for conducting innovation in public-private partnerships, this section identifies drivers and challenges for innovation in three PPP types, infrastructure partnerships, service partnerships and innovation partnerships. *Table 1* provides an overview of results from the analyses of the three PPP types.

Table 1: Organizational form, innovation drivers and challenges in three PPP types

PPP type	Organisational form	Innovation drivers	Challenges
Infrastructure Partnerships	Long-term contract or joint venture for the design, construction, finance and operation of a facility	- Strong competition for the best solution within the public budget - Incentives for improved solutions through bundling of tasks and risk transfer - Open specifications and minimal requirements provide freedom for private optimization	- Detailed contract specifications prevent private input - Too much risk transfer disincentives private experimentation - Lack of flexibility in long term contracts
Service Partnerships	Contract or joint venture on the delivery and development of services in a collaborative, trust-based relationship	- Specific focus on developing a flexible, trust-based relationship to jointly identify and develop the best solutions - Economic incentive systems supporting 'big bang' or incremental improvement	- Difficulties of developing trust between the partners
Innovation Partnerships	Development contract or more informal arrangement to jointly develop and potentially procure innovative solutions targeted the public sector	- A specific focus on innovation of solutions targeted the public sector - Pooling of knowledge and resources towards a solution not specified on	- Legal complexity and lack of adequate models - Different interests and work procedures between public and private actors

		beforehand - Public and private actors share risks and gains as equal partners with strong commercial and public value interest in the project	- Lack of implementation

Infrastructure Partnerships

The main idea of the UK PFI contract was to reduce pressure on public budgets by providing public infrastructure with private finance, while getting around restrictions on public spending (Hodge and Greve 2013), and it can be discussed if PFIs and similar infrastructure partnerships are actually 'partnerships' or merely a financial arrangements (see for example Hodge and Greve 2007). Besides the financial argument, infrastructure PPPs have also been linked to promises of increased 'value-for-money' (VfM) and more innovative solutions (OECD 2008, Hodge and Greve 2013).

The contract transfers a number of risks to the contractor with the purpose of providing an incentive for the contractor to employ whole-of-life planning and on-time delivery and thereby for the 'agent' to follow the 'principal's' interests. PPPs tend to have relatively open output specifications combined with minimal technical requirements and service level agreements to provide greater freedom to private providers (ibid.). Competition and the high transaction costs involved in bidding should induce bidders to be innovative and try out new ideas to deliver the best possible solution within the budget and thereby impress the client (Ball et al 2003, Akintoye et al 2003, Leiringer 2006). Especially when the 'competitive dialogue' procedure is used, bidders will have the opportunity to apply market knowledge, technical know-how and project management skills to direct their

proposals better towards public objectives and deliver a more efficient and effective solution than the public authority might have come up with by itself. As such, competitive and collaborative structures may supplement each other to drive forward innovation.

Despite these expectations of innovation, empirical investigations display mixed results. In a single case study of a PFI high school in the UK, Ball, Heafey and King (2000) conclude that the most innovative features could be found in the project requirements directed by the client. Investigating waste management PPPs also in the UK, Slater, Frederickson, Thomas, Wield and Potter (2007) suggest that although these PPPs were often considered innovative in a UK context, they did not seem to provide more innovative solutions than other organisational arrangements, such as pure private ownership (Slater et al 2007). Hurst and Reeves (2004) conclude that the first infrastructure partnership in Ireland for a public school '*has not resulted in significant innovations and the public sector has failed to provide any evidence of value for money'* (p.379).

In contrast, Esteve, Ysa and Longo (2012) show how the Spanish the Blood and Tissue Bank conduct innovation in collaboration with external stakeholder through various forms of cooperation including infrastructure partnerships. Examples from the study include an infrastructure partnership for designing a new headquarters for the Bank, which became one of the most energy efficient to be found in Mediterranean countries employing innovative technologies to drastically reduce energy demands for heating and cooling. The authors suggest that radical, high-risk innovation projects increase interdependency between the partners and tend to lead them towards more tightly organised forms of collaboration (Esteve et al 2012).

Three main challenges for conducting innovation in infrastructure partnerships may explain these mixed results. Firstly, public authorities tend to write too detailed specifications and thereby prevent private sector input (Ball et al 2000, Hurst and Reeves 2004, Leiringer 2006). Leringer (2006) suggests that the stringent manner in which contracts are formulated in practice in combination with regulatory standards leave little leverage for the contractor to make changes as the project develops. Ball, Heafey and King (2000) show that although output specifications in this procurement was relatively open, the client used the competitive dialogue process to direct bidders towards specific solutions (Ball et al 2000). Effectively, infrastructure partnerships may sometimes provide little leverage for private companies to bring innovative ideas.

Secondly, the idea that risk transfer should incentivize innovation may not hold. According to Leiringer (2006), the characteristics of PFI contracts may incentivize private businesses to only bring tried and tested technologies and 'best practice' solutions to the table in order to limit risk exposure. Accordingly, too much risk transfer may actually reduce the private company's interest in experimentation (Greve 2010). On the basis of a comparative case study of transport PPPs in the Netherlands, Koppenjan (2005) suggests that the creation of added value do not emerge simply by switching risks to the private actor, but rather through early cooperation to ensure that projects are convincing and motivational projects for public and private actors.

Thirdly, the long duration of contracts combined with detailed specifications can become a challenge in the contract period, as it may prevent the adjustment of contracts to emerging political objectives or new technological developments. As the contractor will have the ownership of the facility and thereby a monopoly on service delivery in the contract period, additions and service changes will need to

be negotiated and may lead to higher costs (Ball et al 2000). Leiringer (2006) describes how the parties of PFI contracts have to '*go out of their way to establish routines that effectively counter the restrictions in collaborative working forced upon them by stringent contracts'* (p.305). As he suggests, while this might be possible if the parties are willing, it may be tempting for the public authority to fall back on old habits of hierarchical steering.

In conclusion, the combination of competitive and collaborative drivers in infrastructure partnerships in principle provide a potential for conducting innovation, but competitive drivers for innovation may in practice be reduced by too much risk transfer, whereas the importance of collaboration in close dialogue between public and private partners across the PPP process have tended to be overlooked. Infrastructure partnerships tend to involve only best practice tried and tested technologies, but as Leiringer suggests, transferring tried and tested technology to a new setting may also be considered innovation. Whereas these early experiences point towards several challenges for innovation in infrastructure PPPs, future examples might be expected to show more innovative results as learning from early projects are diffused and the possibility for competitive dialogue is improved with the new procurement directive.

Service Partnerships

In contrast to infrastructure partnerships, service partnerships are more directly concerned with partnership relationships. In comparison to the typical PFI contract where a relational dimension may be developed over time on the basis of a contract, service partnerships specifically aim to provide flexibility and facilitate close collaboration in contracts. As Stelling (2014b) suggests, service partnerships' '*contractual foundation makes a future relationship constitutive, rather than extra-contractual*' (p.140). As such, service partnership contracts may

be strongly related to the concept of 'relational contracting', which outlines a more collaborative, flexible and trust-based form of contracting out compared to traditional adversarial contracting (Williamson 1985, Reeves 2008). Because of the complex and changeable nature of the involved tasks, service partnerships are typically defined through output-specifications and performance measures to allow for flexibility and continuous improvement towards political objectives (Domberger and Fernandez 1999). Innovations in service partnerships may be implemented either as a 'big bang' operation in the beginning of the partnership or incrementally over the partnership lifetime (DCLG 2006).

PPP research provides only few accounts of innovation in service partnerships, but experiences seem generally positive[4]. In the example of the before mentioned Spanish Blood and Tissue Bank, a joint venture partnership with the private company Caridien framed the development of an innovative technological process to automatize the separation of blood components. This 'big bang' service innovation was afterwards diffused to other blood banks around the world (Esteve et al 2012). In an example from England, Bovaird (2006) show how the London Borough of Harrow developed and implemented a new ICT system in revenue and benefits services in close cooperation with a private partner. The contractor would get a reduction in payments, if they saved less than projected, whereas additional savings would be shared between the partners. Three years after signing the contract a new system was implemented, which after some initial technical difficulties delivered a number of innovations and costs savings of 16%. Examples of innovations were the integration of emails directly into the workflow (process innovation) and introducing 'e-billing' (a new service) (Bovaird 2006, pp. 86-88).

[4] These examples provided here are not specifically named 'service partnerships' in the referenced articles, but the description of them fits this partnership type.

However, there may also be challenges involved for conducting innovation in service partnerships. Investigating two anonymized contract-based service partnerships in Danish health care, Stelling (2014b) questions the level of trust actually developed in these ‘ strong relational’ partnerships. Both partnerships aimed to deliver innovation and efficiencies in a specific service area, where the private consultants would assist public agencies in improving their work processes, thus quite similar to Bovaird’s case. The private partner took most of the financial risk with the potential for gaining a profit, when efficiencies were obtained. However, projects experienced difficulties in trust development between the organizations. Whereas top-level managers had initiated the partnership and counted on middle managers and employees to participate, initial scepticism towards private consultants in the organizations developed into distrust and erosion of partnership relationships, which made it difficult for the private agents to deliver results (Stelling 2014b, pp. 137-161).

In conclusion, there seems to be strong potential in service partnerships for both more radical ‘big bang’ service innovation and/ or more incremental improvements in the organization and delivered services. Service partnerships combine competitive contracting with a more collaborative approach to contracting out based on market-based economic incentives. However, as Stelling (2014b) shows, flexible, trust-based partnership relationships do not necessarily develop between the partners, which may challenge the possibilities for collaboration and commercial gain from these partnerships.

Innovation Partnerships

In contrast to infrastructure and service partnerships, the main purpose of innovation partnerships is to provide an institutionalised cooperation for public and private actors to jointly develop innovative solutions to challenges in the

public sector. Innovation partnerships generally do not establish a principal-agent relationship, where the private agent delivers a pre-described service to the public principal, but rather involves a pooling of ideas, knowledge and resources between two or more equal partners to develop a solution that may not be specified on beforehand (Damvad 2010, Munksgaard et al 2012). Whereas the private partner usually brings technical know-how, the public party may contribute with knowledge of user experiences and access to 'real life' facilities for testing solutions (DECA 2009).

PPIs may be initiated either by a public authority experiencing a specific challenge or by a private company wanting to test a product or idea. PPI reports outlines clear benefits for both partners. The private partner may benefit from commercialisation of the developed product or service, increased knowledge of user needs from product testing and networking with public or other private actors (DECA 2009). Testing the solution in a public environment may also bring increased legitimacy to the solution and ease the opening of new markets (DBA 2014). The public organization may improve public services, achieve efficiencies in work flows, deliver politically high profile projects, improve the working environment and support an innovative culture in their organization (DECA 2009).

There are many examples of successful PPIs having delivered radical innovation with potential for national, European and international diffusion or more incremental innovation, but there are also examples of partnerships where one or both partners did not achieve their objectives (Brogaard and Petersen 2014b). An example of radical innovation with international commercial potential is the development of an 'incubator station for fertility treatment' in a PPI between the Danish Herlev Hospital and the English company Ruskin Technologies which had the technical skills to realize the idea. The final product could improve fertility

rates by 50% compared to traditional methods and has been marketed by Ruskin Technologies in both England and the Nordic countries (DECA 2009). The PPI project 'Bonusrens' could be characterized as a more incremental innovation, where Fredensborg Municipality and the private company 'Bonusrens' tested the use of steam to sterilize furniture and toys in day care institutions resulting in implementations of this solution in several institutions (Brogaard and Petersen 2014b). A so far less successful project was the development of the 'KOL suitcase' to enable patients to be treated at home, which has stranded between development and implementation (DECA 2009).

There are two main challenges for conducting innovation in PPIs: legal complexity and the differences between interests and working procedures in public and private companies (Munksgaard et al 2012). Firstly, public procurement regulation, the risk of state aid and distribution of property rights outline a complex legal framework for innovation partnerships (Olesen 2013). PPI participants have stressed the lack of solid procurement and cooperation models and guidelines as a main challenge and report spending a lot of time and resources on designing meaningful frameworks from scratch (DECA 2009, Damvad 2010). A main challenge is to hinder that the private company involved in the development of the new solution becomes disqualified in further procurement processes because of EU equal treatment principles (DECA 2009).

Secondly, the collaborative process may be challenged by differences in interests and working procedures between public and private organizations. Whereas private actors tend to favour an effective process towards product development focusing on economic gains, public authorities may focus more on long term competence building and innovation in work procedures in line with their main objective of creating public value. Lack of clear direction and mutual expectations

can lead to disputes and dissatisfaction in both organizations (Munksgaard et al 2012). For example, in the project 'Prevention of digital bullying' both public and private partners experienced that an unclear purpose and role division led to collaborative difficulties. The result was that none of the developed solutions was implemented (Brogaard and Petersen 2014b). Furthermore, private companies experience long public decision procedures as unnecessarily tiresome. The prolonging of the process tends to increase the costs of projects, which can be a serious challenge for especially smaller private ventures (DECA 2009).

The new procurement directive may to some degree mend the challenges in PPPs by introducing 'innovation partnerships' as a distinct procedure for innovative procurement. The procedure outlines an integrated two-step procurement process with the aim of developing an innovative product or service and subsequently purchase the developed solution, provided that the solution correspond to agreed performance and price levels. The partners are allowed to negotiate everything except for minimum requirements and award criteria. As such, this new procedure allows the authority to combine the innovation process and purchase of a solution, thus releasing the authority from having to contract out the implementation of the developed solution in a distinct procurement process (EC 2014, article 31).

In conclusion, the potential for conducting innovation in innovation partnerships lies exactly in the clear competitive drive and upfront technological knowledge in private companies which in collaborative processes with public organisations and users may be channelled towards new products, processes, services that increase societal value. Although legal rules and public private differences are considered challenges to collaborative and competitive strategies, strong results show that it is often possible to overcome these in a manner that fits specific innovation project.

Discussion

The analyses of the potential for conducting innovation in these three types of partnerships, infrastructure partnerships, service partnerships and innovation partnerships, show that although experiences so far have been mixed and tending towards the negative, there is a potential for innovation in all three partnership types, which may be further explored in the future. Applying the concepts of competition and collaboration assisted in showing the drivers and challenges for innovation and explaining the mixed experiences so far.

Infrastructure PPPs provide a competitive driver for the private sector to be innovative to gain the opportunity of a long term profit if they manage to impress within public budgets. Whereas bundling of tasks and risk transfer are thought to support the incentive for improved solutions, experiences show that too much risk transfer to the private sector might reduce their incentive to experiment. Empirical experiences also show that too detailed contract specifications have in some cases prevented private input, whereas long term duration of contracts may reduce flexibility. Infrastructure partnerships tend to bring tested and tried solutions that may be considered innovative in a specific setting, but are less likely to bring more radical innovation. In general, the importance of collaboration to support competitive structures seems to have been underestimated in the implementation of this PPP type.

Service partnerships specifically focus on moving away from the adversarial relationships of traditional contracting out and developing close, flexible and trust-based relationships between public and private partners. The relationship tends to be supported by an economic incentive structure, which makes it advantageous for both actors to work for improvements. Service partnerships may bring innovation either as a 'big bang' operation of a radical solution with potential export

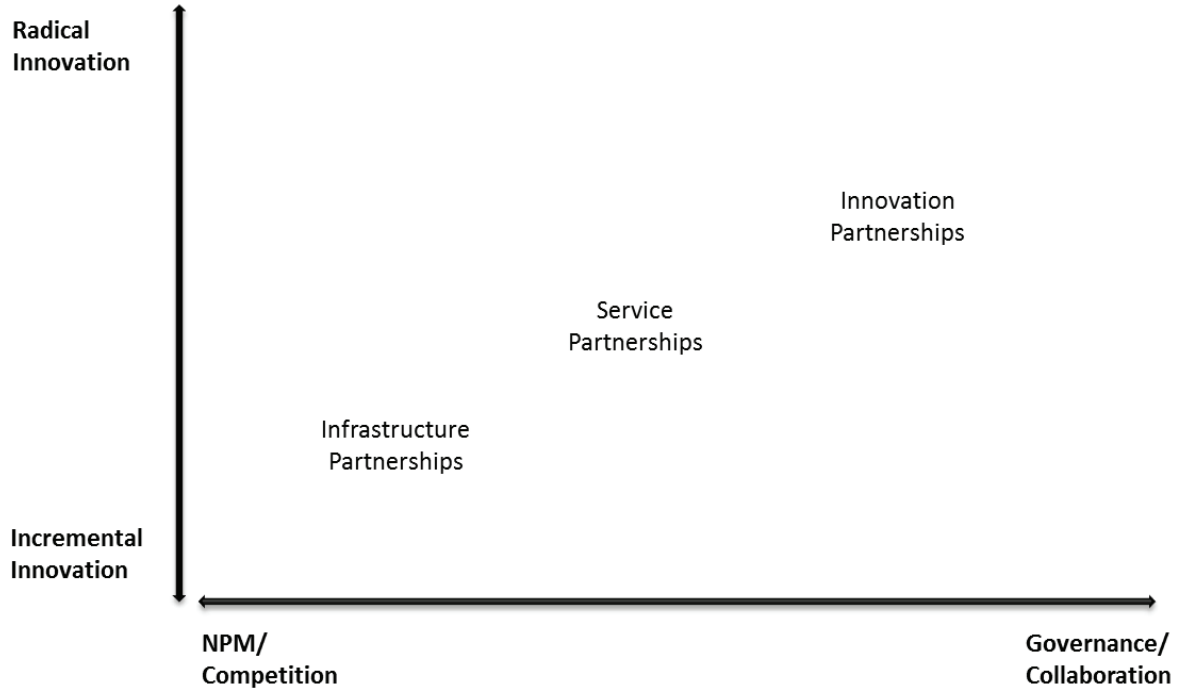
opportunities or as more incremental service improvements and efficiencies over time. However, the idea of close collaboration may be challenged in practice, where building trust can be difficult.

Innovation partnerships are relatively new organizational arrangements, which provide the framework for public and private actors to jointly develop innovative solutions by pooling knowledge and resources. There are strong drivers for collaboration based on the commercial potential for private companies and the prospect for public authorities of gaining public value through new solutions. These processes may be challenged by legal complexity and public-private differences. A new EU procurement process for innovation partnerships may to some degree remedy these challenges.

Accordingly, it seems that there is most potential for conducting innovation in innovation partnerships, which is not surprising since they are organized directly with this purpose in mind. Innovation partnerships are close to governance ideas, as they stress the joining of resources and knowledge in equal collaborative relationships, but also include a strong competitive driver for private companies in the prospects of developing new products and markets. In contrast, infrastructure partnerships are closer to NPM ideas of achieving innovative ideas and efficiencies by letting the private sector deliver public services in competitive processes. There tends to be less emphasis on collaboration in these partnerships, although the introduction and ease of access to 'competitive dialogue' show a realisation of the need for more collaboration in these partnerships as well. Service partnership may be the most 'hybrid' of the three, being modelled after competitive contracting out, but strongly emphasising collaborative relationships.

Figure 1 places the three partnerships on a provisional scale based on their organizational inspiration from NPM/competition to governance/collaboration and the scope of innovation. It is important to stress that this scheme outlines a typology and consequently specific infrastructure, service and innovation partnerships may be placed differently compared to these 'ideal types'.

Figure 1: The inspiration from NPM (competition) and governance (collaboration) in three PPP types compared to the scope of innovation



Whereas this scheme provide an overview of current experiences of conducting innovation in these three partnership types, the key issue is not to compare the 'innovativeness' of these PPPs. The interesting outcome of this review is rather the identification of potentials for innovations in each PPP type and collectively across PPP types to enable increased societal gains from PPPs. The good news is that there seems to be a potential. PPP research and evaluation reports show examples of innovative output and outcomes from all three PPP types, which bring value to both public and private sector organizations. As mentioned, the aim is not

necessarily for all PPP types to deliver radical innovation, but rather to support an innovative culture in the public sector where new ideas are continuously developed, adopted and diffused. Accordingly, the article points towards the value of a broad innovation concept incorporating various types and scopes of innovation which are often interconnected in the innovation of public services. The degree of open dialogue needed between public and private actors may vary depending on the type and scope of innovation in play.

The article also points to potential learning points between the different PPP types. For example, good experiences with collaborative relationships from innovation and service partnerships may to a greater extend be integrated in infrastructure partnerships, whereas the structured focus on risk sharing in infrastructure partnerships may provide a better foundation for innovation partnerships. There is always a risk involved in innovation projects and if that risk is borne by one partner alone, there might be less incentive to innovate.

The review also show examples of less innovative PPPs and innovation processes which have failed. Across PPP types, main challenges for conducting innovation remain the legislative framework and public-private differences. Ironically, the legislative framework aiming to ensure equal competition to gain efficiencies may prevent private input. As several authors have stressed, private-private models of collaborative innovation through 'open innovation' (Chesbrough 2006) are generally more collaborative and less restricted than public procurements (Sørensen 2012, Munksgaard et al 2012). PPPs continue to exist in 'the shadow of hierarchy' (Scharpf 1997) not only because of complex legislative frameworks, but also when public agencies in practice keep to their habits of hierarchical governing. However, political and administrative processes should not only be perceived as challenges for conducting innovation. As this review indicates, policy

development and administrative objectives of continuous improvement may also be an important driver of innovation. As such, hierarchy may be considered a third driver of innovation in PPPs. Striking the balance between flexible collaboration and securing accountability and equal access to public service markets may not be an easy task for public authorities.

As such, the results of this review support the findings of Esteve et al (2012) that PPPs provide an interesting potential for conducting innovation to improve public service delivery. This article specify that the innovative potential lies in the ideas and strategies embedded in the organizational form of PPPs with the prospect of combining collaborative and competitive drivers to conduct innovation through processes of 'competitive collaboration'. Accordingly, managers involved in PPPs should not focus on either collaboration or competition, but on the integrating both aspects wisely in the contract design and management practices of PPPs.

This article has provided small sneak-peaks into innovation processes in PPPs based on a conceptual framework and current experiences. However, there is a great need for more conceptually based empirical work on how innovation processes are conducted in practice in PPPs. The 'competitive collaboration' framework may provide a solid starting point for further debate. In comparison to the framework provided by Leiringer (2006), the issue of risk might be slightly underestimated in the competitive collaboration framework. Whereas risk sharing has been integrated in this framework as a factor influencing the possibilities for competition or collaboration, it may also be argued that risk sharing should have a more prominent position in the analysis of innovation in PPPs.

Conclusion

This article has investigated the potential for conducting innovation in public-private partnerships. The article identified innovation drivers and challenges in three types of PPPs: Infrastructure partnerships, service partnerships and innovation partnerships. The article shows that a mix of competitive and collaborative strategies in processes of 'competitive collaboration' provide a potential for innovation in all three PPP types, although there are also challenges for activating these drivers in practice. Political and administrative hierarchy may be considered a third driver.

The main challenge for conducting innovation in PPPs remains the legislative framework and public-private differences. If the public actor resists the temptation to fall back on hierarchical governing mechanisms and both partners make an effort to build trust and find common ground across differences, innovative results show that it is possible to overcome these challenges. The new public procurement directive may improve these possibilities, and it will be interesting to follow whether and how these new possibilities will be taken up by public procurers in Europe over the next years.

The article has contributed with a conceptual framework for analysing innovation in PPPs and an overview of current ideas and experiences from PPP research and evaluations reports, which may be a solid starting point for new empirical investigations. There is a need for more empirical case studies, which make a serious effort to investigate at the micro-level how public and private actors may conduct innovation in PPP processes within the available frameworks. Employing the right drivers for innovation in the contract design and management of PPPs may bring added value to both public and private sector organizations.

References

Akintoye, A., Hardcastle, C. Beck, M, Chnoyio, E. and Asanova, D. 2003: 'Achieving best value in private finance initiative project procurement'. *Construction Management and Economics* 21, 5, pp. 461-470

Albury, D. 2005: 'Fostering Innovation in Public Services'. *Public Money and Management* 25, 1, pp. 51-56

Baker, K.P. 2007: *Strategic Service Partnerships and Boundary-Spanning behaviour: A study of multiple, cascading policy windows*. Birmingham: University of Birmingham

Ball, R., Heafey, M. and King, D. 2000: 'Private Finance Initiative – A good deal for the public purse or a drain on future generations?' *Policy & Politics* 29, 1, pp. 95-108

Bekkers, V., Edelenbos, J., Steijn, B, eds. 2011: *Innovation in the Public Sector. Linking Capacity and Leadership*. Basingstoke: Palgrave Macmillian

Bovaird, T. 2006:'Developing New Forms of Partnership with the 'Market' in the Procurement of Public Services'. *Public Administration* 84, 1, pp.81-102

Bovaird, T. 2004:'Public-private partnerships: from contested concepts to prevalent practice'. International Review of Administrative Sciences 70, pp.199-215

Brinkerhoff, D.W. & Brinkerhoff, J.M. 2011:'Public-Private Partnerships: Perspectives on Purposes, Publicness and Good Governance'. *Public Administration and Development* 31, pp. 2-14

Brogaard, L. and Petersen, O.H. 2014a: 'Oversigt over offentligt-private innovationspartnerskaber (OPI) på velfærdsområdet'. Copenhagen: *KORA* – Det Nationale Institut for Kommuners og Regioners Forskning

Brogaard, L. and Petersen, O.H. 2014b: Offentligt-private innovationspartnerskaber (OPI) – Evaluering af erfaringer med OPI på

velfærdsområdet. Copenhagen: *KORA* – Det Nationale Institut for Kommuners og Regioners Forskning

Bryson, J.M., Crosby, B.C. and Stone, M.M. 2006: 'The Design and Implementation of Cross-Sector Collaborations: Propositions from the Literature'. *Public Administration Review* 66, pp.44-55

Chesbrough, H. 2006: 'Open Innovation: A new paradigm for understanding industrial innovation'. In H. Chesbrough, W. Vanhaverbeke and J. West eds., *Open Innovation: Researching a New Paradigm*, Oxford: Oxford University Press

Christensen, T. and Lægreid, P. 2011: 'Complexity and Hybrid Public Administration – Theoretical and

Empirical Challenges'. *Public Organization Review* 11, 4, pp. 407-432

Damvad 2010: 'Health Innovation in the Nordic Countries – Public Private Cooperation'. Copenhagen: Nordic Council of Ministers

DBA 2014: 'Når nye løsninger skal på markedet. Markedsmodning – en nøgle til nye arbejdspladser og vækst i Danmark'. Copenhagen: Danish Business Authority (*Erhvervsstyrelsen)*

DECA 2009: 'Analyse af offentligt-privat samarbejde om innovation'. Copenhagen: Danish Enterprise and Construction Agency (*Erhvervs- og Byggestyrelsen)*

DCLG 2006: *Structures for Service Delivery Partnerships*. London: Department for Communities and Local Government

Domberger, S., and Fernandez, P. 1999: 'Public-Private Partnerships for Service Delivery'. *Business Strategy Review* 10, 4, pp. 29-39

Donahue, J. and Zeckhauser, R. 2011: *Collaborative Governance*. Princeton: Princeton University Press

Eaton, D., Akbiyikli, R. and Dickinson, M. 2006: 'An evaluation of the stimulants and impediments to innovation in PFI/PPPP projects'. *Construction Innovation* 6, pp.63-77

EC 2014: *Directive 2014/24/EU of the European Parliament and of the Council of 26 February 2014 on public procurement and repealing Directive 2004/18/EC*. Brussels: European Commission

EC 2004: *Directive 2004/18/EC on the coordination of procedures for the award of public works contracts, public supply contracts and public services contracts*. Brussels: European Commission

Eggers, W.D. and Sing, S.K. 2009: 'The Public Innovators Playbook: Nurturing bold ideas in government'. *Deloitte Research*, available at www.deloitte.com/innovatorsplaybook

Esteve, M., Ysa, T. and Longo, F. 2012: 'The Creation of Innovation through Public-Private Collaboration'. *Revista Espaniola Cardiologia* 65, 9, pp. 835-842

Evald, M.R., Nissen, H.A., Clarke, A.H., Munksgaard, K.B. 2014:'Reviewing Cross-Field Public Private Innovation Literature: Current Research Themes and Future Research Themes Yet To Be Explored'. *International Public Management Review* 15, 2, pp. 32-57

Greve, C. and Hodge, G. eds. 2013: *Re-thinking Public-Private Partnerships*. London/New York: Routledge

Greve, C. and Hodge, G. 2005: 'Introduction'. In G. Hodge end C. Greve eds. *The challenge of public-private partnerships*, Cheltenham: Edward Elgar Publishing

Greve, C. 2010: 'Public-Private Partnerships in Business and Government'. In D. Coen, W. Grant and G. Wilson eds. *The Oxford Handbook of Business and Government*, Oxford University Press

Ham, H.V., and Koppenjan, J. 2001: Building Public-Private Partnerships: 'Assessing and managing risks in port development'. *Public Management Review* 3, 4, pp. 593-616

Hartley, J. 2005: 'Innovation in Governance and Public Services: past and present'. *Public Money and Management* 25, 1, pp. 27-34

Hellowell, Mark 2010: 'The UK's Private Finance Initiative: history, evaluation, prospects'. In G. Hodge, C. Greve and A. Boardman Eds., *International Handbook on Public-Private Partnerships*. Cheltenham: Edward Elgar

Hodge, G. and Greve, C. 2013: 'Introduction'. In C. Greve and G. Hodge, eds., *Re-thinking Public-Private Partnerships*. London/New York: Routledge

Hodge, G., Greve, C. and Boardman, A. eds. 2010: *International Handbook of Public-Private Partnerships*. Cheltenham: Edward Elgar Publishing

Hodge, G. and Greve, C. 2007: 'Public-Private Partnerships: An international Performance Review'. *Public Administration Review*, May/June 2007, pp. 545-558

Hood, C. 1991: 'A Public management for all seasons?' *Public Administration* 69, pp. 3-19

Hurst, C. and Reeves, E. 2004: 'An economic analysis of Ireland's first public-private partnership'. *International Journal of Public Sector Management* 17, 5, pp.379-388

Jessop, B. 1998: 'The rise of governance and the risk of failure: The case of economic development'. *International Social Science Journal* 50, 155, pp. 29-45

Kappeler, A. and Nemoz, M. 2010: 'Public-Private Partnerships in Europe – Before and During the Recent Financial Crisis'. Economic and Financial Report 2010/04. EIB, may be downloaded from http://www.eib.org/epec/resources/efr_epec_ppp_report1.pdf [30.03.2015]

Kickert, W.J.M., Klijn, E.-H. and Koppenjan, J.F.M. 1997: *Managing Complex Networks. Strategies for the Public Sector*. London: SAGE

Klijn, E-H. 2010: 'Public-Private Partnerships: Deciphering meaning, message and phenomenon'. In G.A. Hodge, C. Greve and A.E. Boardman *International Handbook of Public-Private Partnerships*, Cheltenham: Edward Elgar

Klijn, E.H. and Teisman, G.R. 2005: 'Public-private partnerships as the management of co-production: strategic and institutional obstacles in a difficult

marriage'. In G. Hodge and C. Greve eds., *The Challenge of Public-Private Partnerships. Learning from international experience*. Cheltenham/Northampton: Edward Elgar

Klijn, E.H. and Teisman, G.R. 2003: 'Institutional and Strategic Barriers to Public-Private Partnerships: An analysis of Dutch cases'. *Public Money and Management* 23, 3, pp.137-146

Kooiman, J. 1993: *Modern Governance: New government-Society Interactions*. London: SAGE

Koppenjan, J.F.M. 2005: 'The Formation of Public-Private Partnerships: Lessons from nine transport infrastructure projects in the Netherlands'. *Public Administration* 83, 1, pp. 135-157

Leiringer, R. 2006: 'Technological Innovation in PPPs: Incentives, opportunities and actions'. *Construction Management and Economics* 24, 1, pp. 35-51

Linder, S.H. 1999: 'Coming to Terms with the Public-Private Partnership: A Grammar of Multiple Meanings'. American Behavioral Scientist 43, pp.35-51

McQuaid, R. W. 2010: 'Theory of organizational partnerships: Partnership advantages, disadvantages and success factors'. In S.P. Osborne ed. *The New Public Governance? Emerging perspectives on the theory and practice of public governance*. Abingdon: Routledge

Mohr, L.B. 1969: 'Determinants of Innovation in organizations'. *The American Political Science Review* 63, 1, pp.111-126

Moore, M.H. 2005: 'Break-Through Innovations and Continuous Improvement: Two Different Models of Innovative Processes in the Public Sector'. *Public Money and Management* 25, 1, pp.43-50

Moore, M.H. 1994: 'Public Value as the Focus of Strategy'. *Australian Journal of Public Administration* 53, 3, pp. 296-303

Mulgan, G. and Albury, D. 2003: 'Innovation in the Public Sector'. London: Cabinet Office

Munksgaard, K.B., Evald, M.R., Clarke, A.H. and Nielsen, S.L.2012: 'Open Innovation in Public-Private Partnerships?' *Ledelse & Erhvervsøkonomi* 2, pp. 41-51

OECD 2011: Together for Better Public Services. Partnering with Citizens and Civil Society. OECD Public Governance Reviews. Paris: OECD Publishing

OECD 2008: Public-Private Partnerships. In Pursuit of Risk Sharing and Value for Money. Paris: OECD

OECD 2007: 'Innovation and Growth. Rationale for an Innovation Strategy'. *Organization for Economic Co-Operation and Development (OECD):* http://www.oecd.org/science/inno/39374789.pdf

Olesen, K.N. 2013: 'Model contracts for Public-Private Innovation Partnerships, a Danish Initiative'. *European Procurement & Public Private Partnership Law Review* 3, pp. 248-257

Osborne, S.P. ed. 2000: *Public-private partnerships. Theory and Practice in International perspective*. London/new York/Abingdon: Routledge

Osborne, S.P. 1998: 'Naming the Beast: Defining and Classifying Service Innovations in Social Policy'. *Human Relations* 51, 9, pp. 1133-1154

Osborne, S.P. and Brown, L. 2011: 'Innovation, Public Policy, and Public Services in the UK. The word that would be king?' *Public Administration* 89, 4, pp. 1335-1350

Osborne, D. and Gabler, T. 1992: *Reinventing Government.* Reading: Addison-Wesley

Reeves, E. 2008: 'The practice of contracting in public-private partnerships: Transaction costs and relational contracting in the Irish School Sector'. *Public Administration* 86, 4, pp.969-986

Rhodes, R.A.W. 1997: 'From Marketization to Diplomacy: It's the Mix that Matters'. *Australian Journal of Public Administration* 56, 2, pp.40-53

Rogers, E.M. 2003: *Diffusion of Innovation*. 5th ed. New York: Free Press

Rosenau, P. M. ed. 2000: *Public Private Policy Partnerships*. London: The MIT Press

Savas, E.S. 2000: *Privatization and Public Private Partnerships*. New York: Seven Bridges Press

Scharpf, F.W. 1997: *Games Real Actors Play. Actor Centered Institutionalism in Policy Research*. Boulder: Westview Press

Slater, R., Frederickson, J., Thomas, C., Wield, D. and Potter, S. 2007: 'A critical evaluation of partnerships in municipal waste management in England'. *Resources, Conservation & Recycling* 51, pp. 643-664

Stelling, C. 2014a: 'An Excursion into the Public-Private Partnership Jungle: Stop Standardizing, but keep on Mapping.' *International Public Management Review* 15, 1, pp. 1-28

Stelling, C. 2014b: *Public-Private Partnerships and the Need, Development and management of trusting. A processuel and embedded exploration*. PhD Series 17.2014, DK-Copenhagen Business School

Stoker, G. 1998: 'Governance as theory: Five propositions'. *International Social Science Journal* 50, 155, pp.17-28

Sørensen, E. 2012: 'Governance and innovation in the public sector'. In D. Levi-Faur ed. *Oxford Handbook of Governance*. Oxford: Oxford University Press, pp.215-227

Sørensen, E. and Torfing, J. 2011: 'Enhancing Collaborative Innovation in the Public Sector'. *Administration and Society* 43, 8, pp.842-868

Udbudsportalen/KL 2010: *Seks modeller for offentligt-private samarbejde – En guide til kommunerne*. Copenhagen: Udbudsportalen/Local Government Denmark (KL)

Van de Ven, A.H., Polley, D.E., Garud, R. and Venkataraman, S. 2008: *The Innovation Journey*. Oxford: Oxford University Press

Walker, R. 2006: 'Innovation type and diffusion: An empirical analysis of local government'. *Public Administration* 84, 2, pp.311-335

Weihe, G. 2008: 'Ordering Disorder – On the Perplexities of Partnership Literature'. *The Australian Journal of Public Administration* 67, 4, pp.430-442

Williamson, O.E. 1985: *The Economic Institutions of Capitalism*. New York: The Free Press

Yescombe, E.R. 2007: *Public-Private Partnerships. Principles of Policy and Finance*. Oxford: Elsevier

Ysa, T., Esteve, M. and Longo, F. 2013: 'Enhancing Innovations in Public Organizations through Public-Private Partnerships: The Role of Public Managers'. In G. Hodge and C. Greve eds *Re-thinking Public-Private Partnerships*. London/New York: Routledge

Article 2

The Prominent, but Contested Role of Public-Private Partnerships in Sustainability Transformations of Waste Management Systems

Comparing English and Danish experiences

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Abstract

This article investigates the role of public-private partnerships in the context of sustainability transformations of waste management systems. Urban scholars have pointed to the importance of investigating sustainability transformation processes in place-specific local contexts and pointed towards the role of partnerships in gathering actors, strategies and resources to solve the complex challenge of sustainable development. However, these scholars has not engaged in depth with the partnership phenomena or the growing body PPP research, which on the other hand has mostly focused on the financial benefits of PPPs. This article bridges these perspectives through a comparative analysis of the role of PPPs in sustainability transformations of English and Danish waste management systems. The analysis is based on qualitative, in-depth interviews with experts and public and private actors engaged in various types of PPPs supplemented with policy

papers, contracts, websites, etc. The article concludes that PPPs do play a prominent role in strategies for sustainability transformations of waste management systems in England and Denmark and show concrete examples of contributions to sustainability change from policy partnerships, service delivery partnerships and technology partnerships. Nonetheless, PPPs remain contested as policy instruments in waste management, where local authorities traditionally have played the main role as service providers. The future of PPPs in waste management in the two countries depends on strategic choices of various groups of public and private actors.

Introduction

Today, we face the challenge of sustainable development in several domains such as energy, water management, transport and resource management (Markard et al 2012). These systems may be understood as socio-technical infrastructure networks (Uyarra and Gee 2012, Bulkeley et al 2014), not only encompassing physical components and technologies such as waste treatment facilities, power plants or transport networks, but also social structures such as organizations, regulation and social networks (Hughes 1983). Socio-technical infrastructure networks tend to be highly path dependent, durable and resistant to rapid change, not only due to the fixity and sunk costs of the technical and physical components, but also to the vested interests of incumbent social groups (Monstadt 2009, Uyarra and Gee 2012). Adding to this, infrastructure systems have become increasingly 'splintered', as neo-liberal policies have led to deregulation and liberalization of service provision (Van Vliet 2012). In consequence, despite pronounced political ambitions of more sustainable production and consumption patterns, it has proven difficult to deliver these necessary fundamental system changes in practice (Hartman et al 2002).

Socio-technical systems are not only stable, but also provide a key to change. Researchers in sustainability transformation have investigated how these fragmented systems can be managed to influence and direct collective efforts towards transformation (Loorbach 2004, Kemp et al 2007). Whereas these scholars (and those working on socio-technical regime theory in general) have tended to focus (often implicitly) on change processes at the national scale, urban scholars have emphasized the need to investigate socio-technical transformation processes in place-specific urban contexts. These studies suggest that local actors may respond to or contest pressure for system change or perhaps even initiate and facilitate change from below (Hodson and Marvin 2010, Uyarra and Gee 2012, Bulkeley et al 2014). In this emerging research field, investigations have shown that public-private partnerships may play a role in the governing of change processes (Bulkeley and Broto 2012, Bulkeley et al 2014).

However, neither socio-technical regime theory or urban infrastructure literature have seriously engaged with the partnership phenomena and the growing body of public-private partnership (PPP) research emerging over the past decades (Rosenau 2000, Osborne 2000, Weihe 2008, Hodge et al 2010, Greve and Hodge 2013). Likewise, PPP researchers have in general mostly focused on the financial benefits of PPPs and broadly disregarded potential social and environmental effects (Koppenjan and Enserink 2009). In contrast, researchers in environmental governance have suggested , international, regional and local multi-stakeholder partnerships directed at promoting sustainable development as necessary policy tools to gather actors with relevant knowledge and competences to solve the complex challenge of sustainability transformation (Hartman et al 1999, Bruijn and Tukker 2002a, Malmborg 2003).However, despite the empirical relevance and general promotion of partnerships for sustainability, there continues to be little research based evidence on the possibilities of PPPs to contribute to the

sustainability transformation of urban infrastructure systems. This article aims to fill this research gap by investigating PPPs as policy instruments for sustainability change.

The article explores the role of PPPs in sustainability transformations of municipal waste management systems through a comparative case study of two national contexts: England[5] and Denmark. An analysis of the transformation of waste management in the Netherlands from landfilling towards an integrated system of recycling and recovery during the 1970s to 1990s has shown that socio-technical regime theory can be useful for describing these processes (Geels and Kemp 2007, Kemp 2007, Kemp et al 2007). Similar transformation processes are taking place in England and Denmark (Uyarra and Gee 2012). The article is based on qualitative interviews with experts and public and private waste managers in both countries, triangulated with policy reports, procurement material, etc. Three main types of PPPs are identified: Policy partnerships, service delivery partnerships and technology partnerships. These partnerships play a prominent role in sustainability change of English and Danish waste management systems in various ways, but continue to be contested as policy instruments.

The article begins with an introduction to theory on sustainability transformations of urban infrastructure networks and moves onto propose and discuss PPPs as policy instruments in this context. Following, the article will introduce the external pressure for change on English and Danish waste management systems and describe these historical transformation processes. This introduction will be succeeded by a section on methods and data collection. On this background, the

[5] England is selected as a case rather than the whole of UK, since the Devolved Administrations of Scotland and Northern Ireland have their own waste management policies. As England has no devolved administration, I will however refer to the UK government.

analysis will describe the identified PPP types and their contribution to sustainability change illustrated by examples of 'placed-based' PPPs from the two countries. After discussing and comparing the results, the article will conclude on the general applicability of PPPs as policy instruments for sustainability transformation of urban infrastructure networks and the fruitfulness of combining perspectives on sustainability transformation of urban infrastructure and PPPs.

Sustainability transformation in urban infrastructures networks

Socio-technical regime theory provides an ambitious attempt to describe the process and governance of system innovation (Loorbach 2004, Geels 2005a, Schot and Geels 2008, Markard et al 2012). In the multi-level perspective (MLP), sustainability change in socio-technical regimes are described as interlinked processes between three layers: regime, niches and landscape. The *socio-technical regime* is '*a seamless web of interrelated social and technical components'* (Bulkeley et al 2014, p.1472), where incumbent regime actors provide stabilization through established roles, routines, cognitive patterns, practices or contracts supported by formal regulation and existing infrastructure arrangements. The *niches-level* are 'incubation rooms' shielded from mainstream markets, where new technologies may be fostered and matured (Geels and Kemp 2007). The *socio-technical landscape* is in principle an exogenous environment to regime actors, including aspects such as '*economic growth, broad political coalitions, cultural and normative values, environmental problems and resource scarcities*' (ibid., p.443).

As Uyarra and Gee (2012) describes, socio-technical systems are '*highly durable, path-dependent, resistant to rapid change and often associated with incremental, rather than radical, innovation'* (p.101). Vested interests, sunk costs and lockins tend to lead towards stabilization and change requires an active reconfiguration of

these complex, large infrastructure systems (ibid.). Researchers in this field have investigated how old systems despite of these challenges are transformed or neglected in favour of new systems (Rotmans et al 2001, Geels 2005a; 2005b, Kemp 2007). According to the MLP perspective, system change comes about through interplay between all three levels. Pressure from the landscape on the existing regime may open for the possibility of new ideas emerging from the niches level to enter and perhaps even threaten the existing regime. In reproduction and transformation processes, innovations improve the existing regime and potentially redirect the trajectory through incremental changes, whereas transition processes imply a discontinuous shift to a new trajectory or system (Geels and Kemp 2007).

Whereas urban scholars have embraced the idea of understanding infrastructure networks as socio-technical, they have also pointed to limitations in this theory of system change. First, researchers have criticised the over-emphasis on niches as drivers of change, as this might understate the importance of interplay between landscape and regime. Pressure for change may be expressed and perceived differently across regimes, in which actors may have various resources to contest or adapt to new demands. Accordingly, regime transition and transformation may develop through a variety of trajectories (Hodson and Marvin 2010). Second, urban scholars have questioned the often implicit focus on the national level, as it fails to acknowledge the '*place-specific formation of sociotechnical regimes and the contestation, negotiation, and management of urban transition strategies*' (Monstadt 2009). Third, they suggest it might be difficult to separate niches from regimes. Instead of being closed 'incubation rooms', niches may be 'open-ended' experiments in the political-strategic urban regime. Accordingly, rather than decisive transitions from one regime to another, change may evolve in fragmented

and plural regimes, where various solutions are tested, contested and adopted or discarded in local contexts (Bulkeley et al 2014).

With this critique in mind, the article will investigate how PPPs may contribute to sustainability change in the national and local contexts in Denmark and England. The next section will show how PPPs are identified and categorized, where after the following section will discuss the potential in PPPs for contributing to sustainability change.

Identifying and categorising public-private partnerships

Public-private partnerships (PPPs) may be broadly defined as '*cooperative institutional arrangements between public and private sector actors'* (Greve and Hodge 2005). PPPs may provide a framework for public and private actors to work jointly towards an agreed purpose, while sharing risks, costs and benefits involved (Ham and Koppenjan 2001). Whereas most PPP research has focused on long-term infrastructure contracts, such as the Public Finance Initiative (PFI) in the UK, this paper aims for a broader approach to capture the variety of PPP types in waste management. This strategy aligns with the 'policy approach' in Rosenau (2000) ed., where public-private constellations within a specific policy area are described and analysed in the context of a specific policy field (Weihe 2008). This article mainly focuses on PPPs in the 'place-specific' urban context, where local authorities are responsible for the development and delivery of municipal waste management services and may cooperate with private waste management companies for this purpose. However, the article also includes partnerships for developing or implementing new policies and solutions for municipal waste services, which may also include a broader range of actors, such as government, knowledge institutions, etc.

The variety of PPPs has led researchers to warn against drawing general conclusions about PPPs without specifying what is meant by 'PPP' (Weihe 2008). Accordingly, a starting point for investigating PPPs in this article has been to identify, categorize and describe PPPs in the context of municipal waste management. Three main questions may characterize PPPs: 1) Why is the PPP initiated?, 2) Who participates in the PPP?, and 3) How is the PPP organized? (Glendinning and Powell 2002) This article develops an empirical categorization based on 'purpose' ('why'), such as PPPs for the purpose of 'service delivery' (Bovaird 2004, Brinkerhoff and Brinkerhoff 2010). As Bovaird (2004) suggests, each purpose "*is likely to require partnerships with different membership, strategies, structures and operational processes and there are likely to be different criteria against which the partnerships will be monitored and evaluated*" (p.202). As such, this categorization opens for variations in membership ('who') and organizational form ('how') and enables a discussion of contributions from various PPP types.

PPPs and sustainability transformation

As Tukker and Bruijn (2002) conclude, system transformation might 'just happen' as new technologies evolve, but this may not necessarily result in the most sustainable solutions. Therefore, there is a strong need for leadership, especially from public authorities, to bring together interdependent actors, for example in new partnerships (ibid.).The idea of partnership is widely celebrated as a plus sum word signalling win-win solutions. A main idea in partnerships is for the involved organizations to achieve gains that exceed the benefits from working alone (Rosenau 2000). In a diverse network society, where actors with relevant knowledge and resources are dispersed and interdependent, partnerships may gather relevant knowledge, skills and resources to better address complex societal challenges such as sustainability and potentially develop innovative solutions to

pressing problems (McQuaid 2000, Hartman et al 1999, Bruijn and Tukker 2002b, Klijn and Teisman 2005).

According to Hartman et al (2002), collaboration in partnerships may also facilitate the development of new relationships and social values, which can provide the seeds for system change. In line with this, Bulkely et al (2014) suggest that the establishment of new partnerships such as the London Energy partnership '*provided critical means through which to gather relevant actors, strategies and projects around the low-carbon energy logic'* in the process of transforming the city of London towards a low-carbon energy future (p. 1478). In contrast, critics have claimed that partnerships typically involve mainly strong, incumbent regime actors and therefore tend to produce only incremental change to keep status quo (Levy 1997). Furthermore, especially the former UK Labour government has been accused of labelling PFI projects as partnerships, although they were rather contractual instruments for getting private finance for public projects 'off the balance sheet'. 'Partnership' collaboration, in terms of moving the client-contractor relationship from traditional outsourcing towards intense co-production and joined decision-making, was perhaps a diminishing part of the scheme (Falconer & McLauglin 2000, Klijn & Teisman 2000).

Accordingly, there might be a potential for developing more sustainable waste management solutions in PPPs, but researchers have also pointed out potential challenges for real-life PPPs to deliver system transformation. Various PPP types may contribute to different levels of sustainability change; improvement and optimization of existing systems, system redesign through incremental innovations or more radical system transition. Before engaging in the case studies of PPPs, the next section will present the landscape pressure on national and local governments

towards more sustainable waste management systems, which seems to have opened a window of opportunity'(Kingdon 1984) for change.

The comparative case study

The article is based on an embedded comparative case study, where subunits of specific PPPs have been identified and categorized in the two national cases through an iterative process of moving between theory and data (Eisenhardt 1989, Yin 2009, Stewart 2012). The analytical approach of a comparative case study was chosen to enable some degree of generalization across cases, while permitting a context-based understanding of the complex processes of sustainability change (Peters 1998). The mapping included expert interviews, snowballing (Pedersen 1998), background research (reports, websites, etc.) and observations from conferences, workshops etc. in the waste management sector. In the subunits, semi-structured in-depht, qualitative interviews was conducted with public and private waste managers and triangulated with document studies of policy reports, procurement material, websites, contracts, etc. Based on these data, the articles provide an overview of various forms of partnerships in England and Denmark without claiming to present a comprehensive or exclusive list.

The data collection process aimed at including the broadest possible variation of PPPs and also a few examples of in-house and traditional contracting arrangement to contrast findings. All in all, 43 interviews with 58 respondents from 36 organizations were conducted, hereof 25 interviews in Denmark and 18 in England. The respondents involved in specific PPPs were asked to describe their considerations for engaging in a PPP, the organization of the PPP and the process of establishing and managing the PPP with an emphasis on the possibilities and challenges for innovation of more sustainable solutions. Data collection took place from February 2012 to April 2014. Interviews with public and private

managers were transcribed and coded in main themes for further analysis. Names and titles of specific persons and some of the organizations have been anonymised for sensitivity reasons.

England and Denmark have a reasonable level of comparability, as they 1) are both EU member states with a common legislative framework directing national waste and public procurement policies, 2) share similar levels of recycling around the EU average, are both challenged by the 2020 EU target and undergoing a continuous transformation of their waste management systems, but have had different trajectories of sustainability transformation, and 3) both have a comparably high inclusion of private actors in waste management services in a European context. Introductory research showed that whereas PPPs had played an important role in the recent English sustainability transformation, the main changes in Danish waste management took place earlier and seemed to primarily have involved municipal companies. As such, these cases suggest that PPPs may not be necessary, but could be an efficient instrument for sustainability transformation.

The following section will define sustainability and look into the external landscape pressure for sustainability transformation of waste management shared by both countries.

External landscape pressure for sustainable waste management

Sustainable development was defined in the Brundtland report as '*development that meets the needs of the present, without compromising the ability of future generations to meet their own needs'* (WCED 1987). This development outlines trajectories of change, which combine the objectives of economic growth, environmental protection and social cohesion. Developing more sustainable waste

management systems has received renewed political interest in the light of scarcity of global resources, economic restraints after the global financial and economic crisis and acknowledgement of the effect of waste management on the emission of ozone depleting gases leading to climate change (Calmin and Gaillochet 2009). Over the past few years, these consideration have led to waste being increasingly seen as a resource that should be fed back into production and consumption rather than discarded, which challenges modern 'make-use-throw away' practices (EC 2011, Corvellec and Hultman 2012).

In many member states, the EU has been a major driver of sustainable development in waste management (Campos and Hall 2013). The revised Waste Framework Directive (WFD) established the purpose of EU waste regulation as to prevent the generation and management of waste from harming the environment and human health, refrain from excessive resources use and develop close-loop systems for material recycling (EC 2008). The framework also provided a 'Waste Hierarchy' ranking waste management methods according to environmental impact from 1) prevention of waste, 2) preparing for reuse, 3) recycling, 4) recovery (for example incineration with energy production) and 5) waste disposal (landfill) (ibid, article 4). In line with the waste hierarchy, the EU Landfill Directive established binding targets of diverting the amount of bio-degradable waste going to landfill to 75% by 2010, 50% by 2013 and 35% by 2020 (EC 1999), whereas the WFD demanded 1) separate collection of at least paper, metal, plastics and glass by 2015, and 2) reuse or recycling of at least 50% of household waste by 2020 (EC 2008).

Adding to the pressure from existing targets new policies from the European Commission point towards even more demanding targets in the future. The vision of a 'circular economy' with 'zero waste' outlines a broader agenda with waste

management not only being about creating 'end-of-pipe' solutions for managing waste, but also focusing on preventing and minimizing waste production (EC 2011, EC 2014). Hence, the external landscape pressure for sustainability change of waste management practices in member states will most likely only increase in the coming years.

Transformations of waste management in England and Denmark

England has been known as an environmental laggard in a European context and continued the practice of literally dumping waste in holes in the ground up until the late 1990s. However, within the past 15 years the country has taken a huge step towards transforming waste management systems from landfilling towards recycling, reuse and recovery. Denmark, on the other hand, has for many years been an environmental frontrunner and slowly progressed on recycling from the 1980s. In the EU comparison of municipal waste though, Denmark now appears to be lacking behind some of the best recyclers in Europe, such as Germany, Austria and Switzerland (EUROSTAT 2014), and as *figure 2* shows, seems to have been almost standing still over the past five years. In both countries, waste specific measures towards sustainability transformation have coincided with organizational reforms towards a greater inclusion of private actors in waste management services, which have changed the conditions for local authorities. *Table 1* provides an overview of waste management in the two cases.

Table 1: Waste management in England and Denmark, 2011[6]/2013

	England	Denmark
Waste production in total (2011)	228 million ton per year	9 million ton per year
Household waste production (2011)	22,9 million ton	2,4 million ton
Household waste production per capita (2011)	423kg/person/year	447 kg/person/year
Treatment of municipal waste (2013)	31% landfilling, 24% incineration, 43% recycling and reuse	1,5% landfilling, 54% incineration and 44% recycling and reuse

Source: DEFRA 2011a, DEFRA 2014a, DEFRA 2013a, EPA 2014b, p. 17, EPA 2014a

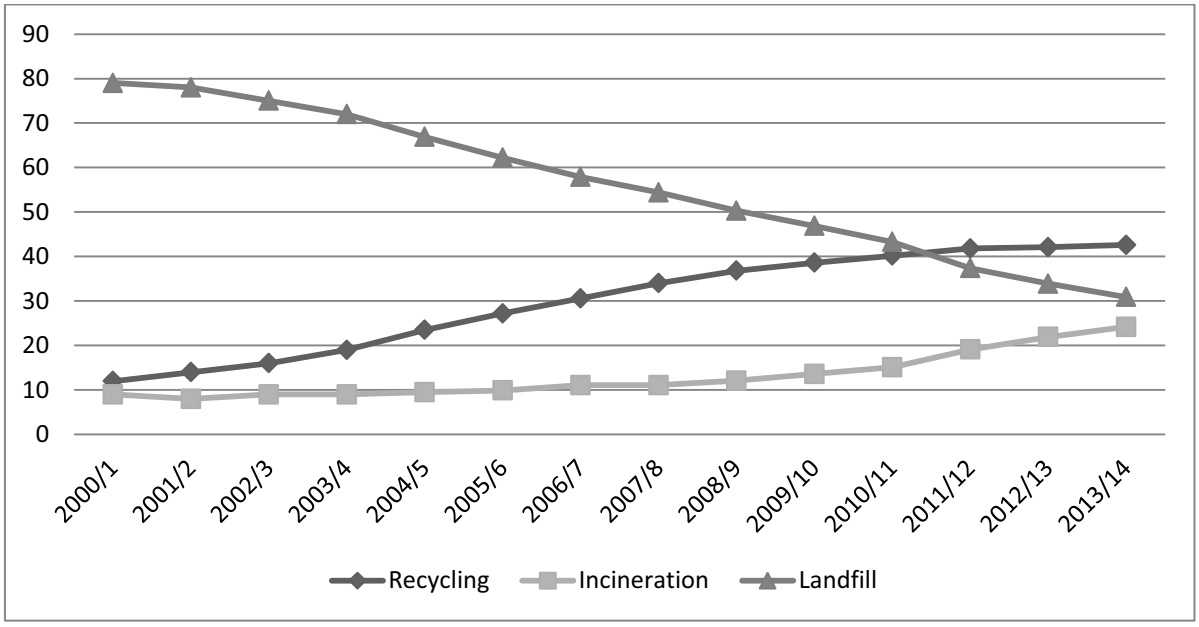
England

England produces around 228 million tons (mt) of waste, whereof 2,9 mt is generated by households with 423 kg per person (DEFRA 2011b; 2014a). The EU term 'municipal waste' has in England been used to describe local authority collected waste (LACW), which DEFRA has reported since 2000. Besides household waste, LACW also include waste from other sources collected by local authorities (DEFRA 2014b). *Figure 1* shows the development in the treatment of LACW over time. Over the eleven years from 2000 to 2010 England increased recycling percentages from 12% to 40%, whereas in the same period reducing waste going to landfill from 79% to 43,3% and increasing recovery through incineration from 9% to 15,1%. Although the pace of change has slowed down in the past years and landfill is still relatively high, England continues to move closer

[6] In general 2011 data was used, since more recent data was not accessible for all categories. However, 2013 data was used to describe municipal waste treatment to provide the most recent progress towards the EU 2020 targets.

to the EU targets. By 2013, 43% LACW was recycled, 31% was landfilled and 24% incinerated (DEFRA 2014a)[7].

Figure 1: The transformation of municipal waste management in England over time (percentage/year)



Source: DEFRA 2014a

In England waste management is regulated mainly through the Department of Food, Rural Affairs and Agriculture (DEFRA), whereas local authorities (LAs) have the statutory responsibility for collection and disposal of municipal waste (see Bulkeley et al 2005 for further details). The responsibility of LAs is divided between two levels: County Councils (or specific Waste Authorities) are responsible for waste disposal as Waste Disposal Authorities (WDAs), whereas district or borough councils are responsible for collection as Waste Collection Authorities (WCAs). Following critiques of the inefficiency and fragmentation of the two-tier system some authorities joined in formal Unitary Authorities (UAs)

[7] In 2010 DEFRA aligned definitions of municipal waste with the EU and reported only waste from households as MSW (DEFRA 2011c). This calculation method resulted in 44,2% recycling in 2013, which in consequence moves England a little bit closer to the EU 50% recycling target (DEFRA 2014b). As this data has only been reported from 2010, this article has kept to LACW to be able to show the development over time in English waste management.

responsible for both treatment and collection (Slater et al 2007). There are approx. 273 WCAs, 40 WDAs and 81 UAs (OFT 2006).

Early experiments with incineration and recycling schemes in the 1800'ds were abandoned in the 1930'ies in favour of landfilling, which was seen as a cheaper and more efficient way of dealing with waste and at the same time filling up holes in the ground from the extraction industry (Funch 1995, Davoudi 2000). The global focus on sustainability of the 1970s led to some political scrutiny, and coincided with emerging local challenges of finding new areas for landfilling as the extraction industry retracted. In 1996, the Environmental Agency was delegated regulatory responsibility for waste management and began to impose stricter environmental criteria for landfills (Davoudi 2000; 2009), and in the 1990s, the first non-binding targets for recycling were introduced. However, England did not engage in serious efforts towards a transformation before the EU Landfill Directive from 1999 added tangible economic pressures on the government (Weaver 2005, Bulkeley et al 2007). If the targets of diverting biodegradable waste from landfill to 75% of the 1995-level by 2010, 50% by 2013 and 35% by 2020 would not be met, the UK risked fines up to £180 million by 2020 (Bulkeley et al 2005).

In 1996, a Landfill Tax Escalator was introduced to increase the costs of landfilling over time, which was supported by the Landfill Allowance Trading System (LATS) until the escalator reached a high enough level (EEA 2013b). The Waste Strategy 2000 included the first binding targets for recycling at least 25% of household waste by 2005, 30% by 2010 and 33% by 2013, which was translated into statutory local authority targets. In the development of the strategy especially the future role of incineration was highly disputed. Whereas the first draft outlined a dramatic increase in incineration capacity, press and public protests lead to the

reformulation that incineration was only to be considered, when recycling and composting was not possible (Bulkeley et al 2005).

Subsequently, the Waste & Resources Action Programme (WRAP) was established to promote sustainable waste systems and develop markets for recycled products (wrap.org.uk). An important initiative was also the introduction of mandatory (now voluntary) Joint Municipal Waste Management Strategies (JMWMS) in 2000/2001 to establish local strategies for reaching government targets in coordination between WDAs and WCAs (Bulkeley et al 2005). In 2003 the New Technologies Demonstrator Programme (NTDP) was established by DEFRA to encourage the development of new technologies and offset the risks of demonstrator projects for emerging technologies (Powrie, no date, Bulkeley et al 2005). In 2006, the Waste Infrastructure Delivery program (WIDP) was established to accelerate and support development of local waste infrastructure through PFIs (DEFRA 2006, EEA 2013b).

The introduction of waste specific strategies, measures and targets coincided with organizational reforms towards greater inclusion of private actors in the management of municipal waste. For most of the 20th century, municipal waste management services were provided in-house by local authorities (LAs). However, in line with the Thatcher government's focus on privatization, the Local Government Act introduced Compulsive Competitive Tendering (CCT) in 1988 to allow for private provision of local services. In 1990, the Environment Protection Act demanded LAs to either contract out waste disposal services to the private sector or place these services in Local Authority Waste Disposal Companies (LAWDCs) in 'arms' length' of authorities (Slater et al 1997). With Labour taking over government in 1997, CCT was abolished in favour of 'Best Value' stating

that in principle it did not matter who delivered the service, as long as they provided 'value-for-money' and high quality for users (Connoly and Wall 2013).

Today, around 50% of waste collection services and almost all treatment services are delivered by private businesses, the last mentioned usually in PFIs or PPP arrangements (OFT 2006). According to the respondents, and probably linked to political history, the choice of contracting out waste collection has been politically polarized in the UK with Labour councils tending to keep waste in-house and Conservatives contracting out. In comparison, private sector inclusion in waste treatment services seems to be a more pragmatic choice, which may be connected to the successful separation of LAWCD's in arm's length from local authorities, a heavy pressure for privatization of these and local authorities being reluctant or unable to single-handedly invest in expensive treatment facilities. The market for waste management services has undergone a process of internationalization, economic growth and vertical integration with a few large multi-nationals dominating the market (Davies 2007). Accordingly, this shift towards private inclusion has formed the conditions for local authorities' possibilities for organizing sustainability transformation and introducing new waste management systems.

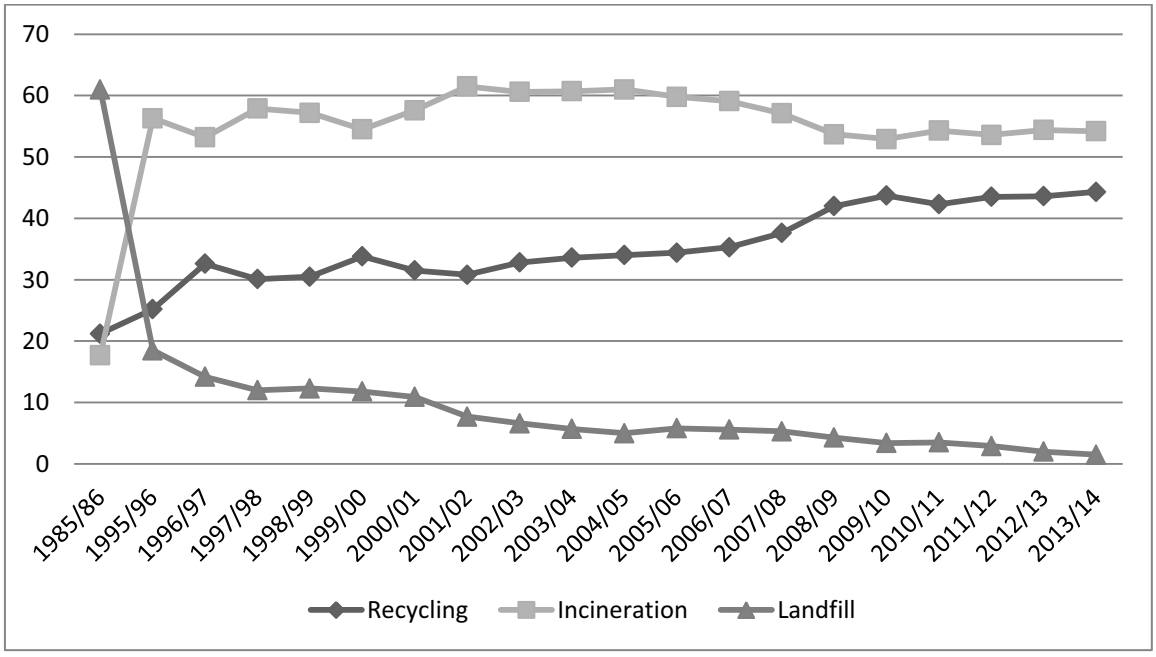
Denmark

Denmark produces around 9 mt of waste per year of which 2,5 mt is household waste, but in comparison to England the amount of waste produced by person is higher. As *Figure 2* shows, a large step change in Denmark took place considerably before the English transformation and following a steady increase in recycling has taken place[8].

[8] There was a small decrease in recycling in 2010, which was most likely a technical issue caused by a new waste registration system and the privatization of recyclable commercial waste (EEA 2013c).

In Denmark waste management is regulated by the Ministry of Environment having in practice delegated this responsibility to the Danish Environmental Protection Agency (EPA, in Danish: Miljøstyrelsen). The 98 Danish municipalities have the statutory responsibility for collection and disposal of waste and enjoy great freedom to organize these tasks. In general, this has been done through the establishment of inter-municipal companies, which finance, deliver and operate waste treatment facilities and sometimes also deliver collection services (Grønnegaard Christensen 2001). By 2010, 79 municipalities were co-owners of 21 out of 29 existing incineration plants through publicly owned companies (EPA 2010). In contrast to incineration, pre-treatment for recycling is often handled by private companies (EPA 2013a).

Figure 2: The transformation of municipal waste management in Denmark over time (percentage/year)



Source: EPA 2014a[9]

[9]This data is required directly from the Environmental Protection Agency in Denmark and include corrections to the numbers reported to EUROSTAT for 2011 and 2012. There is a hole in the data from 1985 to 1995.

Main Government initiatives towards landfill diversion and recycling were taken before 2001 (EEA 2013c). In 1979, as the first country in the world, Denmark introduced a law on reuse of paper and beverage packaging, and in the 1980s the first recycling stations were established (Funch 1995). In 1987 the government introduced a tax on landfill and incineration to encourage recycling followed by a total ban on landfilling of combustible waste in 1997. Between 1985 and 1997 recycling increased from 21,2% to 30,2%, landfilling decreased from 61% to 12% and incineration increased from 17,7% to 57,9% (EPA 2014a). Subsequently, the third national Waste Strategy 2005-2008 established the first national target of 33% recycling of household waste by 2008 (Danish Government 2003).

By 2013, Denmark recycled 44% of MSW, whereas 54% was recovered through waste incineration and only 1,5% was landfilled (EPA 2014a). Incineration continues to play a dominant role in the Danish waste management systems and opposite the English experiences this technology has been broadly accepted in Danish society as an efficient and less environmentally damaging way of managing waste, which produces cheap energy and heat for Danish households (DME 2013). In the 1980s to 1990s incineration plants were connected to local district heating systems, and the technology has gradually been improved over time in cooperation between the ministry, inter-municipal associations and the Danish incineration industry (Kleis and Dalager 2003). Also in recent years, Denmark has had a strong focus on technology development in waste. Waste became a specific focus area in the government action plan for promotion of eco-efficient technologies from 2010 (Danish Government 2010a), which secured DKK 90 million in 2010-11 for environment technology development and testing in waste, water and air. Recently, funding has especially been directed at recycling, where the environment technology programme for example has

supported better sorting of waste batteries, new methods for organic waste treatment and recycling of phosphor from bio-waste (see http://ecoinnovation.dk/).

In consequence of this development, Denmark has not had any problems reaching EU landfill diversion targets and has only recently come under pressure from recycling targets (EEA 2013c). The EU 2020 recycling target was not implemented before the most recent waste strategy 'Denmark without waste' from September 2013, which established a 50% recycling target for specific types of household waste by 2022 (Danish Government 2013). With this strategy, the Danish government outlines a 'second wave' of sustainability transformation in Denmark from incineration towards increasing recycling and reuse. The transformation towards increasing recycling may challenge the existing socio-technical regime, where inter-municipal associations have already been under pressure from the government since the late 1990s.

Also in Denmark, there has been a gradual movement towards privatization of waste management services. Inter-municipal associations has been criticised for non-transparency, lack of incentives for economic efficiency and for fostering unequal competition with private waste companies (DCA 1999, Grønnegaard Christensen 2001, Madsen 2002, EPA 2010), and by 2007, a coalition of political parties introduced benchmarking, new accounting systems and a 'liberalization' of private recyclables, which in practice meant a private 'monopoly' on this waste, which had formerly been a part of some municipal collection schemes (DME 2007). The ministry of environment continue to consider a privatization of waste incineration activities (EPA 2014b), but a decision is continuously postponed and the question is fiercely disputed in the sector (see for example Dansk Affaldsforening 2013).

Contracting out was never compulsive in Denmark, but the government has been pushing municipalities towards this through voluntary agreements (DCA 2012). By 2001, at least 80% of household waste was contracted out to private companies increasing from 27% in 1990/91 (Grønnegaard Chistensen 2001, LGDK 1992). Whereas the inclusion of private actors in waste treatment is a continuous battlefield, liberalization of waste collection services has been less disputed. The choice seems to be rather pragmatic and independent of particular political leanings in municipalities (Grønnegaard Christensen 2001). However, the process has not been completely without controversy. Two of the biggest municipalities, Copenhagen and Frederiksberg, fought for years to be able to keep their long-term concession contract with the public company R98 (Federspiel 2011). In line with England, Danish waste management markets have been increasingly professionalised, internationalised and concentrated, but with fewer multi-nationals entering, which might be linked to the comparably smaller market and the lack of possibilities in waste disposal. This context of ongoing organizational change provides a degree of insecurity in the waste sector, which may halt new developments as regime actors await a decision on their role in a future organization of waste management.

Accordingly, in both countries legislative targets and economic incentives have been used to drive forward local sustainability change processes in a dialectic process between landscape and regime with local experiences, existing practices and discourses leading to protest and/or support to government initiatives from incumbent regime actors and populations. Whereas the main challenge in England has been to provide new infrastructure to build up sustainable waste management systems from practically zero, in Denmark the main challenge remains to redirect an existing well-functioning system based mainly on waste incineration to include more recycling. Recalling the challenges of change in socio-technical regimes, this

technological and organizational lock-in might explain why Denmark has only changed in baby-steps from the introduction of incineration.

Simultaneous to demands for more sustainable waste management systems, local authorities in both countries have been met with government demands for inclusion of private actors. As Uyarra and Gee (2012) suggest, the effect of these changes may be seen as a more limited power of local authorities to manage waste. Public authorities are increasingly dependent on private businesses as waste collectors, construction and facility managers, technology producers and outlet markets for recyclables. This increases the need for partnership working in the development and implementation of more sustainable waste management solutions. Increased private involvement may also be seen as a strengthening of public authorities, who may draw on private resources and knowledge without relinquishing political control (Grimsey and Lewis 2005). The following sections will look at how partnerships have provided new possibilities and challenges for sustainability transformation.

Identified PPPs in England and Denmark

Based on the empirical data from Denmark and England, three main PPP types in waste management have been identified across Denmark and England: 1) Policy Partnerships, 2) Service Delivery Partnerships and 3) Technology Partnerships. *Table 2* provides an overview of the PPP types with examples from both countries. These PPPs have different purposes in relation to waste management (*why*), involve different organizations and actors (*who*) and tend to be organized differently (*how*). They also play different roles in the sustainability transformations of waste management in Denmark and England and provide different possibilities and challenges.

Policy Partnerships are typically more loosely coupled networks of actors, where the government or another strong organization gathers various public and private stakeholders to find specific solutions for the implementation of waste policies directed at sustainability change. *Service Delivery Partnerships* are contract-based or joint venture (company) partnerships between local authorities and private companies aimed to develop and deliver waste collection services and/or provide and operate new waste treatment facilities. *Technology Partnerships* are typically partnerships within a closed group of actors cooperating on the basis of a contract or collaborative agreement to develop and test innovative technologies for sustainable waste management. The following section will describe the role, potential and challenges of these partnerships illustrated by examples.

Table 2: PPP types in municipal waste management with examples from England and Denmark

	Purpose	Participants	Organization	Examples, England	Examples, Denmark
Policy Partnership	Development and or/ implementation of policy	Government organizations, local authorities, various private companies, knowledge institutions, facilitator organizations	Loosely coupled network of various actors committing to a joint purpose	Partnerships initiated or supported by the Waste and Resources Action Programme (WRAP) , such as Metal Matters and Local Reuse Partnerships	Partnerships initiated by the EPA , for instance on incineration residue, shredder waste and mechanical sorting plants, Resursium, Copenhagen Cleantech Cluster's partnership on

					plastic waste
Service Delivery Partnership	Development and delivery of waste infrastructure and services	Local authorities, private waste management companies	Contract-based or joint venture organizations between one or more actors	**Waste collection:** RBKC - SITA, Trafford Council - Veolia ES, Manchester City -Enterprise (JV) **Waste infrastructure:** GMWDA - VLGM (JV), NLWA (in procurement), ELWA-Shanks **Waste infrastructure and collection:** Shropshire	**Waste collection:** Renosyd - Marius Pedersen, Faurskov Forsyning - Meldgaard, Vestforbrænding – Danish private company **Waste infrastructure:** Vejle Waste and Recycling (in procurement)(JV)

				council-Veolia ES, Sheffield Council - Veolia ES, Somerset Waste Partnership - KIER/May Gurney/Marks and Spencer	
Technology Partnership	Development and testing of new technology	Private companies, local authorities, knowledge institutions	Closed group of one or more actors based a collaborative agreement or contract	Anaerobic Digestion (Shropshire District Council - (Biogen) Greenfinch), Mechanical Heat Treatment (Merseyside WDA - Orchid Environmental)	Renescience Technology (DONG Energy - Amager Ressource Center, etc.), hybrid waste vehicle (Meldgaard – Banke -Esbjerg Municipality, etc.), electronic registration (Odense Renovation - Stena Recycling)

JV: Joint venture

The role of PPPs in the Sustainability transformation of English waste systems

The PFI approach was born in England and is today the dominant method of financing public infrastructure in England. PFIs are used in most areas of public service with waste management being among the most important sectors (Hellowell 2010). Whereas Labour continued the focus on private inclusion, the new government shifted the rhetoric from being one of down-scaling the state in favour of the private sector to being one of 'joint working' and 'partnership' with public, private and civil society sector organizations sharing responsibility for societal development (Falconer & McLaughling 2000). Partnerships were seen as a 'third way' of governing, distinct from the centralized, bureaucratic hierarchies of 'Old Labour' and the market governing by the Conservatives (Glendinning and Powell 2002). This partnership turn has also been evident in waste management, where partnerships have been used to implement new government policy, deliver new waste infrastructure and services and test new technologies.

Policy partnerships

In line with the central government approach, partnership working was a central strategy in the Waste and Resource Action programme (WRAP). WRAP was established as a not-for-profit company with funding from DEFRA, EU and the devolved administrations with the objective of promoting sustainable development by supporting local businesses and authorities in introducing recycling and reuse. For this purpose, WRAP has facilitated and supported a number of voluntary networks, campaigns and partnerships between private businesses, civil society organizations and local authorities (EEA 2013b).

An example is the 'Home Improvement Sector Commitment', a voluntary private sector commitment under which home improvement retailers promise to reduce

packaging, decrease waste to landfill and help consumers recycle more (WRAP 2010). WRAP also supported the 'Metal Matters' campaign initiated by the private industry organizations Beverage Can Makers Europe (BCME), Novelis Recycling and Tata Steel. The implementation of the campaign was organized in partnerships with local borough councils. A pilot project was carried out in 2010 in partnership with Nuneaton & Bedworth Borough Council, WRAP and the founders of Metal Matters. The partners succeeded in increasing metal recycling by 12,9% in the three weeks following the campaign. During 2012, 28 authorities joined the campaign (WRAP, no date a, Metal Matters 2014).

WRAP has also facilitated a number of 'local reuse partnerships' in local areas to encourage organizations to work together in their local area to increase reuse. An example is Buckinghamshire, where WRAP in 2010 assisted Buckinghamshire Waste Partnership in reaching its targets for recycling and landfill diversion. This led to a new Reuse Forum being established between 5 local authorities, 7 local reuse organizations, 3 housing associations and 3 private contractors to share information and work together to raise awareness of reuse. WRAP also assisted in the design for a new Household Waste Recycling Centres (HWRCs) contract, which was designed to provide incentives to increase reuse and include cooperation with the community sector. Accordingly, two local reuse shops were established at HWRCs in partnership between authorities, the private contractor and South Bucks Hospice. According to Waste Prevention Officer Laura Silverstone '*the re-use shops have been a major success, and developing relationships with other organizations has been really rewarding'* (cited in WRAP, no date b). Between July 2013 and June 2013 more than 45,000 items were sold, equating nearly 500 tonnes of material diverted from landfill (ibid.).

Whereas economic incentive structures and government targets provide the driver to act, WRAP's partnerships facilitated the implementation of government policy by supporting local strategies and actions to increase recycling. WRAP has been innovative in mobilizing private production and design companies to engage in the prevention of waste, rather than focusing only on traditional end-of-pipe solutions. However, whereas the Labour government took an active role in driving forward sustainability change, the current conservative Liberal-Conservative coalition government has announced a withdrawal from intervening in the sector leaving action to the market and local authorities (DEFRA 2013b). The government has cut down WRAPs budget to less than half of its former size from **£**56 million in 2009/10 to **£**15,5 million in 2015/16, which means the organization have had to reprioritize and close down some activities (RESOURCE 2013, DEFRA 2013c). WRAP now considers changing to a charitable organization, which might increase funding opportunities, but will also change its platform (WRAP 2014).

Accordingly, in England policy partnerships have been used to mobilise and encourage local authorities, private companies and civil society organizations to take action together and develop new solutions. As such, these partnerships have the potential to act as translators between policy makers at the landscape level and industry, local authorities and civil society organizations at the regime level to improve waste collection systems within the existing socio-technical regime, although these efforts are currently challenged by reductions in funding and future organizational changes.

Service delivery partnerships

Whereas policy partnerships have been used by the government to mobilise and facilitate change processes, service delivery partnerships have the concrete purpose of providing waste infrastructure and/or deliver waste collection services

in cooperation between local authorities and private providers at the regime level. Sustainability targets may be more or less integrated in these contracts.

Waste treatment infrastructure

In waste infrastructure, the Public Finance Initiative (PFI) model of letting the private sector design, build, operate and own public infrastructure facilities in long-term 20-35 year contracts was used as the main option to provide new waste processing plants. The PFI model was introduced by the former Conservative government in 1992, but was reframed as a 'public-private partnerships' by 'New' Labour in 1997 (Hellowell 2010). According to several respondents, a PFI was the only affordable possibility for them to provide the required new waste infrastructure, as authorities did not have access to this level of funding without private co-financing. From the late 1990s DEFRA allocated in total £2 billion PFI credits to 32 waste PFI projects (DEFRA 2011a). The programme was closed as part of the Spending Review by the new Coalition government in 2010,where the government also retracted provisional WIDP funding from seven planned infrastructure projects, since it was calculated that the UK would be able to reach EU landfill diversion targets without this infrastructure (DEFRA 2010a; 2011d). Supported projects included East London Waste Authority (ELWA), Greater Manchester Waste Disposal Authority (GMWDA) and Shropshire Waste Partnership (now Shropshire Council UA).

In Shropshire a PFI contract provided the possibility for a step change from landfilling towards recovery and recycling. The local county council and four district councils formed a formal unity, the Shropshire Waste Partnership (SWP), to jointly apply for PFI credits to procure a new waste solution[10]. The authorities had realized that 'change was looming' and did not have the resources to act

[10] In this process, the Shopshire Waste Partnership was changed into Shropshire Unitary authority including to other councils as well.

independently. According to Shropshire Council, "*the PFI route was at that time the only affordable route for the authority to achieve the targets, which we had to achieve, set by the Government*" (Shropshire interview). The project received government funding and signed a 27-year combined disposal and collection contract with Veolia ES in September 2007. The contract also included a target to increase recycling above 50% in 2012 and reduce landfill from 65% in 2005/6 to 5% in 2015 (Veolia 2008). In 2010, the recycling rate crossed 50% for the first time (Shropshire News 2013).

The PFI in Shropshire is an output-based contract measured by a number of key performance indicators (KPIs) to provide incentives for the contractor to increase recycling. However, some of the early PFIs in the 1990s-early 2000s were less geared towards sustainability. The current situation for those contracts shows the potential hazard for local authorities of committing to long-term contracts. EU procurement rules do not permit authorities to substantially change a contract within the contract period. This became a challenge in for example East London.

The East London Waste Authority (ELWA) had signed an innovative 25-year PFI contract in 2002/3 and was one of the first authorities in England to implement Mechanical-Biological Treatment (MBT) technology. The contract also had a recycling target of 25%, which was ambitious at that time. Nonetheless, as political demands for recycling increased, it became clear that the contract was not designed to further increase recycling:

> "When we started looking at procurements in the 1990s, for us the driver was to keep waste out of landfill, because landfill tax was becoming more expensive. […] Recycling was just added in the backend, so the incentive payments in the contract do not encourage the contractor to increase recycling. We now want to recycle more, but we are not incentivizing the contractor to do so, and the infrastructure does not allow them to either" (ELWA interview).

As such, as objectives changed over time, ELWA became locked in to a contract that no longer fulfilled their needs.

According to respondents, PFIs facilitated the implementation and improvement of well-known technology in new contexts, but were more rarely used to implement or test new technologies. Whereas ELWAs contract imported innovative technology from Italy to England, most PFI contracts delivered what respondents referred to as 'bankable' technology, such as incineration, whereas more innovative technologies such as Anaerobic Digestion (AD), gasification and to some degree MBT was considered more high-risk and consequently was harder to secure funding for. As PFIs typically transfer technology responsibility to the contractor, a bank lending money to a PFI project will lean towards secure investments in tried and tested technology, since '*if the contractor does not get paid, then the bank does not get its debt paid back'* (consultant interview).

The PFI in Greater Manchester is generally perceived as one of the more innovative projects. The Disposal Authority strongly signalled to the market that they were looking for an innovative solution focusing on recycling. They chose a more expensive, but more sustainable and flexible solution integrating various technologies, which was all tested and proven, but considered innovative at this large scale. Nonetheless, the most innovative aspect of the Greater Manchester contract may not be the technology, but rather the organization of the partnership. In cooperation with its contractor, Greater Manchester solved one of the main challenges of MBT, namely to secure an outlet for the residual product, a Refuse Derived Fuel (RDF). The contractor engaged the private chemical production company Ineos Chlor as a third partner to use the RDF to provide energy for a chlorine producing plant in Runcorn. The contract reached 41% recycling in 2013/14 (GMWDA 2014). However, the process had not been without challenges,

and the authority had to work hard first to convince the market to deliver something more innovative and second to convince the nine WCAs to align their various collection methods to feed into the new infrastructure system (GMWDA interview).

As mentioned before, PFIs have been criticised for not being 'genuine' partnerships in the sense of having equal, long term relationships built on mutual trust and jointly developed objectives (Klijn and Teisman 2005, Wettenhall 2005). In the identified cases, most public and private managers described that PFIs were contracts and based on hard-nosed negotiations, but also that partnership working was needed to make cooperation work in practice after signing the contract. In Shropshire, the cooperation was backed by a 50-50 sharing mechanism to secure both partners a benefit from introducing efficiencies and public and private managers expressed trust towards each other. The private manager was described as 'really good' and 'a numbers guy', and as one of the public managers said, '*he's an honest person by nature, and I think we benefit from that*' (Shropshire interview). The partnership was tested, when public resistance to a household recycling centre at Bridgnorth prolonged the planning process, but as the contractor described '*it was a tough time, both partners were working together, so when things were close to actually being fulfilled, you don't start saying 'the timescale is not right' – you find a way*' (Veolia ES interview).

In contrast, the NLWA expected to change from a 50-50 shared joint venture with a private contractor into a more strict contractual relationship in a new PFI-contract directed at an MBT solution. A respondent from the authority did not necessarily expect a 'warm and fuzzy' relationship with a coming contractor, since there is a lot at stake in these contracts, although '*the individuals in it, if it is going well, can make it feel like partnership, and you can have a willingness, with some*

companies more than others, to explore improvements' (NLWA Interview). This PPP project was however, ended by September 2013, when a change in planning policy provided a possibility for pursuing a new combined heat and power facility. The authority is currently pursuing this option and has prolonged the contract with the former joint venture company, which in the process has been fully procured by the authority. All in all, experiences from waste management show that a well-designed contract combined with efforts of the people involved may allow PFIs to evolve into a partnership-like relationship, where challenges in sustainability transformation processes are solved jointly and the lack of flexibility can be resolved along the way as situations change or new ideas arrive.

Whereas PFI contracts have played an important role in providing waste infrastructure, there appears to be a general tendency of moving away from these large scale integrated contracts and towards smaller, stand-alone procurements (Hogg 2014). Blackburn with Darwen UA decided not to join an integrated PFI contract with Lancashire Waste Partnership, because they felt too many factors would be outside of their control, whereas the signals from the market was that single procurement would save them money (Blackburn with Darwen interview). The PFI system may in general be criticized for neglecting smaller recycling initiatives in favour of large scale infrastructure facilities for recovery, which lock in local authorities in long term contracts (Slater et al 2007, Uyarra and Gee 2012). On the other hand, PFIs not only secured private funding and expertise, but also delivered coordinated, comprehensive transformations of socio-technical regimes in local areas, and as such was a solution at a time when funding was low and action severely needed.

Waste collection services

In contrast to PFIs, waste collection contracts tend to be more short term. The contracts are on average seven years, corresponding to the smaller investments involved, primarily in vehicles (OFT 2006). A main change in WCAs has been the introduction of separate or co-mingled collection systems to allow recycling. Whereas these solutions are more expensive than collecting single stream residual waste, increasing landfill taxes began to make the change worthwhile for local authorities. In some WCAs, 'partnering contracts' and joint ventures have replaced traditional contracts for waste collection, with the objective of increasing the flexibility to innovate and deliver improvements in a closer working relationship between public authorities and private companies (DCLG 2006).

An often mentioned example of a 'genuine' partnership in waste collection, is the 16-years partnering contract for waste collection and street cleansing between the Royal Borough of Kensington and Chelsea (RBKC) and Sita UK Ltd. Prior to the contract, the RBKC was under considerable pressure from statutory demands to increase recycling to 22% by 2003/4 and 33% by 2005, whereas the borough had struggled to deliver an increase to 16,5% by 2003/4 (RBKC 2004). As such RBKC aimed to find a contractor willing to work continuously with the council to improve recycling, while keeping the service quality high (Letsrecycle.com 2005). The contract included a partnership charter committing the parties to work 'cooperatively in partnership' with joint steering groups and innovation forums and 'open book' accounting with profit sharing (RBKC 2005/2011).

According to the public and private managers involved, the close and trust-based relationship in this contract made it easier to implement changes. For example, when the council needed cost savings and considered cutting services, the private contractor managed to develop a cheaper and more efficient system that did not

jeopardize recycling. As the contractor said: "*We were able to make that change, because there was trust. We understood what the borough wanted, and they were talking openly to us about it and made sure we had everything we needed to make the change*" (SITA UK interview). By 2011, the partners had increased recycling to 30% (RBKC 2014).

In another English Local Authority they were preparing a new contract, where they expected flexibility to be key: "*One of the things that are crucial this time is flexibility. Flexibility, to be able to adapt to all those different things that are coming in our direction. We don't know what customer expectations are going to be in the future, but I think they are going to be even higher. Recycling is likely to be more prominent in the future. Finances are likely to be less. How do you juggle all that?*" The Borough had a good working relationship with their current contractor and was looking for the 'same kind of thinking' in a new contract, but as the respondent asked: "*How do you write a good relationship into a contract? I don't know if you can. If you have any good ideas let me know."* (English Local Authority interview).

Accordingly, partnering contracts in waste collection seem to ease implementation of new solutions and efficiencies in the contrast period and thereby better enable the development towards more sustainable waste management systems. However, as for PFIs there is no guarantee for authorities that a partnering contract will actually deliver a partnership relationship. Despite general positive experiences, there seems to be relatively few of these close-knit partnerships in England.

Technology partnerships

Whereas new solutions may be more or less the objective of service delivery partnerships, a few identified public-private partnerships in England also directly

focused on development and testing of new technologies. The New Technologies Demonstrator Programme (NTDP) was established in 2003 by DEFRA to "*encourage the development of new technologies for the recovery of value and the diversion of BMW away from landfill, by supporting the construction and operation of new facilities to explore the viability of a particular technology or process*" (Powrie, no date). In the program ten projects were granted support, whereof two were arranged as local partnerships: 'Biocycle South Shropshire' and 'Merceyside WDA/Orchid Environmental'. The programme was closed down by the end of 2009 (DEFRA 2010b).

'Biocycle South Shropshire' was organised as a partnership between South Shropshire District Council (SSDC - now part of Shropshire UA) and Greenfinch Ltd (now Biogen Greenfinch Ltd) to demonstrate treatment of biodegradable waste by Anaerobic Digestion as the first plant in England. Greenfinch provided the technology, whereas the council provided a site and initiated the application for additional funding (LGA 2015). In total £3,55million was invested in the project through funding from DEFRA and Advantage West Midlands with additional funding from WRAP to establish a new food waste collection. The evaluation report pointed to learnings on feedstock composition and odour control and increased familiarity with the technology (DEFRA, no date a). The plant was in operation for six years until it was closed down in 2012 (Shropshire 2012). Likewise, Merseyside WDA and Orchid Environmental tested Mechanical Heat Treatment (MHT) and led to the establishment of two commercial large-scale plants (DEFRA, no date b, letsrecycle.com 2011)

Technology partnerships provided 'incubation rooms' for development and testing new technologies for waste treatment, but in line with the arguments of urban scholars, rather than being external to the existing regime, incumbent regime

actors participated actively in experimenting with new technologies. These technologies were not seen as a threat to regimes, but rather as a possibility to improve existing local waste management systems.

Summarizing the English case, policy partnerships have been used as a central strategic instrument by the government organization WRAP taking an active role in mobilising, engaging and supporting incumbent actors to deliver sustainability innovation in various local contexts. The Labour government also supported the use of service delivery partnerships to provide necessary new infrastructure and a more flexible approach to waste collection services to allow transformations and provided funding opportunities for two technology partnerships between private industry and local authorities developing and testing new sustainable waste treatment technology. As such, partnerships have played a prominent role in the English sustainability transformation of waste management, although especially PFIs are contested as policy instruments and the inclusion of private actors in waste collection remains politically disputed. However, in the future PPPs may play a smaller role with the new government retracting from waste initiatives.

The role of PPPs in the sustainability transformation of Danish waste systems

In Denmark, the PPP term has been linked closely to the British PFI contract model. In the state unit Udbudsportalen's guide on public-private cooperation, a PPP is defined as a PFI-like infrastructure contract, compared to for instance a public-private company (joint venture) or service partnership (LGDK/Udbudsportalen 2010). PFI-type PPPs have never had a great breakthrough in Denmark, and as Petersen (2011) concludes: "*Denmark's strong public finances and well-built infrastructure made private finance through the PPP model largely redundant*" (Petersen 2011, p.25). However, PPPs seem to

gain increasing interest in Denmark. A recent government report lists 14 Danish PPP projects with 15 in the pipeline and reported good results (DCCA 2012).

Even though service delivery PPPs are new in a Danish context, partnerships with the private sector in a broader sense have deep roots in the Danish corporatist tradition and consensus-orientated society (Greve and Mörth 2010). A partnership approach to policy-making and sustainable development was emphasised by the Danish Social Democratic-led coalition government coming into power in 2011, which for example stated that "*There is a need for new solutions. And they are to be developed through dialogue, partnerships and broad cooperation*" (Danish Government 2011). This approach has also been evident in recent waste management policies (Danish Government 2013, EPA 2014b).

Policy partnerships

The government action plan for promotion of eco-efficient technologies from 2010 launched a range of new partnerships to promote knowledge development and targeted action to solve environmental challenges. In the action plan, partnership is understood as '*formalized cooperation to create synergies between knowledge institutions, private companies, government authorities and users to develop efficient, cheap and fast solutions on environmental challenges'* and thus outlining a more networked structured partnership type (Danish Government 2010a, p.30). In line with this, the Waste Strategy '10 outlined the establishment of new partnerships within 'specifically challenged areas' (Danish Government 2010b, p.25). The Danish Environmental Protection Agency (EPA) initiated the first partnership on shredder waste in fall 2011 (a mixed waste type that is currently landfilled).

The shredder partnership was financed by the EPA, facilitated by external consultants and led by a steering group including representatives from the EPA, Danish Industry (DI), the Danish Technical University (DTU), the interest organization AffaldDanmark and the municipal company Reno Djurs I/S. The main objective was to provide a platform to gather relevant actors and inspire to further cooperation on the development of new solutions to extract resources from shredder waste. The partnership produced in the first year an overview of the legislative framework and current technological possibilities and provided a range of suggestions for next steps (EPA 2013b). However, in line with conclusions from a general evaluation of partnerships from 2013, the partnership did not lead to specific development of new technologies or technology clusters, as most actors already know each other well, but rather provided the ground for improved regulation or future directions of technology development (EPA 2013c).

The most recent Waste Strategy from 2013 continued the partnership strategy and launched a partnership with Zealand and Mid Jutland Regions to investigate the possibilities for establishing a pilot plant to demonstrate mechanical sorting of dry waste as a means to take the next steps towards recycling (Danish Government 2013, DAKOFA 2014). The project provided new knowledge on the legal and technical issues, where a main question was whether these plants should be publicly provided, privately provided or provided in public-private partnership (EPA 2014c). As such, the government has played an active role in driving forward mechanical sorting and partnerships for infrastructure, and interestingly, in this case took a more hands-on approach to the provision of waste infrastructure, rather than trusting the market or municipalities to provide this. However, the implementation of mechanical sorting plants remains dependent on procurement decisions in municipalities, municipal companies and/or private companies, and as such, the partnership approach can only take a solution so far.

Although policy partnerships might be new in their current form, the partnership approach to innovation is not new. From the beginning of the 1990s, Vestforbrænding I/S, the largest publicly owned company in Denmark, participated in a series of projects with the EPA to develop more sustainable solutions for incineration residual, which also tended to involve other large actors in the sector. According to Vestforbrænding, these collaborations were open and informal, but over time they became continuously more formalized with legal partnership agreements (Vestforbrænding interview). Through these partnerships, the resourceful publicly owned companies have played a central role in driving forward technology innovation in Denmark in cooperation with authorities, knowledge institutions and private companies.

Today, multiple organizations in Denmark facilitate these kinds of partnerships often supported by public funding and with more or less obligation for the involved organizations to contribute to actual technology development (see for example inno-mt.dk). Recently, CLEAN, a Copenhagen-based cleantech cluster has joined the scene, facilitating for example a partnership on new solutions for plastic waste engaging multiple actors to develop a joint procurement for a mechanical sorting plant for plastic waste (Clean 2015).

Accordingly, in Denmark more loosely organised policy partnerships has been used both by the government and other facilitating organisations and, especially in the past, more bottom-up from incumbent actors to mobilise and engage a range of actors to solve specific issues related to a transformation towards more sustainable waste and resources management. The government may use these types of partnerships to facilitate change processes and gather relevant actors to discuss problems and solutions, but experiences also show that the government is

dependent on local authorities, publicly owned companies, private actors and various knowledge institutions to identify and implement solutions in practice. It seems the Danish tradition for collaborative innovation continues and is enforced with the increased focus on resources.

Service delivery partnerships

Whereas policy partnerships tends to have a national development perspective, service delivery partnerships in local contexts have also begin to emerge, partly in relation to infrastructure provision, which the government has pushed for, and with several cases in waste collection.

Waste treatment infrastructure

Whereas the government project on mechanical sorting is presented as an innovative 'pilot' plant, a local authoritive, Vejle Municipality, has over the past years developed a project on mechanical sorting delivered in a PPP. In July 2013, Vejle Municipality issued a tender for a public-private joint venture to deliver a new 'resource centre' including the construction, part finance, and operation of a modern mechanical sorting plant to manage biodegradable waste, residual and pre-sorted dry recyclables, a new household recycling station and adjacent buildings and services (such as administrative offices, a transfer station, etc.). The contract was to be procured through competitive dialogue (udbud.dk 2013), which in itself is innovative in a Danish context, where traditional procurement processes has been the norm.

Before the procurement process, Vejle Municipality engaged in an 'innovation partnership' with the private company Marius Pedersen A/S. Innovation partnerships is a Danish model for public-private cooperation, where an innovative solution with commercial potential is developed in cooperation between one or

more public and private organizations (Brogaard and Petersen 2014). In this case, the purpose was to discuss potential organizational forms, rather than a specific technical solution (Rønne & Lundgren 2013). A main objective in the Vejle contract was to move beyond the traditional adversarial form of contracting in waste management services and find a more collaborative approach. As a respondent from Vejle Municipality asked: "*Why does a contract need to be an order to do this or that for the lowest price, and then people are in war with each other for the rest of the time? The best thing for both parties would be to find win-win solutions*" (Vejle Municipality interview).

The identified win-win solution was that the new resource centre should be able to treat both household and commercial recyclable waste and thereby provide extra business opportunities for the private company. Unfortunately, Vejle's legal advisor was countered by the state attorney, who in a declaration stated that including a private company in a joint venture did not justify treating recyclable waste from private industry, as this by law was only to be treated by private companies (Kammeradvokaten 2014). This statement, which came during the procurement process, has halted the procurement. In consequence, the future of Vejle's joint venture resource centre and infrastructure partnerships in Danish waste management in general remains insecure.

Waste collection services

The conditions of an 'almost war' between public and private companies described by Vejle stems from experiences with waste collection contracts. In Denmark, waste collection contracts are relatively short term, typically 4 years, sometimes with the possibility of 1-2 years extension. In the interviews, both public authorities and private waste companies described a development towards increasingly adversarial relationships, where increasing competition had led some

private companies to bid very low and then attempt to gain extra money from the contract afterwards. In consequence, public authorities wrote continuously more specified contracts, thus in effect binding both parties to a stiff contract and preventing new ideas from the private sector to enter into these contracts.

To break this pattern, a number of municipalities and publicly owned companies have experienced with 'service partnerships' as a new form of contracting out. For example Renosyd I/S decided to try a 'service partnership' based on disappointing experiences with a former contract:

> "We had a traditional contract with retribution and controlling systems, which did not go well.[…] We experienced a number of deficiencies, probably because they[the private company] had bid too low and could not live up to their own expectations. But when we were done criticising each other, […] we realised, that they only did what our contract asked them to. The contract did not focus on delivering good quality services for citizens, but only on moving waste from A to B. And that was not good enough" (Renosyd interview).

The new contract was designed to incentivise gradual improvements and allow a change in collection services to introduce a new split-bin for packaging waste and a new electronic registration system. Both public and private partner expressed content with this new form of cooperation.

However, it is not necessarily always easy to implement new forms of contracting. The publicly owned company Vestforbrænding pioneered this kind of contract in waste transportation, but whereas Vestforbrænding saw a good start with the partners building trust and the private company bringing in new ideas, they experienced conflicting interest in the operational phase. The partnership was completed, but without the expected positive results. As the cooperation ceased, both companies experienced reduced trust in the opposite part. As such, procuring

a partnership contract is no guarantee for 'genuine' partnership to develop between the partners.

In Denmark, service delivery partnerships in waste collection have been used to improve the possibilities of implementing new solutions to increase recycling, service quality and efficiency within contracts. Service partnerships might be a step on the way towards closer public-private collaboration on waste management, but it is still a new procurement form. As one of the private businesses commented: "*I believe that everyone starting on this is a bit fumbling, trying to figure out how to do this and what could be developed in these partnerships. And I don't believe the limits for collaboration has been challenged yet*" (Danish private contractor interview).

In both waste infrastructure and services, these service delivery partnerships have shown potential for establishing collaborative relationships between incumbent regime actors and potentially implementing innovative technology and organizational forms in a Danish context. However, there continue to be legislative challenges for partnerships and perhaps also challenges in the mind sets of incumbent regime actors, who need to adjust to new ways of thinking and organizing waste.

Technology partnerships

Supplementing the policy partnerships gathering actors and knowledge to develop new solutions and service delivery partnerships implementing new technologies and forms of organizing, there are also a range of technology partnerships in Denmark, which from the outskirt of socio-technical regimes develop and test new technical solutions. These are typically organized in closed groups of actors, where private partners are included because of specific competences and know

how, and public partners because of their knowledge of and access to municipal waste. Typically, all partners invest in the project and share involved risks. Projects are often supported by government funding, for example through the before mentioned environment technology programme.

The most high profile technology partnership is probably REnescience. REnescience is anchored in the majority state-owned energy company DONG Energy with a test facility placed at Amager Resource Centre. The REnescience technology treats unsorted residual waste with enzymes converting biodegradable waste into a bio-liquid and separating dry recyclables. Compared to incineration, the aim is to increase the use of various resources in waste. As such, this new technology may become a competitor to existing incineration technology and other forms of treating residual waste, and it may also make redundant household sorting of waste, which has been the tradition in Denmark. As a respondent from Dong Energy explains: "*We have the tagline 'value from waste', […] and I can sincerely say that with this technology and the focus on it from DONG, we take that seriously. […] We believe that a lot of resources are lost, when it [waste] is simply lit on fire.*" (DONG Energy interview)

The technology was developed and tested in partnership with public and private actors and knowledge institutions and was partly funded by Energinet.dk and the Danish Energy Agency's Development and Demonstration Programme (DONG Energy 2012). DONG would like the first full scale plant to be built in Denmark, but the technology is likely to have a global outreach, and DONG has also been in contact with potential customers in countries such as England, China and the USA and engaged with a partner in Abu Dhabi to spread the technology to the Middle East. DONG expected the first full scale plant to be implemented in 2015 cooperation with Fredericia, Kolding and Middelfart municipalities (FiB 2014),

but is experiencing some technical challenges. It may also be questioned, if REnescience is actually a partnership. Several respondents refer to it as a 'DONG' project, rather than a partnership.

In waste collection, many traditional contracts in Denmark include the possibility for testing technologies such as hybrid/electrical or gas driven vehicles for waste collection. According to the respondents, hybrid vehicles with electric compressors are increasingly in demand in municipal procurements. One of these vehicle types was developed in a technology partnership. The project was initiated by the small start-up Banke Assessory Drives, who got the idea to the electric driven compactor that distinguishes the vehicle. The partnership was facilitated by the Lean Energy Cluster in Southern Denmark (now part of 'CLEAN') with 11 partner organizations, including Esbjerg Municipality and their private waste collector and financially supported by Syddansk Vækstforum (Berlingske Business 2012, Meldgaard interview). In contrast, technology partnerships may also be smaller groups, such as the cooperation between Odense Municipality and Stena Recycling to develop a more efficient and safe electronic registration system for hazardous waste, which was, however, halted by a lack of finance (Stena Recycling interview).

As such, although these partnerships develop and test new technologies in the outskirts of regimes in financed 'incubation rooms', incumbent regime actors tend to be included as partners. Technology partnerships, therefore, provide a link between idea development and technical skills in niches and incumbent regime actor's knowhow on problems and possibilities in waste management. However, it may be questioned whether these co-innovation projects are 'genuine' partnerships.

Summarizing the Danish case, the government has emphasised partnerships as a policy instrument for tackling the sustainability challenge and given partnerships a prominent role in efforts of transforming Danish waste systems from incineration towards increasing recycling and prevention. The government also suggested PFI-style partnerships to combine public and private resources and skills in the provision of new mechanical sorting plants, but the future of these remains insecure, whereas also a local initiative in Vejle was stalled by legislative difficulties. In waste collection, service partnership seems to be spreading as a way of overcoming adversarial relationships, but the potential for co-production of innovation in these partnerships might not yet be fully exploited. More radical innovations seems to be developed in large or smaller technology partnerships, where incumbent regime actors play an active role in driving forward change and producing solutions that are fitted to the waste management sector. The role of partnerships in future waste management systems depends on choices in various actor groups.

The potential of PPPs in sustainability transformation processes

The analysis showed that PPPs clearly contribute to sustainability change and transformation of municipal waste management in England and Denmark, although there are also challenges connected to different PPP types. The three identified partnerships showed potential for supporting sustainability innovation and change by joining actors in policy development and implementation, securing implementation of new solutions in local waste infrastructure and providing flexibility for continuous search for improvements and efficiencies in contract periods, or act as incubation rooms for new technologies. *Table 3* summarizes the various roles and potentials of sustainability change with national variations.

Table 3: The role of PPPs in sustainability change of waste management in Denmark and England

	Role of PPPs in sustainability change		Scope and scale for sustainability change	
	England	**Denmark**	**England**	**Denmark**
Policy partnerships	Facilitate local partnership working to develop and implement local solutions	Facilitate development of new solutions to specific national challenges	System redesign or optimization (national/local)	System redesign or transformation (national)
Service delivery partnerships	Deliver waste infrastructure with private finance, competences and knowhow, improve flexibility for incremental improvements and service changes in collection contracts and joint ventures	Little role in waste infrastructure, but may facilitate public-private cooperation in the future, improve flexibility for incremental improvements and service changes in collection contracts	System transformation, redesign or optimization (local)	System transformation, redesign or optimization (local)
Technology partnerships	Further development and market maturity of new technologies	Development and testing of new technologies	System redesign or optimization (global/national)	System transformation, redesign or optimization (global/ national)

Policy Partnerships are initiated by government organizations at the landscape level to facilitate the development of national or local solutions to implement government waste and resources policies in dialogue with incumbent local actors, niche technology developers and knowledge institutions. Whereas in England these partnerships are used to encourage and facilitate transformation processes or improvements in specific local contexts, in Denmark the government focuses on developing new technological or organizational solutions to solve national challenges.

Service Delivery Partnerships are initiated by local authorities to deliver new waste treatment facilities or waste collection services in cooperation with private waste management companies. These partnerships have the potential for creating local systems transformations or redesign existing systems or finding ways of optimizing current practices. Although these contracts may bring new technologies from one local waste management systems to another or even test or implement new technology matured in niches and fitted to local needs, they are perhaps mostly innovative in developing new forms of organizing service delivery.

Technology Partnerships are closed groups of organizations and actors, which provide a framework for interaction between regime actors and technology providers with different competencies and skills to develop and test new technologies and/or lead technologies closer to market maturity and sale at national or perhaps even global markets.

Whereas the contributions from these various partnerships may be analytically separated, an even more interesting observation may be how they seem to supplement each other as they contribute to linking actors and solutions at various

levels in the multi-level framework. Whereas partnership may be based mainly on one of the three levels, all partnership types seems to include organizations across landscape, regime and niches, when innovating. Policy partnerships are based on the landscape level, but initiate interaction with and in between regime actors and niches. Service delivery partnerships are based at the regime level, but are clearly supported by governments at the landscape level and may reach out to technology niches when searching for improved solutions. Technology partnerships are based at the niche level, but usually include and may even be initiated by regime actors and often depend on government funding. As such, these partnerships may be interlinked in various ways to foster sustainability transformation. The next section will show this interlinkage in the two cases and discuss how the future of PPPs will be affected by strategic choices in different social groups.

Strategies for governing sustainability transformations

In England, the government chose a very hands-on strategy towards the sustainability challenge after a few years of softer policy measures and non-binding targets, which was driven mainly by economic concerns of the consequences of not meeting EU targets. The government established statutory targets for local authorities supplemented by strong economic incentives for changing from landfilling to recovery and recycling and the possibility of achieving PFI finance for the necessary infrastructure. Whereas the PFI systems secured new waste treatment facilities (approved by the government), the development of markets for the recycled material from new collection systems was tackled by WRAP along with support for redesign of local authority systems to achieve the new targets.

The changing targets and new demands for waste collection in separate streams have led some WCAs to search for new ways of contracting that improved the

flexibility for making changes and at the same time kept low costs. Despite positive experiences with partnering, many English authorities continue to have in-house waste collection and the question of private inclusion remains politically anchored in Labour versus Conservative dominated authorities. As such, local authorities may miss out on opportunities for private input and ideas. On the other hand, according to most respondent the majority of drive towards change comes from public authorities. The labour government also supported technology development in treatment methods alternative to incineration, which was used to improve local systems. Altogether, this led to the fastest sustainability transformation of waste management in Europe, which the government was able to control to a considerable degree through these measures and PPP support systems.

Compared to the current challenge in Denmark, England had the advantage of being able to build up a new system from almost zero, rather than trying to alter an existing infrastructure system with sunk costs, vested interests, etc. It was logical to involve large private companies in this work to attract competencies in these new technologies and integrated waste systems. The focus on involving private actors in local service delivery had continued from the conservative government over to Labours' modernizing agenda and has led to one of the most evolved support systems for PPPs in Europe (Connoly and Wall 2013, Verhoest et al 2015). Whereas some local authorities such as Greater Manchester was supported by the government in managing these complex, large scale projects, it has in the end been up to local authorities to make PPPs work in practice. The future will show, whether sufficient flexibility has been built into PFI arrangements or if England in a few years will face a lock-in situation comparable to the one in Denmark.

Furthermore, the focus on waste policies seemed to decrease with the UK Liberal-Conservative coalition government that entered into power in 2010. With this development combined with deep economic cuts in the budgets of local authorities, the sustainability transformation of waste management systems in England may experience a halt or even a fall-back. Ironically, this retreat by government may lead to less partnership between public and private actors. It may also mean that a further development of waste management will be more decentralised and dependent on local regime actors' willingness to move forward.

In Denmark, regulation and economic incentives for sustainability change was established more than a decade before the English government began to take action. Municipalities have had great autonomy to design local systems, where inter-municipally provided incineration with some added recycling became the dominant solution. In the current change process, policy partnerships have been used not only to develop solutions, but also in attempts to bridge interest conflicts in regimes and find common ground for new solutions. The government has set an ambitious national recycling target, but not applied statutory targets on municipalities. It remains to be seen if this more hands-off approach will work or the government will need to apply harder measures after the review of the resource strategy in 2016 to prevent this former frontrunner to face not reaching EU targets. Although it clashes with the Danish consensus culture, it might be important to remember that there are genuine interest conflicts in play.

The analysis showed that incumbent regime actors played an active role in the reconfiguration of the Danish waste management system including in partnerships for development and testing new technologies. However, whereas Geels and Kemp (2007) suggested that in sustainability transformation processes (in contrast to transition processes) '*the survival of incumbent regime actors is not threatened, and they are the ones to enact the redirection of the development trajectory of the*

existing system' (p. 445), this article suggests a slightly more complex reality. In the Danish waste management sector it seems that main incumbent regime actors, municipalities and publicly owned companies, are actually threatened to some degree by the transformation from incineration towards recycling and prevention. When participating in transformation processes these actors might be preparing for their own 'creative destruction'. Nonetheless, it might be a better strategy for incumbent regime actors to play along in for the time being inevitable transformation processes and reinvent themselves in new roles rather than contesting change.

Municipalities and especially publicly owned companies have invested in and organized their systems around incineration, but may see a future potential in new mechanical recycling plants to answer political demands for recycling. Economies of scale from mixing municipal and commercial waste may tempt them to partner with private actors, but most likely if the current regulations are changed to allow joint venture companies, where municipalities may have the increased flexibility and influence from shared ownership. Otherwise, the safe model of municipal provision and full control may continue to be preferred locally. In contrast, private actors which currently have the monopoly on collecting and treating commercial waste might have less interest in changing this condition, but may realize that they risk missing out on market opportunities, if municipalities decides to side pass them in the provision of new sorting plants. The existence of these interest conflicts does not necessarily mean that incumbent actors may not support the objective of sustainability transformation. Rather it means that these transformations are difficult for them and may force them to rethink their position and roles, which is likely to bring some resistance.

There is an irony in the fact that Denmark now considers using PPPs in infrastructure, whereas England has quit their PFI programme in waste management. The lack of PPPs in Denmark compared to England so far may simply be a timing issue, as the system of intermunicipal provision was established long before PPPs came on the political agenda in Denmark. However, in the Danish waste sector, PPPs are still considered something new, and there is no clear argument to privatize waste treatment in Denmark. The choice remains in the Danish municipalities, which are less dependent on external funding compared to local authorities in England. If the Danish waste sector decides to engage in PPPs, it is central that experiences from England are adopted.

Along with these developments, public and private actors continue to cooperate on waste collection with more or less success. The idea of more relational service partnerships has been spreading and may bring smoother implementation of new collection schemes along with continuous service improvements and efficiencies. Good experiences in waste collection services may support the courage to further partner up in waste treatment. However, this model might not be fully exploited yet, and it seems that local authorities are still holding on to hierarchical governing, rather than leaving more responsibility to private partners.

Public and private actors also collaborate in technology partnerships, where local authorities and publicly owned companies as potential buyers and users of new technologies are relevant partners for private companies. As local authorities have the statutory responsibility and thereby a monopoly on handling municipal waste, some degree of cooperation with a public authority will even be necessary to access municipal waste for testing. Perhaps DONG Energy and their Renescience project points the way for a new waste system, where technology makes separate collection and incineration redundant. DONG has itself been through a process of

focusing the company's activities, where waste incinerators were sold off in favour of a focus on 'New Bio Solutions' (such as Renescience), which they see as part of a future flexible energy system (see DONG Energy 2015, Fjernvarmen 2012). It will be interesting to see, which road the publicly owned companies will follow in these developments.

In contrast to the Danish tradition for large municipalities and publicly owned companies to actively participate in driving forward waste management innovation, the UK government and the public waste sector in general seems to focus less on radical technology innovation. It was remarkable that none of the large waste disposal authorities interviewed took part in technology development activities. Besides the few identified partnerships for testing and maturing technology, it seems there is not the same tradition in England for public authorities taking on this role. Whereas technology partnership may be better forums for more radical innovation, these cases show that the first steps towards technology might be developed in broader policy partnerships providing the knowledge base for identifying needed solutions and creating direction, whereas service delivery partnerships are key to implementing developed solutions. As such, developments at the landscape and regime level are equally important to sustainability transformation than development in niches.

In conclusion, the article shows that public-private partnerships are prominent, but contested governing instruments in transformations of waste management systems in England and Denmark. Behind the question of partnership lies the continuously political question of private sector inclusion in waste management services, which has traditionally been dominated by local authorities. Based on a number of empirical examples, this article suggests that PPPs may gather actors and resources to develop better policies or new solutions and may improve contractual

relationships, but the article does not provide evidence that PPPs should perform better than publicly owned waste infrastructure.

Nonetheless, PPPs may be driven forward by the increasing interdependency between public and private actors in municipal waste management. New political demands for sustainability transformation have developed needs for more complex, green technologies from private developers, whereas economic restraints and the move towards privatization continue to place a strong focus on economic efficiencies. Choosing the right governing instruments to enable sustainability transformation is not only a question of national strategy. Change is taking place through interplay between government, knowledge institutions, local authorities and private companies across European, national and local contexts, where differences in political strategic, practical and market conditions may lead to a variety of trajectories of change.

There may be advantages and disadvantages by the English governing approach compared to the Danish. The English hands-on approach provided the fastest transformation process in Europe, which also benefitted from technology developments in other countries. The next 20-30 years will show if the PFI route will provide enough flexibility for future changes, which with no doubt will come, and if sustainability objectives shave indeed been rooted in the English society beyond the economic rationale in reaching EU targets. In contrast, the more hands-off approach in Denmark may take longer and risks not leading to the most optimal results in a broader societal perspective, but may also secure local ownership of solutions with engaged actors at all levels bringing ideas and solutions to the table.

Conclusion

This article has investigated PPPs as policy instruments for sustainability transformation of urban infrastructure networks in the case of waste management. Through a comparative, embedded case study of the role of PPPs in municipal waste management in England and Denmark, the article has identified three types of PPPs: policy partnerships, service delivery partnership and technology partnerships. The article shows how these partnerships contribute in various ways to sustainability transformation processes by facilitating interplay between actors at landscape, regime and niche levels. Policy partnerships gather actors with various resources and knowledge to develop more sustainable policies or facilitate policy implementation. Service delivery partnerships may be used to implement new waste infrastructure systems or provide flexibility for the introduction of new collection systems and gradual service improvements in cooperation between public authorities and private contractors sharing risks, resources and ideas. Technology partnerships may connect actors in regimes and niches with various competences and skills to develop and test new technologies. In conclusion, policy-makers may benefit from supporting a broad palette of partnerships in the governing of sustainability transformations. Nonetheless, the popularity of the partnership approach should not lead us to overlook that there might continue to be conflicting interests between various actors in these systems.

This article has contributed to a growing literature on governing sustainability transformations of urban infrastructure networks by investigating the role of PPPs in such transformation processes. The results from the article support the argument of urban scholars that sustainability transformations of large infrastructure systems should also be investigated in place-specific local contexts, where they may follow diverse trajectories of change as actors initiate, facilitate or contest change processes and further that landscape-regime interaction should not be overlooked

in these processes. Adding to these points, the article shows how local systems change feed into national transformation processes through dialectic processes between actors at landscape, regime and niches levels interlinked through various forms of partnership arrangements. In line with Bulkeley et al (2014) description of the energy sector, the waste management sector also reveal a 'patchwork' of various experiments, from REnescience and hybrid vehicles to new forms and shapes of partnerships, which through improvement in different parts of the system may bring sustainability transformation over time.

References

Berlingske Business 2012: *Dansk mijø-skraldebil*. By Carsten Teiner Svendsen. Copenhagen: Berlingske Tidende: http://www.business.dk/transport/dansk-miljoe-skraldebil#, [05.06.2012]

Bovaird, T. 2004: 'Public-private partnerships: from contested concepts to prevalent practice'. *International Review of Administrative Sciences* 70, pp.199-215

Brinkerhoff, D.W. & Brinkerhoff, J.M. 2011:'Public-Private Partnerships: Perspectives on Purposes, Publicness and Good Governance'. *Public Administration and Development* 31, pp. 2-14

Brogaard, L. and Petersen, O.H. 2014: *Offentlige-private innovationspartnerskaber (OPI). Evalueringer af erfaringer med OPI på velfærdsområdet*. Copenhagen: KORA

Bruijn, T.J.N.M. and Tukker, A. eds. 2002a: *Partnership and Leadership. Building Alliances for a Sustainable Future*. Dordrecht/Boston/London: Kluwer Academic Publishers

Bruijn, T.J.N.M. and Tukker, A. 2002b: 'Introduction: Collaboration as the new Paradigm in Industrial transformation'. In T.J.N.M. Bruijn and A. Tukker eds.

Partnership and Leadership. Building Alliances for a Sustainable Future, Dordrecht/Boston/London: Kluwer Academic Publishers

Bulkeley, H., Broto, V.C. and Maassen, A. 2014: 'Low-carbon transitions and the Reconfiguration of Urban Infrastructure'. *Urban Studies* 51, pp. 1471-1486

Bulkeley, H. and Broto, V.C. 2012: 'Government by experiment? Global cities and the governing of climate change'. *Transaction of the Institute of British Geographers* 38, pp. 361-375

Bulkeley, H., Watson, M. and Hudson, R. 2007: 'Modes of governing municipal waste'. *Environment and Planning A* 39, pp. 2733-2753

Bulkeley, H., Watson, M., Hudson, R. and Weaver, P. 2005: 'Governing municipal waste: Towards a new analytical framework'. *Journal of Environmental Policy & Planning* 7, No. 1, pp. 1-23

Calmin, P. and Gaillochet, C. 2009: 'From Waste to Resource. An abstract of World Waste Survey'. Paris: CyclObe/ Veolia Environmental Services

Campos, M.J.Z. and Hall, C.M. 2013: 'Introduction'. In M.J.Z. Campos and C.M. Hall eds. *Organizing Waste in the City. International perspective on narratives and practices*. Bristol: Policy Press

Clean 2015: *Plastaffald - Innovativ udbudsproces*. Clean website, direct link: http://cleancluster.dk/projekter/plastaffald-innovativ-udbudsproces/?pid=3901, [12.03.2015]

Connoly, C. & Wall, T. 2013: 'The impact of the global financial crisis on public - private partnerships: A UK perspective'. In C. Greve and G. Hodge eds *Rethinking Public-Private Partnerships. Strategies for turbulent times*. London/New York: Routledge

Corvellec, H. and Hultman, J. 2012: 'From "less landfilling" to "wasting less": Societal narratives, socio-materiality, and organizations'. *Journal of Organizational Change Management* 25, 2, pp.297-314

DAKOFA 2014: Automatiske affaldssorteringsanlæg i Danmark? Conference on 3rd April 2014 in Vejle. Dansk Kompetence Center for Affald (DAKOFA): file:///C:/Users/sd.dbp/Downloads/0__Program_030414.pdf

Danish Government 2013: 'Danmark uden affald. Genanvend mere – forbrænd mindre' (Denmark without waste. Recycle more – incinerate less). Copenhagen: Regeringen (the Danish Government)

Danish Government 2011: Et Danmark, der står sammen (A Denmark United). Government Programme 2011. Copenhagen: Regeringen (the Danish Government)

Danish Government 2010a: 'Miljøteknologi – til gavn for miljø og vækst. Handlingsplan for fremme af miljøeffektiv teknologi 2010-2011'. Copenhagen: Regeringen (the Danish Government)

Danish Government 2010b: Affaldsstrategi '10 ('Waste strategy '10'). Copenhagen: Regeringen (the Danish Government)

Danish Government 2003: 'Affaldsstrategi 2005-2008' (Waste Strategy 2005-2008). Copenhagen: Regeringen (the Danish Government)

Dansk Affaldsforening 2013: 'DØR' smider affaldet ud af den grønne omstilling. Press release 4th March 2013, Copenhagen: Dansk Affaldsforening: http://www.danskaffaldsforening.dk/documents/21355/45660/PM_D%C3%98Ropl%C3%A6g+smider+affald+ud+af+gr%C3%B8n+omstilling.pdf/da1b9877-3ecc-4671-afd2-e76d75c9c3c6

Davies, S. 2007: 'Politics and markets: The case of UK Municipal Waste management'. Working paper 95, School of Social Sciences, Cardiff University

Davoudi, S 2000: 'Planning for waste management: changing discourses and institutional relationships'. *Progress in Planning* 53, pp. 165-2016

Davoudi, S. 2009: 'Scalar tensions in the governance of waste: the resilience of state spatial Kenyesianism'. *Journal of Environmental Planning and Management* 52, No. 2, pp. 137-156

DCA 2012: *Klar til konkurrence i kommunerne*. Copenhagen: Konkurrencestyrelsen (Danish Competition Authority)

DCA 1999: Redegørelse om affaldssektoren. Konkurrencestyrelsen (Danish Competition Authority), Copenhagen: Erhvervsministeriet

DCCA 2012: 'Erfaringer fra de danske OPP-projekter' ('Experiences from Danish PPP projects'). Valby: Konkurrence- og Forbrugerstyrelsen (Danish Competition and Consumer Agency)

DCLG 2006: 'Structures for Service Delivery Partnerships'. London: Department for Communities and Local Government

DEFRA 2014a: 'Management of Local Authority Collected Waste 2000/01 to 2013/14'. London: Department of Environment, Food and Rural Affairs, May be downloaded from: https://www.gov.uk/government/statistical-data-sets/env18-local-authority-collected-waste-annual-results-tables.

DEFRA 2014b: 'Waste from households. Local Authority Collected Waste Statistics – England'. London: Department of Environment, Food and Rural Affairs (DEFRA)

DEFRA 2013a: Statistics of waste managed by local authorities in England in 2012/13, 7 November 2013. London: Department of Environment, Food and Rural Affairs (DEFRA)

DEFRA 2013b: 'Waste stakeholder letter from Dan Rogersen'. London: Department of Environment, Food and Rural Affairs (DEFRA)

DEFRA 2013c: 'Review of Defra's funding for WRAP in England'. London: Department of Environment, Food and Rural Affairs (DEFRA)

DEFRA 2011a: ARCHIVE: Local authority funding: Private Finance Initiative (PFI) projects. Old DEFRA website 28 February 2011, http://archive.defra.gov.uk/environment/waste/localauth/funding/pfi/projects.htm

DEFRA 2011b: 'Waste Data Overview'. London: Department of Environment, Food and Rural Affairs (DEFRA)

DEFRA 2011c: 'Local authority collected waste – definitions of terms'. DEFRA website, 23 September 2011.Direct link: https://www.gov.uk/local-authority-collected-waste-definition-of-terms

DEFRA 2011d: 'Government Review of Waste Policy in England 2011'. London: Department of Environment, Food and Rural Affairs (DEFRA)

DEFRA 2010a: 'Changes to PFI programme'. Press Release, 20 October 2010. London: Department of Environment, Food and Rural Affairs (DEFRA)

DEFRA 2010b: ARCHIVE: New technologies demonstrator programme factsheets [last modified 7 July 2010]. http://archive.defra.gov.uk/environment/waste/residual/newtech/demo/factsheets.htm

DEFRA 2006: 'An Action Plan for the Waste Infrastructure Delivery Programme'. London: Department of Environment, Food and Rural Affairs (DEFRA): http://archive.defra.gov.uk/environment/waste/residual/widp/documents/widp-actionplan.pdf

DEFRA, no date, a: 'Biocycle South Shropshire Ltd. technology: Anaerobic Digestion'. London: Department of Environment, Food and Rural Affairs (DEFRA) : http://archive.defra.gov.uk/environment/waste/residual/newtech/demo/documents/biocycle-100603.pdf

DEFRA, no date, b: 'Merseyside WDA/ Orchid Environmental. Technology: Mechanical Heat Treatment'. London: Department of Environment, Food and Rural Affairs (DEFRA): http://archive.defra.gov.uk/environment/waste/residual/newtech/demo/documents/merseyside-wda-100603.pdf

DME 2013: 'Waste Incineration – recovery of energy and material resources'. Copenhagen: Danish Ministry of the Environment

DME 2007: 'Politisk aftale om organisering af affaldssektoren' (Political agreement on organization in the waste sector). Copenhagen: Danish Ministry of the Environment

Dong Energy 2015: 'New Bio Solutions'. Dong Energy website: http://www.dongenergy.com/da/forretningsaktiviteter/thermal-power/hvad-vi-laver/new-bio-solutions, [15.03.2015]

Dong Energy 2012: 'REnescience – converts household waste to bioliquid'. DONG Energy website: http://www.dongenergy.com/en/innovation/utilising/pages/renescience.aspx, [05-11-2012]

EC 2014: 'Towards a circular economy: A zero waste programme for Europe'. COM (2014) 398, Brussels: European Commission

EC 2011: 'Roadmap to a Resource-Efficient Europe'. COM (2011) 571, Brussels: European Commission

EC 2008: 'Directive 2008/98/EC of the European parliament and of the Council of 19 November 2008 on waste and repealing certain directives'. Brussels: European Commission

EC 1999: 'Council Directive 1999/31/EC of 26 April 1999 on the landfill of waste'. Brussels: European Commission

EEA 2013a: 'Managing Municipal Solid Waste – A review of achievements in 32 European countries'. EEA report No. 2/2013, Copenhagen: European Environment Agency

EEA 2013b: 'Municipal Waste Management in the United Kingdom'. Prepared by David Watson for the ETC/SP, Copenhagen: European Environment Agency

EEA 2013c: 'Municipal waste management in Denmark'. Prepared by Birgitte Kjær, ETC/SCP. Copenhagen: European Environment Agency

EPA 2014a: 'EUROSTAT MW indberetning' and supplementing data files (data on municipal waste treatment in Denmark to be reported to EUROSTAT).

Required directly from the Environmental Protection Agency, 16 November 2014. Copenhagen: Environmental Protection Agency

EPA 2014b: 'Danmark uden affald. Ressourceplan for affaldshåndtering 2013-2018'. Copenhagen: the Environmental Protection Agency

EPA 2014c: 'Juridiske rammer for sorteringsanlæg'. Miljøprojekt 1558, 2014. Copenhagen: Miljøstyrelsen (Environmental Protection Agency)

EPA 2013a: 'Affaldsstatistik 2011'. Copenhagen: Miljøstyrelsen (Environmental Protection Agency)

EPA 2013b: 'Partnerskab for shredderaffald'. Miljøprojekt nr. 1467 (2013), Copenhagen: Miljøstyrelsen (Environmental Protection Agency), may be downloaded from http://www2.mst.dk/Udgiv/publikationer/2013/03/978-87-92903-97-6.pdf

EPA 2013c: 'Evaluering af Miljøministeriets miljøteknologiske indsats 2007-2011'. Copenhagen: Miljøstyrelsen (Environmental Protection Agency), may be downloaded from http://www2.mst.dk/Udgiv/publikationer/2013/04/978-87-93026-08-7.pdf

EPA 2010: 'Forbrænding af affald. Afrapportering fra den tværministerielle arbejdsgruppe vedrørende organisering af affaldsforbrændingsområdet'. Copenhagen: Environmental Protection Agency, may be downloaded from http://www.frinet.dk/media/244938/rapport%20forbr%C3%A6nding%20af%20affald.pdf

Eisenhardt, K.M. 1989: 'Building Theories from Case Study Research'. *The Academy of Management Review* 14, 4, pp. 532-550

EUROSTAT 2014: 'Recycling rate of municipal waste'. http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&plugin=1&language=en&pcode=t2020_rt120

Falconer, P. & McLaughlin, K. 2000: 'Public-private partnerships and the 'New Labour' Government in Britain'. In S. Osborne ed. *Public-Private Partnerships. Theory and Practice in international perspective*. Oxon/New York: Routledge

Federspiel, S. 2011: *Vi tog skraldet. Renholdning I København 1898-2011*. Copenhagen: R98

FiB 2014: 'Første Renescience anlæg kan stå klart i 2015'. Nyhedsbrev, Forskning i Bioenergi, Brint og Brændselsceller (FiB) nr. 40, February 2014, direct link: http://www.biopress.dk/PDF/fib-nyhedsbrev-nr.-40-februar-2014

Fjernvarmen 2012: Fremtiden på plads for mange af Dongs kraftvarmeværker. Kolding: Fjernvarmen nr. 3, marts 2012: http://www.danskfjernvarme.dk/magasinet/udgivelser/2012-marts

Funch, E. 1995: 'Fra køkkenmødding til genbrugsstation'. Glostrup: Vestforbrænding

Geels, F.W. and Kemp, R. 2007: 'Dynamics in Socio-Technical Systems: Typology of change processes and contrasting case studies'. *Technology in Society* 29, pp. 441-455

Geels, F.W. 2005a: 'The dynamics of transitions in socio-technical systems: A multi-level analysis of the transition pathway from horse-drawn carriages to automobiles (1860-1930)'. *Technology Analysis and Strategic Management* 17, 4, pp. 445-476

Geels, F.W. 2005b: 'Processes and patterns in transitions and system innovations: Refining the co-evolutionary multi-level perspective'. *Technological Forecasting and Social Change* 72, pp. 681-696

Glendinning, C. and Powell, M. 2002: 'Introduction'. In C. Glendinning, M. Powell and K. Rummery eds. *Partnerships, New Labour and the Governance of Welfare*, Bristol: The Policy Press

GMWDA 2014: 'The Authority's work at a glance'. Oldham: Greater Manchester Waste Authority. May be downloaded from:

http://www.gmwda.gov.uk/clientfiles/File/Authority%20at%20a%20glance%20web%20version.pdf

Greve, C. and Hodge, G. 2013: *Rethinking Public-Private Partnerships. Strategies for turbulent times*. London/New York: Routledge

Greve, C. and Hodge, G. 2005: 'Introduction'. In G. Hodge end C. Greve eds. *The challenge of public-private partnerships*, Cheltenham: Edward Elgar Publishing

Greve, C. and Mörth, U. 2010: 'Public-Private Partnerships: The Scandinavian Experience'. In G. Hodge and C. Greve eds *International Handbook of Public-Private Partnerships*. Cheltenham: Edward Elgar Publishing

Grimsey, D. and Lewis, M. K. (2005): 'Are Public-Private partnerships Value for Money? Evaluating alternative approaches and comparing academic and practitioner reviews'. *Accounting Forum* 29, pp. 345-378

Grønnegaard Christensen, J. 2001: *Affaldssektorens politiske organisering*. Danske Entreprenører, Miljøsektionen

Ham, H.V. and Koppenjan, J. 2001: 'Building Public-Private Partnerships: Assessing and managing risks in port development'. *Public Management Review* 3, No.4, pp. 593-616

Hartman, C.L., Hofman P.S. and Stafford, E.R. 2002: 'Environmental Collaboration: Potential and Limits. In T.J.N.M. Bruijn and A. Tukker eds. *Partnership and Leadership. Building Alliances for a Sustainable Future*, Dordrecht/Boston/London: Kluwer Academic Publishers

Hartman, C.L., Hofman, P.S. and Stafford, E.R. 1999: 'Partnerships: A Path to Sustainability'. *Business Strategy and the Environment* 8, pp. 255-266

Hellowell, M. 2010: 'The UK's Private Finance Initiative'. In G. Hodge, C. Greve and A. Boardman eds *International Handbook of Public-Private Partnerships*. Cheltenham: Edward Elgar Publishing

Hodge, G., Greve, C. and Boardman, A. eds. 2010: *International Handbook of Public-Private Partnerships*. Cheltenham: Edward Elgar Publishing

Hodson, M. and Marvin, S 2010: ’Can cities shape socio-technical transitions and how would we know if they were?’ *Research Policy* 39, pp. 477-485

Hogg, D. 2004: ‘Material Recovery Facilities in England’. Eunomia Research & Consulting, Presentation at the DAKOFA conference “Automatiske sorteringsanlæg I Danmark?” on 3rd April 2014 in Vejle, Denmark

Hughes, T.P. 1983: *Networks of Power. Electrification in Western Society 1880-1930*. Baltimore: John Hopkins University Press

Kammeradvokaten 2014: ’Kommuners deltagelse I selskaber der håndterer genanvendeligt erhvervsaffald’. Download: http://mst.dk/media/mst/8873048/Notat%20om%20L548-Kammeradvokaten.pdf, [22.05.2014]

Kemp, R. 2007: ‘An example of a “managed transition”: The transformation of waste management subsystems in the Netherlands (1960-2000)’. In M. Lehmann-Waffenschmidt *Innovations Towards Sustainability: Conditions and Consequences*, Heidelberg: Physica-Verlag/Springer

Kemp, R., Loorbach, D. and Rotmans, J. 2007: ‘Transition management as a model for managing processes of co-evolution towards sustainable development’. *International Journal of Sustainable Development & World Ecology* 14, pp.78-91

Kingdon, J. 1984: *Agendas, Alternative, and Public Policies*. Boston: Little, Brown

Kleis, H. & Dalager, S. 2003: *100 år med affaldsforbrænding i Danmark*. Babcock & Wilcox Vølund and Rambøll

Klijn, E.-H. and Teisman, G.R. 2005: ‘Public-private partnerships as the management of co-production: strategic and institutional challenges in a difficult marriage’. In G. Hodge and C. Greve eds. *The Challenge of Public-Private Partnerships*, Cheltenham: Edward Elgar Publishing

Klijn, E.-H. and Teisman, G.R. 2000: ‘Governing Public-private partnerships: Analyzing and managing the processes and institutional characteristics of public-

private partnerships'. In S. Osborne ed. *Public-Private Partnerships. Theory and practice in International Perspective*, London: Routledge

Koppenjan, J.F.M., and Enserink, B. 2009: 'Public-Private partnerships in Urban Infrastructures: Reconciling Private Sector Participation and Sustainability'. *Public Administration Review* 69, No. 2, pp. 284-296

Letsrecycle.com 2011: 'Orchid shuts formerly Defra-backed MHT Plant'. 14 July 2011, direct link: http://www.letsrecycle.com/news/latest-news/orchid-shuts-formerly-defra-backed-mht-plant/

Letsrecycle.com 2005: 'London borough signs multi-million pound contract with SITA'. Press release on 13 January 2005, http://www.letsrecycle.com/news/latest-news/councils/london-borough-signs-multi-million-pound-contract-with-SITA, 24.07.2014

Levy, D.L. 1997: 'Environmental management as Political Sustainability'. *Organization and Environment* 10, 2, pp. 126-147

LGA 2015: 'Building an anaerobic digestion plant in partnership'. Local Government Association website, direct link: http://www.local.gov.uk/climate-change/-/journal_content/56/10180/3510673/ARTICLE

LGDK 1992: 'UDBUD. Stigende interesse og klar effekt'. Kontoret for økonomi og planlægning, Copenhagen: Kommunernes Landsforening (Local Government Denmark)

LGDK/Udbudsportalen 2010: 'Seks modeller for offentligt-privat samarbejde'. Copenhagen: KL (LGDK) /Udbudsportalen, direct link: http://www.opilab.dk/Seks%20modeller%20for%20offentlig-privat%20samspil.pdf

Loorbach, D. 2004: 'Governance and Transitions. A multi-level policy-framework based on complex systems thinking'. Paper for the Berlin Conference on Human Dimensions of Global Environmental Change

Madsen, P.K. 2002: *Forundersøgelse af forudsætninger for og konsekvenser af en liberaliseret affaldssektor*.
Miljøprojekt nr. 709, 2002. Copenhagen: Environmental Protection Agency

Malmborg, F. 2003: 'Conditions for regional public-private partnerships for sustainable development – Swedish perspectives'. *European Environment* 13, 3, pp. 133-149

Markard, J., Raven, R. and Truffer, B. 2012: 'Sustainability Transitions: An emerging field of research and its prospects'. *Research Policy* 41, pp. 955-967

McQuaid, R.W. 2000: 'The theory of partnership: Why have partnerships?' In S.P. Osborne *Public-Private Partnerships – Theory and Practice in International Perspective*, London/New York: Routledge

MetalMatters 2014: 'About MetalMatters'. Metal Matters website: http://metalmatters.org.uk/about/, 19.11.2014

Monstadt, J. 2009: 'Conceptualizing the political ecology of urban infrastructures: insights from technology and urban studies'. *Environment and Planning A* 41, pp. 1924-1942

OFT 2006: 'More competition, less waste'. OFT841, Office of Fair Trading, London: UK government

Osborne, S.P. 2000: *Public-Private Partnerships. Theory and practice in international perspective*. New York: Routledge

Pedersen, A.R. 1998: 'En præsentation af sneboldsmetoden'. In P. Bogason and E. Sørensen *Samfundsforskning bottom-up: Teori og metode*, Copenhagen: Samfundslitteratur

Peters, B.G. 1998: *Comparative Politics. Theory and methods*. New York: New York University Press

Petersen, O. H. 2011: *Public-Private Partnerships: Policy and Regulation – With Comparative and Multilevel Case Studies from Denmark and Ireland*. PhD Series

8.2011, Doctoral School of Organization and Management, Frederiksberg: Copenhagen Business School

Powrie, no date: 'The New Technologies Demonstrator Programme: Summary and Key Findings'. TAC summary report by the chair. London: DEFRA: http://archive.defra.gov.uk/environment/waste/residual/newtech/demo/documents/TAC-Summary.pdf

RBKC 2014: 'Recycling'. Website of Royal Borough of Kensington and Chelsea: http://www.rbkc.gov.uk/environmentandtransport/domesticrecyclingandrubbish/performanceandstrategies/ourperformance/recycling.aspx, 24.07.2014

RBKC 2005/2011: 'Waste Management contract'. May be downloaded from: http://www.rbkc.gov.uk/councilanddemocracy/commentscomplaintsfeedback/freedomofinformation/wastemanagementcontract.aspx, 23.07.2014

RBKC 2004: 'Municipal Waste Management Strategy and Action Plan 2004-2009'. London: The Royal Borough of Kensington and Chelsea's waste management division

RESOURCE 2013: 'DEFRA cuts WRAP funding'. Article by Annie Reece, 27 June 2013. RESOURCE.co, http://resource.co/article/UK/Defra_cuts_WRAP_funding-3262

Rosenau, P. ed. 2000: *Public Private Policy Partnerships*. London: MIT Press

Rotmans, J., Kemp, R., and Asselt, M.v. 2001: 'More evolution than revolution: Transition management in public policy'. Foresight 3, 1, pp. 15-31

Rønne & Lundgren 2013B: 'Mødereferat'. Required from Vejle Waste and Recycling, Vejle

Schot, J. and Geels, F.W. 2008: 'Strategic niche management and sustainable innovation journeys: theory, findings, research agenda, and policy'. *Technology Analysis and Strategic Management* 20, 5, pp. 537-554

Shropshire 2012: 'Closure of anaerobic digestion plant', 22 August 2012, website of Shropshire Council, direct link:

https://shropshire.gov.uk/news/2012/08/closure-of-anaerobic-digestion-plant-%E2%80%93-coder-road-business-park-ludlow/ [17.03.2015]

Shropshire News 2013: *Shropshire marks ten years of recycling improvements*. 13 May 2013, Direct link: http://shropshire.gov.uk/news/2013/06/shropshire-marks-10-years-of-recycling-improvements/ [06-09-2013]

Slater, R., Frederickson, J., Thomas, C., Wield, D. & Potter, S. (2007): 'A critical evaluation of partnerships in municipal waste management in England'. *Resources, Conservation and Recycling* 51, pp. 643-664

Stewart, J. 2012: 'Multiple-case Study Methods in Governance-related Research'. *Public Management Review* 14, 1, pp. 67-82

Tukker, A. and Bruijn, T.J.N.M. 2002: 'Conclusions: the prospects of Collaboration'. In T.J.N.M. Bruijn and A. Tukker eds. *Partnership and Leadership. Building Alliances for a Sustainable Future*, Dordrecht/Boston/London: Kluwer Academic Publishers

udbud.dk 2013: 'Danmark-Vejle: Tjenesteydelser I forbindelse med spildevand, affald, rengøring og miljøbeskyttelse 2013/S 128-220349'. Announcement of procurement at udbud.dk: http://udbud.dk/Pages/Tenders/ShowTender?tenderid=10640

Uyarra, E. & Gee, S. 2012: 'Transforming urban waste into sustainable material and energy usage: the case of Greater Manchester (UK)'. *Journal of Cleaner Production*50, pp. 101-110

Van Vliet, B.J.M. 2012: 'Sustainable Innovation in Network-Bound Systems: Implications for the Consumption of Water, Waste Water and Electricity Services'. *Journal of Environmental Policy & Planning* 14, 3, pp. 263-278

Veolia 2008: 'Reducing the carbon footprint: Methodology for application of WRATE to monitor the carbon footprint (CO2 eq.) for the VES Shropshire contract'. Brief for WRATE study. Veolia Environmental Services, UK

Verhoest, K., Petersen, O.H., Sherrer, W. and Soecipto, R.M. 2015: 'How do governments support the development of public-private partnerships? Measuring and supporting PPP Governmental Support in 20 European Countries'. *Transport Reviews: A Transnational Transdisciplinary Journal* 35, 2, pp. 118-139

WCED 1987: 'Our Common Future'. *World Commission on Environment and Development* (WCED)

Weihe, G. 2008: 'Ordering Disorder – On the Perplexities of Partnership Literature'. *The Australian Journal of Public Administration* 67, No.4, pp. 430-442

Weaver, P. M. 2005: 'Innovation in municipal solid waste management in England: policy, practice and sustainability'. *International Journal of Innovation and Sustainable Development* 1, pp. 21-45

Wettenhall, R. 2005: 'The public-private interface: surveying the history'. In G. Hodge, C. Greve and A. Boardman eds *The Challenge of Public-Private Partnerships: Learning form international experience*, Cheltenham/Northhampton: Edward Elgar

WRAP 2014: 'Waste & Resources Action Programme Annual Report and Consolidated Accounts for the year ended 31 March 2014'. London: Waste and Recycling Action Programme (WRAP)

WRAP 2010: 'Home Improvement Sector Commitment (2009-2012). Case studies'. London: *Waste and Recycling Action Programme* (WRAP)

WRAP, no date a:' Increase metal recycling rates at the kerbside. Case study: Nuneaton & Bedworth Borough Council'. London: *Waste and Recycling Action Programme* (WRAP): http://metalmatters.org.uk/downloads/final-nuneaton-case-study9cdbb89c10756.pdf

WRAP, no date b: 'Transforming reuse through partnerships. How two related partnership projects have increased bulky waste re-use in Buckinghamshire'. London: *Waste and Recycling Action Programme* (WRAP):

http://www.wrap.org.uk/sites/files/wrap/WRAP%20Bucks%20case%20study%20%20FINAL.pdf)

Yin, R.K. 2009: *Case Study Research. Design and methods*. 4th ed. Thousand Oaks: SAGE Publications

Article 3

Hierarchy, Market and Network: Managing Mixed Governing Strategies for Innovation in Public-Private Partnerships

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Abstract

PPPs have been used all over the world to deliver new infrastructure and public services. This paper investigates how innovation is developed and implemented in PPPs. Although innovation is often mentioned as a potential benefit of PPPs, empirical studies investigating this in practice has been scarce, scattered and show mixed results. Based on a case study of four innovative PPPs for infrastructure and service delivery in municipal waste management in England and Denmark, this paper aims to take the first steps towards an increased conceptual understanding of the possibilities and challenges for PPP innovation.

The paper suggests that PPPs might deliver both governance and organizational innovation, in terms of innovation as the PPP itself or in the organizational design of PPPs, and service innovation, in terms of process and/or technology innovations in the PPP outcome. Three governing strategies for innovation in PPPs are identified: hierarchy, market and network. Although these three forms of social coordination might be separated analytically, they are in practice often closely

interwoven. In all four cases, the paper identifies a mix of these strategies over the whole PPP process from the pre-contract phase over the contract design to the post-contract phase leading to various forms and levels of innovations. On this background, the paper suggests that PPP innovation is related to the management of a mix of governing strategies.

Introduction

Public-private partnerships (PPPs) are used all over the world to deliver public infrastructure and services in cooperation between public and private sector organizations (Osborne 2000, Rosenau 2000, Hodge et al. 2010). In comparison to slow-moving, bureaucratic public organizations and the free, unregulated forces of the market, PPPs are said to deliver more efficient, effective and innovative solutions through competition for service delivery and synergies from collaborative structures between public and private actors with different resources, competences and knowledge (Lowndes and Skelcher 1998, McQuaid 2000, Greve and Hodge 2005). In a public sector pressured by increasing citizen demands, complex societal challenges and budget restraints, innovation is increasingly seen as essential to improve public services and deliver 'more for less' (Albury 2005, Osborne and Brown 2011, Sørensen and Torfing 2011). Hence, whereas efficiency arguments of 'value for money' have dominated the PPP debate so far (see for instance Hodge and Greve 2007), innovation is likely to become increasingly in demand in the future.

However, investigations of innovation from PPPs are few, diverse and show mixed results. Whereas some studies document innovative outcomes (Akintoye et al 2003, Bovaird 2006, Esteve et al 2012), others describe PPPs leading to business as usual (Hurst and Reeves 2004, Leiringer 2006, Slater et al 2007). As Leiringer (2006) suggests, despite the broad practical acceptance of PPPs as

innovation instruments, '*the theoretical basis to support them seems strangely underdeveloped*' (p. 302). This paper aims to remedy this research gap by taking a closer look at the theoretical ideas linking PPPs to innovative outcomes and investigate how these are managed in the 'real world'. The intention is to provide the first stepping-stones towards a theoretical and empirical understanding that may reach across various sectors and organizational forms of PPPs.

Whereas partnerships are often contrasted to bureaucratic hierarchies or competitive markets, the theoretical starting point of this article is a more complex reality, where partnerships as organizational forms may be separated from the modes of coordination actually applied. Thus PPPs can be governed through a variety of forms of social co-ordination – including hierarchy, market and network (Lowndes and Skelcher 1998). This variety of coordination forms may be associated with various strategies for innovation in the public sector (Sørensen 2012). This paper investigates how these modes of co-ordination and associated innovation strategies are used in practice in a comparative case study of four waste management PPPs from England and Denmark. The case analyses are based on qualitative, in-depth interviews with public and private managers involved in the PPPs triangulated with document analysis of contracts, tender material, waste management strategies, websites, etc. As two of the cases are organized as joint ventures (also referred to as 'mixed companies'), the paper also contributes to an increased understanding of 'mixed companies', which are less studied in literature (Cruz and Marques 2012).

Based on the case analysis, the paper suggests that the development and implementation of innovation in a PPP is related to the management of a mix of governing strategies for innovation in the PPP process - from the pre-contract phase, to the creation of the contract design and the post-contract phase. The cases

reveal how public managers combine these strategies in efforts of developing innovative services in terms of both organizational and technological outcomes. Thus the paper supports the significance of 'managerial efforts' in PPPs (Steijn et al 2011), but emphasise that at least in these types of tightly organized PPPs, network-based managerial strategies should be supplemented by hierarchical and market management strategies in order to develop innovation. Also, not simply the overall organizational form, but the specific ways these strategies are implemented in the procurement process and contract provides various possibilities for innovation. Contrary to seeing hierarchy, market and networks as counterproductive opposites, this analysis points to that although there might be tensions between them, the right mix of coordination might be mutually supportive. As Rhodes concluded already in 1997: "It's the mix that matters" (Rhodes 1997).

In the following two sections, the paper will explore and define the concepts of PPPs and innovation in this context, before the conceptual framework of hierarchy, market and network strategies for innovation is rolled out. This leads to a presentation of the comparative case study followed by an analysis of the mix of governing strategies for innovation applied in the four cases. The paper concludes by discussing the implications for theory and practice of managing mixed governing strategies for innovation in PPPs.

The organizational form and process of waste management PPPs

PPPs may be defined broadly as *'cooperative institutional arrangements between public and private sector actors'* (Greve and Hodge 2005). With a public organization as one partner, PPPs will always have a policy function in a broad sense of the word, in this case to provide waste management services or treatment facilities to citizens (Rosenau 2000). These kinds of partnerships are based on a

contractual relationship, which regulate the cooperation between public and private organizations in the specified contract period and may be based purely on the contract or organized as a joint venture. The contract is signed following a procurement process, where the public organization(s) choose a partner among competitive bidders presenting diverse solutions to a public call for tender. This process might be more or less open for cooperation in terms of dialogue and negotiation on the formation of tasks and division of responsibilities in the contract. Within the EU, these processes are obliged to follow competition principles of transparency and equal access and established procedures in the public procurement directive (EC 2004b).

In 2004, a new procedure of 'competitive dialogue' was added to the 'negotiated' and 'open or restricted' procedures, which allows for a period of dialogue between authority and bidders before the final tenders in situations of particularly complex contracts, where the authority is not able to specify the contract in either technically or financially/legal terms. The aim was to provide increased flexibility in discussions with candidates on all aspects on the contract, and the directive further point to the benefits of describing outputs in functional or performance terms rather than detailed specification to open for innovative ideas arising in the procurement phase (EC 2004a). Obviously, these formulations are subject to interpretation. Whereas in England, similar procedures was followed even before this regulation within the framework of negotiated dialogue, in Denmark authorities has shown more caution and most PPP projects has been procured through traditional open or restricted procedures.

The competitive dialogue procedure is especially mentioned in the directive as a possibility for the provision of long term infrastructure contracts, such as procurement of waste treatment facilities (EC 2004b). These specific contract

types originated in the UK with the PFI scheme in the early 1990s (Weihe 2008). Their contract design varies from traditional construction contracts in terms of especially finance, ownership and risk sharing. Rather than the public authority paying a private contractor out front for the construction of a pre-designed facility, the authority contract out a bundle of tasks, such as design, construction, finance and operation of a facility in a period of 20-30 years. In this timeframe, the risk of for instance technology and maintenance of facilities are transferred to the project company, whereas the authority pays instalments for 'usage' and then potentially takes over ownership of the facility, when the contract expires (Yescombe 2007). PFIs have primarily been seen as a mechanism of getting access to private funding to get around restrictions on public sector investments and reduce pressure on public sector budgets, but the PPP model has also been linked to a promise of increased 'value for money' and innovative solutions through private sector involvement (Hodge and Greve 2013).

Whereas long-term infrastructure PPPs has largely dominated the PPP debate (Weihe 2008), PPPs for service delivery has taken a less prominent role. Compared to the former, these tend to be more short-term contracts involving relatively minor private investments. Service PPPs often involve a complex bundle of tasks, which is managed through close interaction and dialogue between the partners in a 'spirit of partnership'. Because of the complex and changeable nature of tasks, service PPPs tend to have more loosely defined specifications to allow for flexibility (Domberger and Fernandez 1999). Waste collection has often been used as the prime example of a standardized service with possibilities for economies of scale, which might easily be contracted out (Bennett and Johnson 1980, Savas 2000). However, the political pressure for continuous improvements and the increased complexity of recycling services might challenge this perception

and point towards a potential benefit from a more 'relational' form of contracting (Walls 2005).

Accordingly, PPPs are formed through a process from the pre-contract phase of contract preparation and procurement that leads to the final contract design, which frames a new post-contract phase. As we will return to, these phases might provide various possibilities for social coordination (Lowndes and Skelcher 1998, Ysa 2010) and hence lead to various innovation strategies. For instance, the possibilities for innovation in the pre-contract phase might depend upon the choice of a more or less hierarchical procurement procedure. Before we continue down this line, we need to take a closer look on the concept of innovation.

Defining innovation

Innovation is *a creative process of developing new ideas to change existing practices in a specific setting and also involves the implementation and diffusion of these ideas* (Mulgan and Albury 2003, Walker 2006, Van de Ven et al 2008). Rather than ideas 'grabbed out of thin air', innovations are often described as piecemeal solutions, where old ideas are connected and re-used in new contexts (Rogers 2003). As Stark (2009) emphasizes, most innovative ideas are not just out there waiting to be found, but needs to be generated in a '*curious cognitive function of recognizing what is not yet formulated as a category*" (p.4). Innovations may occur from a number of sources, such as inspiration from good practice in other settings, top-down external pressures for change, or experienced challenges in the current setting bottom-up (Walker 2006). To provide a bottom-up example, a group of Danish engineers in a private company came up with the idea to transfer and adapt the concept of electric passenger cars to the waste management sector, formed a new company and engaged in a dialogue with actors

in the field to develop a new product category, a hybrid collection vehicle, which was implemented in a number of Danish municipalities.

According to Osborne and Brown (2011), innovation theory has originally focused private sector production processes, and thus innovation has been understood as new products or production processes. However, this does not necessarily capture the nature of service innovations. Service innovations often combine the implementation of new products and technologies with changes in the organization and processes of service delivery. It is also important to remember that service innovations take place in a political and institutional context (Osborne and Brown 2011). In the public sector, innovations are directed at producing 'public value' (rather than surplus value) and are often framed by new political strategies, languages and concepts creating a demand for change (Hartley 2005). Even more encompassing, Moore and Hartley (2008) introduced the concept of 'governance innovation' involving not only specific service changes, but changes in the "*ways in which productive activity is financed (or more broadly, resourced), the processes that are used to decide what will be produced, and the normative standards used to evaluate the performance*" (p.4). Accordingly, the PPP in itself might be considered a governance innovation, which frames the specific service delivery (Ysa et al 2013, Hodge and Greve 2007). Accordingly, although history reveals a long history of public-private cooperation (Wettenhall 2010), the implementation of a PPP in a specific local or national context or the specific design of the PPP can be considered innovative.

PPPs can also be more or less ambitious considering the scale of innovation. Innovations might be more radical, such as the hybrid waste collection vehicles, but also smaller and more incremental innovations – such as a new electronic registration system for bin collections - might provide important contributions to improving the quality of waste management services (Albury 2005). Furthermore,

Hartley (2005) emphasizes the importance of diffusion of innovation. In a public sector context with less competitive edge between organizations, diffusion of already tested solutions might be equally important to produce public value as the continuous development of 'new to the world' innovations (Hartley 2005). A good example could be the diffusion of split-bodied bins for collection of recycled materials. Rather than developing their 'own' solution, many municipalities adopt this solution from other authorities, but it anyways affects services for local citizens – whether they see this as a positive or negative service change (Osborne and Brown 2011). In the next section, we will look into the mix of strategies for producing innovation in (or as) PPPs.

Hierarchy, competition and network as innovation strategies

The relationships between public and private sector actors in PPPs might be related to at least three forms of social coordination: hierarchy, market and network. Adding to the traditional dichotomy of markets and hierarchies (Coase 1937, Williamsen 1975, 1985), the network term as a 'third wheel' of coordination was consolidated during the 1990s (Kooiman 1993, Rhodes 1996, Kickert et al 1997, Jessop 1998). Whereas in theory these three archetypes might be separated, they are closely interrelated in most real-life cases (Bradach & Eccles 1991, Rhodes 1997). The mixing of governing strategies in PPPs might be connected to two public management reform movements, New Public Management (NPM) and Networked Governance (NG), which have challenged traditional hierarchical administration and – in different ways - emphasized the need involve private sector actors to innovate public organizations and services (Klijn 2010, Sørensen 2012). Although these innovation strategies might be linked to different time periods, they might also be seen as competing or supplementary as they co-exist with traditional public administrative practices as 'layered realities for politicians and public managers' (Hartley 2005, p.29).

Hierarchical governing is often connected to the public bureaucracy and the idea of neutral, rule abiding public servants implementing ideas developed at the political level (Frances et al 1991). Bureaucracies has been criticized for being ineffective, slow moving and rigidly rule-bound and for being risk averse in fear of political failure. Conversely, although this critique might resonance to some degree, investigations of innovation in the public sector have shown numerous examples of innovative programs and concepts for service delivery (Borins 1998, Albury 2005, Sørensen and Torfing 2011). Accordingly, hierarchy might embody its own governing strategy for innovation. As Hartley (2005) describes: "*The role of policy-makers in this approach to innovation is to act as commanders – creating legislation and then support for whole scale changes, while assuming that the detailed work of implementation will be carried out by officials*" (p.30). As policy instruments, PPPs are subject to political command and control of hierarchical organizations. Hence the political level of ambition towards innovation might to a large degree be set by the public sector as legislators and purchasers of PPPs. Furthermore, PPPs might also establish rather bureaucratic structures between public and private actors in the contracts to regulate implementation of for instance innovation.

In the critiques of the heavy administrative bureaucracy in the public sector, politicians and public managers in the beginning of the 1980s increasingly looked to the private sector *competitive markets* as an ideal alternative. New Public Management (NPM) reforms demanded implementation of market-like structures in the public sector through a separation of policy (steering) from implementation (rowing) (Osborne and Gabler 1992). Public organizations should leave most of the 'rowing' to private or voluntary organizations at competitive markets or in arms' length organizations at safe distance from bureaucratic home organizations (Hood 1991). Thus the NPM strategy for innovation was to install competition and

market-based incentives in the public sector to motivate actors into developing innovative processes and services in order to gain 'competitive advantage' (Sørensen 2012). This demanded new managerial competencies from public administrators, who needed to 'manage markets' through demand and performance monitoring in order to achieve the most efficient solutions (Hartley 2005, Domberger and Fernandez). As variants of contracting out often established in arm's length of home organizations, PPPs are clearly linked to the NPM reforms and ideas of market competition (Klijn 2010).

Networked governance has increasingly been seen as an alternative to hierarchy and markets. According to this stream of research, the fragmentation of the public sector by NPM reforms as well as the rise of new, complex policy problems have led to an increased need for coordination through the establishment of inter-organizational networks between mutually dependent actors in society (Rhodes 1996, Kickert el al 1997). Compared to hierarchical command and control and competitive markets, networks are coordinated through collaboration and trust (Frances et al 1991). Network theory emphasises the importance of institutional and managerial strategies to achieve good outcomes. The network manager leads and enables processes and outcomes by connecting actors, arranging structures for interaction, establishing process rules and searching for new solutions (Hartley 2005, Steijn et al 2011). The idea is that the framing and facilitation of interaction between actors with various resources, competences and ideas should enhance the public sectors ability to develop innovative solutions to solve complex, societal problems (Sørensen 2012). This might be linked to the idea of 'collaborative advantages' (Huxham 1996) emerging from synergies developed through close interactions between actors. Thus PPPs might be seen as a special kind of highly institutionalized network that frames collaboration between public and private

actors in order to facilitate co-production of innovative solutions (Klijn 2010, Steijn et al 2011).

Table 1 summarizes the various innovation strategies and associated public manager roles from hierarchy, competition and network.

Table 1: The innovation strategies of hierarchy, market and network

	Innovation strategy	**Public manager role**
Hierarchy	New political objectives are implemented through administrative command and control	Administrator (implementing)
Market	Competition between private providers incentivize them to deliver more efficient and effective public services	Market manager (demanding, incentivizing, monitoring)
Network	Collaboration between mutual dependent public and private actors with various resources, competences and ideas lead to new and better solutions to complex societal problems	Network manager (leading, enabling, searching)

Source: see Hartley 2005, p.29

Mixing market, network and hierarchy

The mixed hierarchical, competitive and networked coordination in PPPs might be both beneficial and challenging. On the positive side, market competition might provide external pressure for the cooperation partners to agree and move forward, whereas collaboration might provide the resources for development of innovation fused by the competitive pressure (Sørensen 2012). On the other hand, experiences

from urban regeneration partnerships show that a competitive environment, where partners need to consider their own survival as organizations, may create tensions in co-operations (Lowndes and Skelcher 1998). The idea of public and private organization collaborating closely towards a common goal might also lead public organisations to overlook private objectives of economic surplus and consequently become a source of conflicts and confusion.

Hierarchical command and control might provide direction of the collaboration towards the creation of public value and secure clear divisions of roles and responsibilities. On the other hand, hierarchy might also challenge the effect of competition and collaboration. According to Greve (2010), businesses have complained that public procurement processes restrain them from proposing innovative solutions, unless this is specifically outlined in the procurement material from the public authority. These mixes of mutually beneficial or restraining coordination and innovation strategies might change over the PPP process (Lowndes and Skelcher 1998). The next sections will investigate how these dynamic mixes develop in practice in the four cases of waste management PPPs. First, the article will provide a presentation of the design of the comparative case study.

The comparative case study

The analytic design is an embedded, comparative case study of four waste management PPPs in England and Denmark (Peters 1998, Yin 2009). Within a common European legislative framework, both countries are pressured to change practices to deliver more environmental sustainable solutions by an EU target on 50% recycling in 2020. Furthermore, these countries share a relatively high inclusion of private sector organizations in waste management services compared to other EU countries (Dijkgraf and Gradus 2008). In England, around 50% of

waste collection services are contracted out to private companies, whereas almost all treatment services are privately provisioned (OFT 2006). In Denmark, at least 80% of collection services are contracted out, whereas most treatment services are provided by municipally owned companies and private companies deliver pre-treatment of recycling (Grønnegård Christensen 2001, EPA 2011).

Whereas in England many of these contracts have been arranged as PPPs, Denmark has only recently seen a few PPPs in waste collection and one in a very early stage in waste treatment. From each country, a PPP in waste collection and in waste treatment has been selected. The cases are selected on a background of 43 qualitative interviews with public and private waste managers and experts approximately equally spread between Denmark and England. The interviews were used to map the variety of waste management PPPs and achieve in-depth information on innovation processes in PPPs. There were two main case selection criteria: 1, The PPPs should have an element of 'partnership' rather than being purely adversarial, and 2, the partnerships should be seen as innovative in the broader waste management community. As such, these cases were chosen for an analytical purpose in a replication design investigating the theoretical framework in a variety of cases across countries and PPP types, rather than necessarily being samples of typical waste PPPs (Yin 2009). The selected cases are presented in *Table 2*.

In England, the partnership contract on waste collection and street cleansing between the Royal Borough of Kensington and Chelsea (RBKC) in the London Area and Sita UK was mentioned several times in interviews as an example of a partnership contract that did not just talk about partnership, but was really a partnership relationship. This case did not have the most sustainable system of waste collection, but displayed continuous innovation effort in the contract period.

In waste treatment, a pilot interview with Greater Manchester Waste Disposal Authority (GMWDA) in relation to a research seminar at Manchester University exposed their PFI joint venture contract with the private consortium Viridor Laing ltd. as an interesting case in at least two ways. First, the public manager described the management of their relationship in partnership terms, and second, the contractual arrangement was in itself innovative and they had implemented political goals and incentives in the contract to improve recycling.

Table 2: Presentation of the four cases in the embedded, comparative case study

	England		**Denmark**	
	Waste collection	**Waste treatment**	**Waste collection**	**Waste treatment**
Public organization	Royal Borough of Kensington and Chelsea (RBKC)	Greater Manchester Waste Authority (GMWDA)	Renosyd i/s	Vejle Waste and Recycling (VWR)
- Population	159,000	2,3 million	80,000	110,000
- Households	85,000	1,000,000	32,000	47,000
Private contractor	Sita UK Limited	Viridor Laing (Greater Manchester) Limited (VLGM Ltd.)	Marius Pedersen A/S	Marius Pedersen A/S/ ?
Contract type	Partnership Contract	Joint Venture Contract	Service Partnership Contract	Innovation Partnership/ Joint Venture Contract

Tasks included	Collection (residual/recycling) and street cleansing	DBFO (Design, Build, Finance, Operate) + communication and education services	Collection (residual/(packaging))	DBFO (Design, build, finance, operate) + administrative and service tasks
Waste amounts	Approx. 90,000 tons municipal waste/ year	Approx. 1,1 million tons municipal waste per year	Approx. 1,300 tons packaging waste and 17,600 tons residual waste	Expected approx. 60-80,000 tons municipal waste per year
Contract period	1st April 2005 – 31st March 2021 (16 years)	1st April 2009 – 31st March 2034 (25 years)	1st September 2008 – 30th April 2013 (5 years)	Innovation Partnership: January – March 2013 Call for tender in July 2013 (20 years)
Contract price	Approx. £12 million in annual value	Approx. £3,8 billion (£631 mill construction costs)	Approx. 16 million DKK in annual value (≈ £1,7 million)	Expected approx. 20-40 mill DKK capital costs + 180-250 mill DKK construction costs (≈ £2,1-4,3 mill + £19,2-26,7 mill)

Sources: RBKC 2004, Census 2011, letsrecycle.com 2005, GMWDA 2014a, Renosyd 2012, p.31, VWR 2014, Rønne & Lundgren 2013B, udbud.dk 2013

In Denmark, the service partnership contract between the publicly owned company Renosyd and Marius Pedersen A/S was the first contract of this kind in waste collection. The choice of this organizational form was directly related to the public organizations aim of achieving a more productive and less adversarial relationship with a private contractor. Compared to an almost parallel example of a similar service partnership contract, Renosyd chose to change their collection system within the contract period. In waste treatment, there is only one example of a PPP in Vejle Municipality, which for the first time in Denmark aims to create a closer collaboration with a private company in a joint venture PPP with the aim of providing both an innovative service delivery arrangement and new technology for mechanical sorting of recyclables. This PPP has not reached beyond the procurement process, which limits comparability, but on the other hand provides a unique, detailed inside to the pre-contract period that is fresh in mind of the interviewed managers.

In all cases, qualitative semi-structured interviews were conducted with public and private managers involved in the PPP and additional material such as procurement documents, contracts and waste strategies were collected. The respondents were asked to describe the aim and organization of the PPP, the public-private relationship and the process of the PPP with an emphasis on their experience of possibilities and limitations for innovation, hereunder the contributions and capacities of public and private actors. They were also asked to provide specific examples of innovations, which made it possible to compare the degree of innovation towards general developments in the sector. The interviews were recorded, transcribed and analysed in an iterative process between theoretical concepts and empirical data. For example, a third category of hierarchy was added to market competition and networked collaboration as the importance of hierarchical governing in innovation processes emerged from the data.

Case studies of waste management PPPs

In both England and Denmark waste management is delegated to local authorities. In Denmark the 98 Danish municipalities are responsible for collection, treatment and disposal of municipal waste, whereas in England the responsibility is shared between Waste Collection Authorities (WCAs) and Waste Disposal Authorities (WDAs). Following critiques of the fragmentation of this system, a number of English authorities were joined in Unitary Authorities (UAs). There are approximately 273 WCAs, 40 WDAs and 81 UAs (OFT 2006). Instead of creating a single organization, many English authorities have solved the issue of coordination between layers by forming various partnership arrangements. Eventually, the Waste and Emissions Trading Act from 2003 made the development of 'Joint Municipal Waste Management Strategies (JMWMS) between WCAs and WDAs mandatory (Slater et al. 2007). Also in Denmark, many local authorities have chosen to coordinate waste management services, especially regarding treatment facilities, and usually by establishing joint public companies (Grønnegård Christensen 2001). Compared to the English case, these are all voluntary activities.

In the following sections, we will investigate the mix of coordination and innovation strategies applied in the four cases from the pre-contract phase, to the contract design and the post-contract phase to see how these might have affected the development of innovative outcomes.

Case 1: The 'Partnership Contract' between the Royal Borough of Kensington and Chelsea and Sita UK Ltd., England

The Royal Borough of Kensington and Chelsea (RBKC) is a waste collection authority in the London Area of England. The borough is one of the smallest and the most densely populated in England with more than 158,000 citizens and 85,000 households (Census 2011). The RBKC is one of four constituent boroughs

to the Western Riverside Waste Authority (WRWA), which is also responsible for waste disposal from the London Borough of Hammersmith and Fullham, the London Borough of Lambeth and the London Borough of Wandsworth. The WRWA is governed by a council of two representatives from each borough. Together, these five authorities have joined in the Western Riverside Partnership (WRP) and have developed a JMWMS according to national regulations (JMWMS 2006). Accordingly, waste collection in the borough needs to be coordinated with the other boroughs and the WRWA to feed into the provided treatment facilities.

Waste collection and street cleansing in the borough is contracted out to Sita UK Limited in a 16 years 'partnership contract' from 1st April 2005 – 31st March 2021. Within the contract, Sita has continued the collection of residual waste and mixed recycling (paper, card, glass, plastics) from bags and blue bins transported in split-bodied compaction vehicles. The contract includes collection of around 90,000 tons of municipal waste, consisting of approximately 53,000 tons of household waste, 6,000 tons of street litter and public institutions' waste and around 30,000 tons of commercial waste (RBKC 2004). The collected material is delivered at two transfer stations near the River Thames. From there, transport and treatment is organized through a 30 year recycling, treatment and disposal contract between the WRWA and Cory Environmental Limited in the period 5th October 2002 – 4th October 2032 (JMWMS 2006). Residual waste used to be shipped down the River Thames to a landfill site in Essex, but since February 2011 it has been delivered to a new Energy-from-Waste (EfW) incineration plant at Belvedere in the London Borough of Bexley constructed within the Cory contract. The contract also included the construction and operation of a new Mechanical Recycling Facility (MRF) receiving pre-sorted recyclables from the boroughs (WRWA 2008).

Pre-contract phase: Hierarchical coordination and a recycling challenge

As well as the coordination with the other boroughs, the RBKC has to take into account a hierarchy of waste management strategies from the EU and national strategies, to the Mayor of London's Municipal Waste Management Strategy (GLA 2003), the JMWMS (JMWMS 2006) and the borough's own Strategy and Action Plan (RBKC 2004). The UK government has prepared a gradual transformation to reach the EU targets by setting statutory targets for individual WCAs. Thus, the RBKC was expected to deliver 22% recycling in 2003/4 and 33% in 2005. Both the Mayors strategy and the JMWMS also underlined the need to focus on recycling rates (JMWMS 2006, GLA 2003). The government targets were seen as a huge challenge for the borough, who after a relatively intense effort in the previous contract (also with Sita), had increased recycling from 7,5% in 2002/3 (letsrecycle.com 2004) to 16,5% in 2003/4, but continued to recycle considerably below the target (RBKC 2004). The borough implemented a recycling collection scheme in bags to be co-collected with residual waste in split-bodied vehicles already in 1993, but has been challenged by a dense populated area with 83% of households living in flats, little storage space for waste and a high residence turnover (ibid., p.7, JMWMS 2006, p.25).

The specifications in the new collection and street cleansing contract were developed concurrently with the RBKC's Waste Plan and Strategy. The final results reflected the challenge of increasing recycling rates and results from consultations with citizens about aims and the waste industry about 'what service improvements could be delivered at a realistic price' (RBKC 2004, p.17). The plan stated that: '*[t]he council seeks two types of improvement in the performance of its contractor's recycling crews. The first is a higher rate of capture of recyclable material at the kerbside. The second is a lower rate of contamination of the collected recyclables*" (RBKC 2004, p.14). In line with citizen's wishes of an

‘unobtrusive’ service, the borough placed much focus on service quality, for instance by setting high standards for complaints management and short duration of waste bags piled on the streets (ibid.). They were also determined on having high standards of street cleanliness and planned to exceed national targets on this by far (RBKC 2004, p.5-7). As the contractor explains, in general, this borough is different from other boroughs, where focus is only on budget savings. In the RBKC, the ‘driver’ is quality rather than money (Sita interview, p.2).

Thus the aim was to find a contractor who would work continuously with the council to solve the recycling challenge and keep a high quality level of service. This involved having flexibility to make changes over the contract period. Hence the contract was output-based and tendered through a ‘negotiated process’, where the contract could be developed in dialogue and negotiation between the authority and potential bidders. In the beginning of 2005, the existing contractor Sita UK won the contract in front of several other bidders (letsrecycle.com 2005). As the Sita suggests, their winning might have been linked to their strong local knowledge and existing relationship with the borough: “*I think we probably had a slight advantage since we knew the borough inside out. I think there was a confidence that whatever the operational plan was it would be good. They knew they could trust that*” (Sita interview, p.5). Accordingly, the cooperation between the RBKC and Sita continued in an altered framework.

Contract design: Framing collaboration and innovation

The contract has several characteristics distinguishing it from traditional contracts. First, the general contract and supplementary documents was accompanied by a ‘partnership charter’, which established forums for joint working and co-production of innovation. The charter prescribe the establishment of a joint partnership board with equal representation from the organizations, the

establishment of innovation forums to jointly manage specific innovation projects, outlined a number of partnership duties and principles of day-to-day working and a setup of an open book system of accounting (RBKC 2005/2011). The formulations in the charter also specifically express network coordination ideas. For instance, it is stated that: "*The council and the contractor agree to work with each other cooperatively in partnership to discharge their responsibilities in relation to the services and to apply their respective special knowledge, skill and expertise, in accordance with the terms of the contract and this charter*" (RBKC 2005/2011: Partnership Charter, p.1). The partners commit to being innovative, proactive, ensure partnership, work in a 'no blame' culture and jointly evaluate the partnership (ibid, p.3). Second, although the contract includes a clause for arbitration, there are no punitive economic incentives for defaults. This signals a high level of trust to the contractor compared to most other contracts. Third, the contract secures the contractor an agreed profit, where after a profit sharing mechanism kicks in. The council may follow the contractors spending through the 'open book's system (private contract manager, p.4). In this way, the interests of both partners are acknowledged – the 'market' interest in an economic profit and the council's interest in transparency and securing against profit seeking on the expense of quality.

Besides the charter, there is a relatively large body of contract materials specifying the general terms in the partnership contract and the service specifications in the supplementary documents. The partnership contract in itself amounts to 53 pages describing the legal and managerial framework with 233 pages of supplementary specifications. The descriptions of waste collection and street cleansing are output-based, and much of the supplementary material is lists of equipment, streets, depots, etc., reflecting the complexity and practical nature of the contract (see Appendix 1). The formulation of collection services emphasize partnership

collaboration and expectations of a high degree of dialogue: "*The Contractor is required to work in very close partnership with the council to develop and adapt waste presentation and collection schedules that meet the council's policy requirements while also meeting the reasonable needs of householders and of commercial costumers*" (RBKC 2005/2011: Waste Collection, p.3). However, in line with the aims of increasing recycling, the contract also establishes several specific demands towards this goal. For instance the contractor shall deliver five recycling wardens to communicate with citizens, employ a 'Waste Reduction and Recycling Manager', ensure proper training of collection crew and introduce separation of recyclables from street litter (RBKC 2004, p.14).

Accordingly, although this contract has some bureaucratic features establishing legal and economic responsibilities and specific organizational features, it is designed to enable continuous service innovations within the contract period in collaboration between the partners.

Contract period: Collaboration and incremental innovation in practice

In the interviews, both authority and contractor expressed that the design of the contract framed the possibility for a more collaborative relationship between the partners. The contractor emphasized the uniqueness of the trust placed by the authority by not implementing the usual default mechanisms, and how this creates an open dialogue and aspiration for them to earn this trust:

> "It is definitely a partnership in the true sense of the word. There is not another contract in the in the UK industry like this one. You've got partnership contracts, but they will still have things like defaults mechanisms, so you will get fined for falling below standards. In this contract, there is nothing like that. (…) A lot of other contracts have not come across with this level of trust and partnership. We get things wrong, but we would never try to hide it. We would just say 'yes, we should have done that, but we didn't'. There are no financial penalties for that and

> the council will understand. We might get it wrong once, but we won't get it wrong twice. We will put it right and make sure that the right operational strategies are in place so that it does not happen again" (Sita interview, p. 2).

The strategic issues are dealt with at the partnership board meetings, but generally issues are dealt with at a lower level, which is made easy by the co-location of officers at various levels. According to RBKC, the close collaboration and good attitude of the contractor staff means that it is almost like running a DSO (in-house "Direct Service Organization"):

> "We have generic officers in each smaller area in the borough, taking on all of the responsibilities of monitoring etc. in one area. This means they are close to the contractor's teams out there, and they have a direct dialogue and often solve issues on the spot. You probably don't have to be co-located, but it helps a lot (…). [The contract managers] both have brilliant attitudes. They immediately work to find a solution, when there is a problem. If they find a problem, they will come into my office and tell me about it, and usually say how they have solved it as well"
>
> (RBKC interview, p.1-2).

This trusting relationship builds on the shared understanding of the each organizations purpose in the contract. As the RBKC explains:

> "Some authorities tries to squeeze the contractor to get as much out of them as possible, but our former director understood that the contractor needs a profit – a reasonable profit, not an extensive one. Because they are secured a profit in the contract, we have a better and more trusting environment" (RBKC interview, p.2).

From the other side, the contractor shows that the company understands the public authorities need for service improvements and cost savings. As the manager explains: "*The partnership is all about adapting to the changing needs of the Borough.(...) The borough wanted this flexibility to make changes in the service for whatever they needed to do*" (Sita interview, p.5-6). For example, when the council needed cost efficiencies and considered cutting down on collection rounds,

Sita UK developed a more efficient routine for twice a week collections with a two day gap that actually improved the service for citizens and secured the same profit margin for the contractor: "*We were able to do that, because there were trust there. We understood what they wanted, and they were talking openly to us and made sure we had everything we needed to make the change.*" (Sita interview, p.4)

The Innovation Forums in the contract were to begin with established as four groups with regular meetings, but the general manager proposed to change this as it did not bring that many ideas and took much time. Instead, everyone would be able to hand a suggestion note to the general manager, who would put this forward to the board. Within this framework, they have implemented several smaller innovations such as providing English lessons to foreign speaking workers or changing to smaller electric vehicles at the dense Portobello Market. At the time of the data collection, they were in a process of discussing what the next steps to improve recycling rates should be (interview, p. 6-7). By 2011, they had managed to increase recycling to almost 30% (RBKC 2014).

Table 3 summarizes the results of the case. The case shows how this partnership aimed at providing flexibility for continuous recycling according to hierarchical targets and did so through dialogues with citizens and the market followed by a competitive tender. The contract was designed to eliminate potential conflicts between public and private interests and provided some demands for specific initiatives towards recycling, but was basically based on the risk of trusting the other partner in a long-term relationship. The contract provided forums and principles for joint working and co-production of innovative solutions. These were used and adjusted during the contract phase through trust-based collaboration to develop and implement efficiency improvements and new ideas. In all phases,

managers mixed hierarchy, market and network in their strategies towards innovative solutions, although the pre-contract phase was mostly dominated by network management strategies.

Table 3: Results of Case 1

	Governing strategies for innovation in the RBKC – Sita UK Ltd. PPP
Pre-contract phase	- Adopting and coordinating political targets in a hierarchy of public authorities (hierarchy, network) - Competitive tendering for a 'partnership contract' for collection services through 'negotiated dialogue 'aimed to improve recycling and secure quality of services (market, hierarchy, network)
Contract design	- Mixing demands to increase recycling with output-based service specifications to allow continuous changes and private input (market, network, hierarchy) - Securing a profit for the private company to avoid incentives for profit seeking in expense of quality (market, hierarchy) - Establishing forums and principles for collaboration and co-production of innovation in a 'partnership charter' (network)
Post-contract phase	Developing and implementing solutions to hierarchically determined problems as well as new ideas based on efficiency or social gains through a close, trust-based dialogue, based on a mutual understanding of the needs of each organization (network, hierarchy, market)

Case 2: The PFI joint venture contract between Greater Manchester Waste Authority and Viridor Laing (GM) Ltd., England

The Greater Manchester Waste Disposal Authority (GMWDA) was created in 1986 as a WDA for nine district councils, Bolton, Bury, Manchester City, Oldham, Rochdale, Salford, Stockport, Tameside and Trafford, situated in the North West of England. As the biggest WDA in England, they are responsible for the disposal of 1,1 million tonnes of waste produced by the more than 1 million households (GMWDA 2014b). In April 2009, the authority signed a 25-year PFI

contract with the private consortium Viridor Laing (Greater Manchester) Limited (VLGM) for the design, build, (partly) finance and operation of a network of waste management facilities in the area. VLGM is a joint venture between Viridor Waste, a subsidiary of Pennon Group PLC, and the investment company John Laing PLC. The £3,8 billion contract involved a construction programme of £631 million financed through a mix of private investment and loans from a range of financial institutions, £124,5 million of PFI credits from the government and a capital injection from the GMWDA itself (GMWDA 2012).

The new facilities would include 5 Mechanical-Biological Treatment (MBT) plants (4 with Anaerobic Digestion (AD)), 4 In Vessel Composting (IVC) plants, 1 Materials Recovery Facility (MRF), 1 EfW incineration facility, 2 green waste shredding facilities, 1 Combined Heat and Power (CHP) station, 7 transfer stations, 21 household recycling centres and 4 education centres. The CHP station would be delivered through a separate Special Purpose Vehicle (SPV) with the chemical producer company Ineos Chlor, which effectively would solve the problem of off take for the residual Refused Derived Fuel (RDF) from the MBT plants (GMWDA 2014a).

Pre-contract phase: Mobilizing support, negotiating with the market and setting political targets

The PFI contract followed a long process, 7 years in total, of setting political targets, investigating and negotiating technological and market possibilities and mobilizing support and coordinating action with district councils and planning authorities. Prior to this contract, the authority managed a Local Authority Waste Disposal Company (LAWDC), which operated a number of waste sorting and transfer facilities and a thermal recovery facility. In 2002/3, almost 90% of municipal waste was sent to landfill, whereas only 7% was recycled (GMWDA

2004, p.10, GMWDA 2012). Hence from 2002-2004 the authorities went through a process of setting targets and exploring various options. They decided on a strategy of 'maximising recycling and minimising landfill', which were formulated in political targets of 50% recycling in 2015 and 75% diversion from landfilling. The authorities formed a joint strategy and consolidated their collaboration in a Memorandum Of Understanding (MOU) in 2004 to have a starting point for the invitation to tender in October 2005 (GMWDA 2004, MOU 2004).

In this process, the GMWDA arranged study tours and technology site visits around Europe for local politicians and planning authorities to investigate and familiarize people with potential technologies and started a dialogue with the waste market (GMWDA interview 2, p.3-4). They were not in doubt about the basic form of contracting, since a PFI contract was 'the only game in town' to achieve the necessary funding (GMWDA interview 1, p.2). To get something more than the standard solution, this meant that they needed to engage in a dialogue with the market. Most of the private companies they talked to in the beginning had suggested a large EfW incineration led approach. However, this was a politically unpopular solution, and although the tender was open regarding technologies, the authorities strongly signalled that they were mainly interested in more 'innovative technologies' such as Mechanical-Biological Treatment (MBT) for residual waste (GMWDA 2004). According to GMWDA, this provided a tension to the private sector needing to secure funding: "*Lenders do not like innovation. They want something proven. They want facilities that have dealt with similar waste at a similar scale for at least two years with proven track records so they have a degree of comfort in that their investment is safe*" (interview 2, p. 1).

In 2005, four bidders were invited to provide final tenders in a 'negotiated' process structured very much alike the new 'competitive dialogue' process. They ended up with a compromise - an integrated solution with proven technology, but where the combination of technologies at that scale was new in a UK context. As GMWDA explained: "*What the market said that they could do might have been half way up what we wanted, and we ended up with something in between. But we needed to push the market in order to get what we wanted*" (Interview 1, p.2). Accordingly, rather than 'cooperative', this process was described as 'hard-nosed", adversarial negotiation:

> "Those four years was a very tense process with a lot of debate, discussion and arguments. We wanted the contractor to take all of the risks. They wanted us to take some of it. It can become a quite adversarial process, where each side got their legal team. And lawyers do not understand partnership working or compromises" (GMWDA interview 2, p.14).

As the final solution began to emerge, the Authority also spent much time trying to convince the WCAs to align collection methods to fit the new facilities:

> "I think one of the biggest challenges was that we have nine waste collection authorities to serve, and every one of them were collecting in a different way - different materials and streams - and they all had their own arrangements for off-take of recyclable materials. So we needed to look at how they collected and try to uniform it across the place and convince them to make investments in different bins, new vehicles, new ways of collecting" (GMWDA interview 2, p.3).

They agreed upon a four-string collection system (green waste with food, paper, card and Tetra Pak, co-mingled dry recyclables (glass, bottles, cans) and mixed residual waste), which was also relatively innovative in a UK context, where most authorities had a mixed recycling bin and a paper bin (GMWDA interview 1, p.2).

VLGM was selected as the preferred bidder in January 2007 and signed the contract in 2009 following financial challenges relating to the global financial and economic crisis (GMWDA 2012). The integrated and flexible solution suggested by VLGM suited the political targets of the authority, and VLGM had managed to solve the largest challenges with MBT by securing an RDF outlet. Accordingly, the innovative PPP organization and output was grounded in the pre-contract phase in a mixed process of coordination, mobilization and negotiation with constituent councils and market actors.

Contract design: Economic incentives for innovation and a hierarchical framework for cooperation

The negotiated, output-based contract was designed to create economic incentives for all actors involved to follow the GMWDAs sustainability objectives. Thus the targets of 50% recycling and 75% diversion of landfill were implemented as performance targets to guide the cooperation with an economic bonus to the contractor for exceeding these targets and a penalty for not meeting them. The contractor was also provided a fixed profit margin to provide 'cushion' for investments and for taking on technology, construction and operational risks (interview 1, p.3). This design aimed to solve potential conflicting interests. As GMWDA explained:

> "From our perspective, we need to save money, and from the contractors' perspective, they are looking to maximize revenues. (…) There is a tension. But the way that the contract works is that the cost of landfill is passed through to us, so when Viridor Laing successfully manages to increase diversion from landfill, we will make a saving. And if they increase it further they will get into bonus territory. So everybody would win from this" (GMWDA interview 2, p.15).

The contract specified the organization of the joint venture, which was to be organized in a rather complex, hierarchical structure with several interfaces for

coordination across the involved organizations. Between the Authority and VLGM, a high/level strategic partnership board would meet quarterly to monitor the contract performance and decide on major strategic issues, communications strategies etc. A partnership management board, where WCAs are also represented, would manage the general contract, whereas a number of service delivery groups could be delegated specific responsibilities. Between the WDA and WCAs, an operational group and a strategic officer group should look into cross-organizational issues of collection services. At the contractor end, Viridor Waste was responsible for operational issues and delegated construction of the plants to various subcontractors, whereas sales of recyclables were to be managed by the Viridor sub-company Viridor Resources Management (GMWDA interview 2, p.5). As mentioned, VLGM also had a separate contract with a joint venture between Ineos Chlor, Viridor and John Laing Investment plc for the construction and operation of a thermal power station producing energy to Ineos Chlor's production processes from the RDF (VLGM interview, p.21).

The complex, hierarchical organization might be said to form a rather bureaucratic framework for the continued cooperation. However, this was seen by the contractor and authority as necessary in order to provide interfaces for coordination and explained as important to implement all these large-scale changes across a number of organizations (interview 2). The contract itself was a comprehensive document with 529 pages of legal text supplemented by a number of schedules and specifications. The contract outlined the organization, procedures and the division of risks and responsibilities, such procedures of site supply and planning permission, procedures for the development of a revised project plan, and consequences and procedures for potential failings of implementation. Including all the specifications and background documents the material amounts to more than 9,506 pages (GMWDA 2009, see Annex 3). Although the 7,726 pages of this

material are environmental reports on facilities, this is a large amount of material to be considered. However, this was also a complex contract, involving large economic investments and technology risks and several organizations (see also *Table 2).*

Post-contract phase: From negotiation to partnership working

From the signing of the contract, the PFI entered into a new phase. From the hard-nosed negotiation in the procurement process, the partners needed to re-build relationships and develop a new way of cooperating:

> "By the time we signed the contract, we were quite fed up with each other. Then we had to draw a line under that put all the argument, negotiation and discussion behind us, and figure out how to make things work in practice. During the next 6-9 months we worked at re-building and re-establishing relationships and partnership working started again" (GMWDA interview 2, p.14)

VLGM emphasized that this kind of partnership working was important to make the PFI work, but also that it was not always easy in practice and demanded hard work:

> "*The most important element of how this work is partnership. The word really implies something pleasant, in working together, but partnerships do not always have that starting point. It is about working hard at being a partner. (...) I would say that if you entered into this hoping to 'make a buck' or 'beat someone up', then it would have fallen a long time ago. This was very complex, quite substantial, and there was a lot at stake – and still is in some ways. Its failure could have been very quick. But it did not fail - because we worked hard on it.*" (VLGM interview, p.13)

Supplementing this, the public director underlined that what made this a partnership was not a problem-free relationship, but the way that difficulties were handled between the partners:

> "Relationship management is the biggest part of the contract. You have to accept that this is a huge contract, it is long term and nothing is going to run smoothly in the duration of that. For me, what defines a partnership, is accepting that yes, you're going to have problems, but it is about the way you resolve them and get over them and make things work. If both parties are prepared to do that, then it is a partnership." (GMWDA interview 2, p.13)

An example of close partnership working in the contract period leading to innovative results is the work in the service delivery group on communication. The communication group consisted of employees from both organizations and was co-located at one of the education centres headed by a public officer. This organization was decided upon within the contract period, since the output-based contract did not specify this in detail. As the contractor explains: "*What the contract says is fairly dry legal words that 'you will have a prevention programme in place', but it doesn't prescribe how you are supposed to do that. That had to be developed over time.*" (GMWDA interview 2, p.8) Guided by a jointly developed five years communication plan, the communication team developed and implemented various innovative campaigns towards prevention of waste, such as a 'recycling fashion show' or a cooking event with leftover food waste.

The contract seemed to be heading towards the targets. The preparatory work of including planning authorities early secured the partners a smooth planning process, which compared to challenges in other waste infrastructure projects, was a great achievement (GMWDA interview 2, p. 4). By February 2014, recycling had increased to 44% and landfill diversion to 56%. The two final plants should be in operation by 2014/15 to hopefully increase these numbers (GMWDA 2014c). During the planning and construction process, the contractor had discovered a possibility for increasing recycling and diversion from landfill beyond the targets,

and consequently the partners chose to upgrade targets towards 60% recycling and 90 % diversion (interview 2, p.8-9).

Table 4 summarizes the results of the case. The main ground for the innovative organizational form and output was formed in the pre-contract phase, where the GMWDA discussed and negotiated solutions with the WCAs and actors at the waste market on the basis of – and during – the coordination of political targets for the contract. In this period, especially their role as enabling network coordinator and market manager was needed, although the establishment of hierarchically decided political targets was a prerequisite for this process. Likewise, the contract design reflected various governing strategies. Targets were implemented through an output-based contract supported by economic incentives (market), which established detailed procedures for cooperation, risk sharing and responsibilities and outlined a hierarchical organization (hierarchy) with several interfaces for joint working (network). Within the contract period, the contract through joint working, where new ideas were developed and targets were improved with mutual gains.

Table 4: Results of Case 2

	Governing strategies for innovation in the GMWDA - VLGM PPP
Pre-contract phase	- Adopting, coordinating and determining political targets in cooperation with WCAs (hierarchy, network) - Competitive tendering for new waste facilities through 'networked' coordination and negotiation with WCAs and dialogue, negotiation and knowledge exchange with market actors pushing them towards innovative solutions (market, hierarchy, network)
Contract design	- Having an output-based contract based on political targets to allow market efficiencies and ideas and cooperation on the implementation process (market, network, hierarchy)

	- Securing the contractor a profit for risk taking and providing economic incentives for exceeding targets and a penalty for not meeting them (market, hierarchy) - Establish a hierarchical 'organization' of forums for joint working (network, hierarchy)
Post-contract phase	Developing a partnership relationship by making things work in practice within the contract framework (network, hierarchy) Developing innovative ideas in joint working arrangements (network) Creating efficiencies to exceed the targets on the background of the economic incentive system creating mutual gains (market, hierarchy, network)

Case 3: The 'Service Partnership' between Renosyd i/s and Marius Pedersen A/S, Denmark

Renosyd i/s is a public interest company owned by Skanderborg Municipality and Odder Municipality in the Mid Jutland area. They have been delegated the operational responsibility for collection and treatment of household waste in the municipalities directed by a board with five members from Skanderborg and three members from the smaller Odder Municipality. As the first public organization in Denmark, they have contracted out the collection of residual waste in a 'service partnership' contract. They entered into a 5-year contract with a two-year extension option (5+2) with Marius Pedersen A/S from 1st September 2008 until 30 April 2013. The contract amounted to around 16 million DKK per year for the provision of collection services for approx. 33,000 households. Within the contract period, the service was expanded with a new collection service of mixed packaging waste in a separate 'resource bin'. This material has temporarily been delivered to a sorting plant in Vojens, but Renosyd has been in dialogue with other municipalities and public companies on having their own sorting plant constructed in the area. Renosyd also has an in-house collection of paper, garden waste and

bulky waste. The public company owns and operates a number of household recycling stations, a controlled deposit and a CHP incineration plant, which is connected to the local district heating system.

Pre-contract: A former adverse relationship and expectations of service changes

The idea to the service partnership was developed on the background of a problematic contract period with another contractor. As Renosyd explains, they realized through a scrutinizing process that perhaps the problem was not simply that the contractor did not perform well, but rather that the contract did not provide the right framework for the cooperation. They gathered inspiration to this new contract form from a consultant with experience from PPPs in the construction industry:

> "When we were done criticizing each other, we realized that they really only did what our contract asked them to. The contract did not focus on delivering good quality services to citizens, but only on transporting waste from A to B. That was not good enough. So we created a working group including an external consultant with experience from partnership working in the construction sector and tried to figure out what to do now" (Renosyd interview, p.3).

Furthermore, Renosyd was in a process of changing their collection systems, which they would need to do within the next contract period. Like the English authorities, Renosyd was pressured by the EU recycling targets and demands to increase recycling, but in contrast diversion from landfill was already secured through incineration. Furthermore, national regulation demanded municipalities to establish collection systems for plastic and metal waste. Renosyd's 'Waste Plan 2010-2012' showed that the two municipalities were far from recycling targets on especially plastics (2%) and metal (11%), which at that time were collected through household recycle stations. Hence the plan, which was finalized within the

contract period, prescribed a change from residual waste collection once a week in traditional bags, to residual waste in a regular bin and packaging waste (metal, glass, plastics) in a split-bodied bin collected every fortnight. This idea was adopted and adjusted from Aabenraa Municipality, who had implemented a similar system (Renosyd 2010/11).

Besides the possibility of changing service specification in the contract period, Renosyd also attempted to secure their right to implement these changes by noting them in procurement material. The contract was tendered through a process of restricted procurement with pre-qualification, which did not provide more dialogue than any traditional procurement process. Hence the organizational form and potential changes were in this case directed from public demand. However, the tender also involved the possibility for a traditional contract in case the market would not be ready for this new contract model (Renosyd 2008). Whereas the traditional procurement material involved a detailed specification of the collection procedure, the service partnership contract described this as guidelines, which could be altered in dialogue between the partners (Renosyd 2008). In that way, Renosyd opened for flexibility to innovate services in the contract period rather than in the procurement period. Three private companies applied for and were approved pre-qualification, where after Renosyd selected a service partnership with Marius Pedersen as the most economically advantageous tender.

Contract design: Economic incentives and risk sharing

Resembling the RBKC contract, this contract was framed by a 'partnering agreement' and a 'partnership charter' establishing the aims and values for the cooperation. This agreement stated that the partners would solve service tasks in an open, collaborative relationship, reaching qualitative an economic objectives through an efficient and instructive process, where both parties would contribute

to a positive, constructive and goal-oriented cooperation and ensure the development of a good 'collaboration spirit' based on openness, honesty and mutual respect (Renosyd 2008: Aftale om servicepartnerskab, p.1). The agreement also established two hierarchical organized forums for joint working to steer the partnership: a strategic oriented 'steering group' and an operational oriented 'project group'. The partnership was to start up with a workshop that would include members of collection staff to 'ground' the partnership idea in the organizations (ibid., p. 3-4).

This framework were combined with a market-inspired 'dynamic budget model', which was created in the pre-procurement phase. The model provided a sharing of costs and benefits to incentivize continuous efficiencies, but also delegated penalties to the contractor if the work was not satisfactory. Thus if the contractor was to exceed the acceptable level of 'mistakes', he would pay retribution, whereas if the contractor did exceed this level, extra costs or savings would be shared between the partners (Renosyd 2008: Betingelser og målsætninger, servicepartnerskab). The contractor experienced the contract model as 'refreshing' in comparison to the traditional contracting out in waste services, which they felt tended to become less and less fair with cumulative demands and less gains to the private contractor: "*We had experienced a period where demands continuously grew until we thought we were about to reach the limit of unfairness. And then, this whole new way of looking at this arrives. A new consultant, we had not seen before. It was very refreshing. The language, the approach, the formulation of the collaborative spirit, attitude and values – a whole new category of concepts was applied.*" (MP interview, p.11)

The contract material amounted to a little more than 100 pages including material for the two various contract models, which in comparison to the English contracts

was moderate. However, the service tasks and organisation were also simpler and thus easier to describe with smaller investments for both parties (see Appendix 2). Compared to the GMWDA contract, targets for recycling are not incorporated in this contract, although they might be steering the partnership indirectly.

Post-contract phase: Service innovation and organizational integration

According to both the contractor and Renosyd, the contract succeeded in framing a much more collaborative relationship. As the contractor described:

> "Obviously, it is also related to the culture and specific persons involved, but we experienced within this contract a completely different form of dialogue. Rather than sitting on each side of a table with a contract in the middle that you tear in from both sides, we experienced that we were sitting on the same side of the table, looking into the same contract and having the same goals of increasing quality and decreasing costs" (MP interview, p.11).

The partners experienced a conflict in relation to a winter period with extreme weather, where the authority got many citizen complaints. According to Renosyd, they managed those issues by holding on to their principles of cooperation:

> "At that point, we were a little annoyed at each other, but then we sat down, looked each other in the eye, remembered our principles and decided to scrap the incentive system for a while and just make things work. (…) This form of collaboration does not mean that we do not ever have conflicts. But we do try to find methods to eliminate them and be open and honest towards each other" (Renosyd interview, p.3).

Whereas the difficult winter period in the beginning led to increased contract costs, shared savings characterized the rest of the contract phase.

Whereas service changes were directed by Renosyd, the contractor participated actively in the further development and implementation of the authority's ideas. As the contractor explained:

> "In relation to waste collection contracts with public authorities, we only innovate if there is a demand for improvement of environmental standards in the contract material. Within the contract period, Renosyd had to change its collection services to collect more waste types, so we have been in dialogue with them on for instance shifting from bags to bins or the possibility of collecting from a stand by the house versus at the roadside. That kind of development, when their needs changes, is something we have participated in." (MP interview, p.13)

In relation the service changes, Renosyd also desired a new electronic chip system to register bin collections, where the contractor actively participated in determining the design of the system and developing a good workflow to eliminate working procedures (Renosyd interview, p.3-4).

The contract period also led to minor improvements initiated by the contractor's staff, such as more efficient collection routes and adjustment to equipment at households. In the day-to-day working, the refuse collectors were functioning as an 'extended arm' of the public company. If they experienced something on the route that was not working well, they would report back to Renosyd (Renosyd interview, p.2). According to Renosyd, they almost perceived the private refuse collectors as being part of their own organization: "*The staffs from Renosyd are almost part of our own staff. For instance they get Christmas presents and stop by for a coffee. Since their contract manager is situated in Esbjerg, we even sometimes get information before he does*" (Renosyd interview 1, p. 4). As such, compared to the RBKC, only collection staffs were co-located and not contract managers.

The results from *case 3* are summarized in *Table 5*. The service partnership was in itself an innovation and a huge step change from traditional contracting out of waste services in Denmark. This model, as well as the service changes in the contract, was initiated from the public company and thus based mainly on hierarchical coordination, although they were implemented in a competitive tendered contract. The procurement process did not open for private sector ideas, but instead there was an enhanced possibility for private influence in the contract period. The contract provided a market-based economic incentive for continuous efficiencies in the contract period, and hierarchical forums for joint working to steer the partnership and implement changes. The incentives in combination with a closer collaboration with the refuse collection staff brought efficiency savings to both partners. Both partners experienced a more open and collaborative working environment, where the contractor actively participated with their knowledge and ideas in the implementation of service innovations.

Table 5: Results of Case 3

	Governing strategies for innovation in the Renosyd - Marius Pedersen PPP
Pre-contract phase	- Preparing to adopt to political targets through a more flexible contract design (hierarchy) - Designing a new contract model with inspiration from the construction sector (hierarchy, network) - Competitive tendering through a traditional restricted procedure (market, hierarchy)
Contract design	- Using a traditional detailed task specification, but making this flexible to allow for changes in the contract period (network, market, hierarchy) - Developing a new dynamic budget model to align economic interests between the organizations (market, hierarchy) - Describing common aims and values of cooperation and continuous

	development of service improvements (network) - Establishing collaborative hierarchical organized forums for joint working governing (network, hierarchy)
Post-contract phase	- Further developing and implementing the public organizations ideas for service innovation through exchange of ideas and knowledge (hierarchy, network, market) - Solving conflicts through open and honest dialogue (network, market) - Developing and implementing minor service changes in close collaboration with the contractor's refuse collection staff (network, hierarchy) - Creating efficiencies to obtain shared savings through the dynamic budget model (market, network)

Case 4: The innovation partnership and joint venture contract in Vejle Municipality, Denmark

Vejle Waste and Recycling (VWR) is a unit in Vejle Municipality situated in the Mid-Jutland area. The division is placed at the same site as the main part of the municipalities waste management facilities and functions almost as a separate 'company' with its own communication staff, legal advisor, a user based economy etc. VWR serves around 110,000 citizens in 46,586 households producing more than 90,000 tons waste each year. The municipality contract out collection services and owns or co-owns most of its waste treatment facilities. Residual waste and organic waste is collected in black and green bags from the kerbside to be sorted at the municipality's optical sorting plant. From there, organic waste is pre-treated and sent to a bio-gas plant, whereas residual waste is sent for incineration with heat and energy production at two municipally co-owned plants in Esbjerg and Kolding. Recycling (paper, card, plastics and metal), garden waste and 'problem' waste (fi. hazardous light bulbs) is collected once a month through a bulky waste collection scheme or at one of the four household recycling sites (VWR 2014). VWR also used to have their own sorting facility for paper, card and

plastic foil, but this was closed down as they calculated it would be cheaper to contract out along with the sale of recycled material (VWR interview, p.6).
In July 2013, VWR issued a tender for a public-private joint venture to replace the optical sorting pant with a new 'resource centre' including the construction, finance and operation of a modern sorting plant able to manage organic, residual and pre-sorted dry recyclable waste, a new household recycle station and adjusting building (such as administrative offices, a transfer station etc.). The contract would also include the operation of existing household recycling sites as well as a number of administrative and service tasks, such as administration of collections, communications, sales etc. The resource centre might be dimensioned to include commercial waste and waste from other municipalities in line with the wishes of the private contractor (udbud.dk 2013).

This solution was innovative in terms of both organizational form and technology – and perhaps too innovative; the procurement process was eventually stalled by legislative complications. Consequently, this analysis will focus on the pre-contract phase – and as part of this – the 'innovation partnership' with Marius Pedersen A/S, which was used to develop an organizational model for the procurement.

Pre-contract phase: A long planning process, an innovation partnership and the beginning of a competitive dialogue process

The contract preparation phase in Vejle was even longer than in Greater Manchester. Vejle Municipality decided to focus on resources in waste already in the late 1980s, where they implemented the optical sorting system to co-collect organic waste as one of the first municipalities in Denmark. Around 2005, the plant began to be run down and they started to investigate new solutions. However, the process was halted by the Danish structural reform in 2007, where a

new Vejle Municipality was created from four smaller municipalities (Give, Vejle, Børkop and Egtved). In 2007 they decided to continue the focus on resources and innovation, but the following years were occupied with aligning their various waste management systems (VWR 2007, VWR 2009).

Towards the end of 2011, a political decision was taken that outlined the idea of building a 'resource centre' on a new site in Vejle Nord. That allowed VWR to engage in various networking activities to investigate available technological an organizational solutions in Europe in the following years. Based on these experiences, they acknowledged that they might not have enough capacity by themselves to provide economies of scale for the sort of mechanical sorting plant, which they were looking at. They were especially inspired by the English PFI experience:

> "In this process, we could see that these sorting plants worked well, but might demand some volume. And then especially in England, we were inspired by the integrated PFI projects. We talked to an English local authority with a joint venture, who was very content with this solution. They did not only cooperate on construction and operation, but also on administrative tasks." (VWR interview, p.7)

As such, VWR was inspired to broaden the scope of the contract. They considered to coordinate with other municipalities, but judged joint procurement to be too difficult and time consuming to coordinate. Also, current public companies were already under pressure from the government towards potential privatization, so they did not see this as a future-proof solution (VWR interview, p.14).

In Denmark, VWR looked at some of the Danish contractual PPPs in the construction sector, but found that these seemed rather traditional and simple compared to the complexity of their project:

> "The complexity of this was larger and we wanted to secure a possibility for continuous development. It is hard to predict the development of waste management services 20 years ahead in time. In comparison it might be easier to plan a parking house - it is probably approximately the same type of cars, whereas the likelihood of shifting to 'flying brooms' is relatively small" (VWR interview, p.11).

Instead, they looked into the more collaborative approach to contracting in the service partnership in Renosyd. VWR hoped that a more collaborative approach might contribute to a new way forward for the waste management sector: "*Why does a contract need to be an order to do 'this and that' for the lowest price? And then being in war against each other for the rest of the time? That is insane. The best thing for both parties is to find win-win solutions.*" (VWR interview, p.11) Accordingly, the final tender material became a piecemeal solution inspired by various PPPs across Europe.

To further develop and mature this idea, they began to discuss these possible solutions with actors at the Danish waste market, which led them into an 'innovation partnership' with the private company Marius Pedersen A/S (MP). Innovation partnerships (OPI) is a Danish model for public-private cooperation where a new solution with commercial potential is developed in cooperation between a public organization and one or more private organizations (Brogaard and Petersen 2014). In this case, the idea was to develop an innovative organizational design (rather than a new technology), which might fit both VWR's political objectives and MP's judgment of what might be a viable private business model. The partners entered into a structured dialogue process supported by two private consultancies, where they discussed possibilities and challenges relating to joint venture PPPs or purely contractual PPPs versus pure public or pure private solutions. As VWR describes: "*There was a lot of dialogue, and then we had the*

lawyers and Deloitte to investigate and present various possibilities, which we could discuss and say 'well, how may this model fit a private company? Would this be interesting for them?' Or 'no, as a municipality this would not work at all'" (VWR Interview, p.10). The dialogue and the end reports showed that a PPP model might be viable for both partners (Deloitte 2013, Rønne & Lundgren 2013A, Rønne & Lundgren 2013B).

VWR decided on the more collaborative and flexible joint venture model and continued an open approach towards the private sector by tendering the contract through a competitive dialogue process. The tender material presented the organizational framework and ideas of the project, but left many details to be decided in the procurement process (interview, p.11, udbud.dk 2013). The material further emphasizes the authority's collaborative vision; '*that the collaboration with the private partner will develop into a close partnership, where the various strengths and competences of the partners may contribute to develop a better and more efficient use of resources*" (udbud.dk 2013, p.1). In November 2011, they began a competitive dialogue process with four pre-qualified bidders.

In relation to the general development and national policies in Denmark, the VWR PPP might be seen as an innovative front-runner project both in terms of organization and technology. The PPP project was developed while the government worked on a delayed resource strategy, which was published in October 2013 (Regeringen 2013). VWR's aims of providing new facilities to extract more resources fitted very well with the aims of the government strategy, which also emphasised separate collection of organic waste and the need for public-private cooperation. Furthermore, the Resource Plan (which followed the strategy) projected that the Ministry would engage in a 'state-of-art' mechanical sorting plant for dry recyclables (EPA 2013, p 37). The National Board of

Environmental Protection had begun working towards this and considered various scenarios for public-private cooperation quite similar to the considerations in the OPI (DAKOFA 2014).

Despite all this coherence, the project has been halted by challenges in the Danish procurement and waste regulations. Whereas recyclable industry waste had been liberalised with the L513 regulation from June 2009, VWR's plan was to increase economies of scale by including recyclable industry waste based on a 51% private ownership of the joint venture, which their legal advisor had recommended as plausible. However, a declaration from the state attorney from February 2014 stated that this would contravene the purpose of this regulation (Kammeradvokaten 2014).

Whereas English PFIs are usually organised in joint venture arrangements, the L548 regulation on the participation of public authorities in joint companies restrict this collaboration to tasks, which has not been contracted out to private actors before with the purpose of preparing markets to take over these tasks. Furthermore, only 50% of the turnover from company sales over a three year period may stem from other customers than municipalities. In combination with the liberalization of recyclable industry waste with the L531 regulation from 2009, this also means that treating recyclable industry waste cannot be a part of a new sorting plant established in a public-private company after L548 (ibid.). Furthermore, the purpose of L548 fundamentally goes against the thought in partnership working of some tasks being best taken care of in public-private collaboration. The Danish Environmental Agency, who originally supported VWR's legal interpretation, currently considers changing the regulation, but otherwise, Vejle will have to fundamentally alter the project.

Table 6 summarizes the results of case 4. Vejle Waste and Recycling has employed a mixture of hierarchical, market and network governing strategies in the pursuit of an innovative PPP model and waste infrastructure. They went through a long political process of developing the main ideas and targets along with which they explored available organizational and technological solutions in a European and Danish context. VWR strived to secure market interest for the PPP by entering into a collaborative OPI with a private company and arrived at a 'piecemeal' PPP solution emphasising market opportunities and a collaborative approach and seeking a technological solution that would be new in a Danish context.

Table 6: Results of Case 4

	Governing strategies for innovation in the Vejle Waste and Recycling PPP
Pre-contract phase	- Developing hierarchical targets on the forefront of top down government demands through various network and market management strategies to search for new solutions and gain knowledge from experiences from public and private actors in Europe and Denmark (hierarchy, network, market) - Developing a new organizational model for public-private cooperation in close collaboration and dialogue with a private company in an 'innovation partnership', thereby aligning hierarchical and market based needs (network, market, hierarchy) - Competitive tendering for new waste facilities and services through a collaborative 'competitive dialogue' process on the basis of hierarchically established targets (hierarchy, market, network)

Comparing the cases: Mixing strategies for innovation

The analysis of the four cases suggests that innovation processes in PPPs is not driven solely by hierarchy, competition or network strategies, but through a combination of all of these. Against similar analyses of social coordination in PPP

processes (Lowndes and Skelcher 1998, Ysa 2010), the investigation of these cases points towards a mix of strategies in all phases of the PPP, rather than a model of temporal shifts from one form of coordination to another. Although a general pattern of moving from hierarchical decision processes, market demand, competition and looser network coordination towards closer collaboration in the contract period might be argued for, this would be a simplification of governing processes in these contract-based PPPs. *Table 7* provides an overview of the cases. Each square shows the relative importance of the three strategies by highlighting potential dominant strategies.

Table 7: Mixed governing strategies for innovation in all four cases

	Case 1 (RBKC-Sita UK)	**Case 2 (GMWDA-VLGM)**	**Case 3 (Renosyd/MP)**	**Case 4 (VWR-MP/?)**
Pre-contract	Hierarchy, market, network	Hierarchy, market, **network**	**Hierarchy**, market, network	Hierarchy, market, network
Contract design	Hierarchy, market, network	**Hierarchy**, market, network	Hierarchy, market, network	-
Post-contract	Hierarchy, market, **network**	Hierarchy, market, network	Hierarchy, market, **network**	-

In all four cases, the process of establishing ambitious targets towards innovative solutions through political hierarchies was prominent to achieve service innovation. Whether taking place before or during contract periods, these processes were a pre-requisite to demand innovation in the PPPs. Especially the GMWDA case and the VWR case displayed that waste markets did not just 'supply' innovative solutions by themselves, but needed to be 'managed' through dialogue, negotiation and demand from public organizations. In both these cases, organizational and technological innovations were discussed with market actors

before the procurement process even started. In this way, the authorities secured that there was a market for the contract and hence competition that might bring efficiencies. In Vejle, VWR even entered a closer collaboration with a private partner through an innovation partnership to have a forum to discuss these issues without the risk of disqualifying their private dialogue partner.

Except for Renosyd, the authorities chose to tender an output-based contract through negotiated or competitive dialogue procedures thus providing a possibility for market input. This might be related to the character of the service tasks, as the collection service that Renosyd required was also – except for the potential of implementing changes within the contract period – rather standard at a competitive market. The main innovation in this contract was the organizational form, which was also kept relatively simple compared to the other PPPs and made voluntary. Seemingly, in the cases where the combination of tasks and organizational structure were more complex and innovative, authorities opted for more networked pre-contract processes.

However, Renosyd did provide a possibility for altering specifications after signing the contract. This might also reflect a general difference between collection (service) PPPs and treatment (infrastructure) PPPs. Whereas the most radical innovation tend to be developed in the pre-contract phase for treatment PPPs, where facilities and technologies are decided upon, collection PPPs tend to focus more on innovation in the post-contract phase, where there is a need for flexibility to introduce service changes and adjustments to collection procedures. In the RBKC case, authorities did demand some specific organizational innovations in the contract, but they emphasised the wish for a contractor, who would continuously work with them towards increasing recycling in the contract period. However, Vejle also emphasised that they wanted the partnership to

develop into a collaborative relationship where "*the various strengths and competences of the partners may contribute to develop a better and more efficient use of resources*" (udbud.dk 2013, p.1). This clearly showed their inspiration from service PPPs. The Vejle case is a prime example of how outreach to a number of various sectors and countries for ideas led to the development of new 'piecemeal' organizational form and process. Perhaps it was rather these networked search processes, than the inclusion of market actors through procurement that were the main cause of larger scale service innovations, whereas tender and flexible contracts were tools for implementation.

Especially in the more complex GMWDA-VLGM case, the contract established a hierarchical structure with procedures for interaction between the various interfaces for collaborative working. In this way, network collaboration was integrated in hierarchical governance structures of the involved organizations. Likewise, market-like structures were implemented in the contracts to provide a continuous drive for efficiencies in the 'monopoly' period after contract award. In this way, mixed frameworks were established for a post-contract period, which was to some degree hierarchically structured, but also provided market structures to incentivize change and collaborative forums to enable co-production of solutions and ideas. Whereas service innovations towards mainly 'social value', for instance increasing recycling, were generally driven by the public sector, the GMWDA actually managed to design a contract were political targets combined with economic incentives aligned the partners interests to work towards and find new solutions to increase recycling.

In all cases, 'relationship management' and partnership working were mentioned as important to make these structures function in practice. Trust did not just occur from the established structures, but needed to be developed over time, where

relationships were created and maintained. In comparison, the RBKC-Sita UK PPP seemed more cooperative and trust-based than the other cases. The partners expressed a high level of mutual respect and close collaboration down through the layers of the organizations, and as the only case, they expressed that they did not have any fall-outs between the organizations. This contract differed in that it did not build on economic incentives or involve penalties, but relied on a fixed profit alone. As Stelling (2014) emphasizes, trusting involves taking a 'leap of faith' rather than constructing control mechanisms to ensure certain actions from the other partner. Hence, there was a larger delegation of trust from the authority to the contractor in the RBKC case, which may explain this difference.

The RBKC-Sita PPP reported that they efficiently solved problems and challenges in everyday working, and they also managed to improve collection rates under very challenging conditions in a densely populated area in inner London, which in itself is valuable. However, it might be questioned, whether the higher degree of collaboration and trust in itself led to more innovation compared to the other cases. In line with the above discussion, the analyses point to that the degree of innovation would also depend on hierarchical coordination of innovation targets, idea development through networked outreach and availability of mature technologies at waste markets.

Relating this to the discussion of mixed company PPPs versus pure contract-based PPP (Bel and Fageda 2010, Cruz and Marques 2012, Cruz et al 2013), the most collaborative PPP in this case setup was actually purely contract-based, although the contract did set up an 'almost' joint organization. Thus, although Steijn et al (2011) have a good point in saying that organizational form matter less compared to management to develop good PPP outcomes, this case study points towards slightly greater complexity in the argument. Although the organizational form as a

‘label’ might not matter, the *specific contractual design*, for instance the organization of forums for joint working, co-location and a fixed profit, might matter a great deal in order to develop collaborative partnership relationships and better outcomes. In all cases, mixes of social coordination forms in the contract were used to incentivise and enable the development and especially implementation of innovative outcomes.

There were also some differences between the countries in the comparative framework. In England, both cases were dominated by the need for coordination between authority levels with split responsibilities. Accordingly, although political target setting could be seen as a hierarchical process, the WDAs needed to act as network managers to enable these targets to be set and agree on the main lines for the procurements of treatment facilities with the WCAs delivering the waste ‘input’. This aligns well with Bovaird’s (2006) suggestion that contracting in UK authorities not only develops toward increased collaborative working, but also towards more complex forms of coordination in procurement processes (Bovaird 2006). Although waste facilities and collection in these cases were not jointly procured, it was not possible for WDAs to procure without the consent of WCAs, which in the other end were obliged by law to cooperate and pressured to align collection systems to permit local system innovation. As PFI’s were practically the only solution for them to get access to adequate funding, they also needed to coordinate with market actors. This was especially important for the GMWDA, who opted for a more innovative solution than mainstream incineration.

Waste system innovation might in principle be easier in Denmark, where municipalities as single authorities have the joint responsibility of collection and treatment. However, Danish municipalities also have a tradition for joint working to provide waste treatment facilities and sometimes collection services. As the

Renosyd case shows, various networks of waste treatment have developed over time on a voluntary basis, rather than top down organized as in England. Whereas Renosyd, in itself a municipal co-operation, takes part in network based idea development with other nearby public organizations about the provision of mechanical sorting facilities, the Vejle case differs by flying solo. According to VWR, a process of coordination between municipalities in the area would take too much time, and instead they rely on the other municipalities to more or less formally join the project at a later point in time (VWR interview). However, Vejle's attempt to secure economies of scale by including private industry waste may fail in consequence of current Danish legislation. Perhaps Danish municipalities will have to go through the same hard processes of political (and procurement) coordination as the English authorities to be able to innovate their waste systems.

Conclusion

This paper has shown how the management of a mix of hierarchical, market and network strategies throughout the PPP process were employed in four waste management PPPs to develop innovative organizational forms and outcomes. The cases were all at different stages and had slightly different approaches to the innovation of waste management services. In England, the Royal Borough of Kensington and Chelsea were under political pressure to increase recycling in their collection service and engaged in a collaborative, trust-based and flexible contract with no economic penalties to align public and private objectives and allow for continuous improvements in the contract period. In Greater Manchester, the WDA undertook a networked coordination exercise, where they discussed and negotiated targets and solutions with WCAs and market actors in order to mobilize for a large scale system innovation of both organizational form and technology use. The partners in this PPP made a complex organizational PFI-contract work in practice

and developed ideas to exceed political targets through joint effort towards partnership working.

In Denmark, Renosyd wanted to change former adversarial relationships to private contractors and gain flexibility to implement a new recycling system within the contract period. They developed a new contract model based on a 'partnership charter' to frame a more collaborative relationship and a market-based dynamic budget model to align economic interests. This led to efficiencies and shared economic gains, a more open relationship and private ideas and input to the implementation of the new system. In Vejle, the division of Waste and Recycling gathered organizational and technical inspiration from especially English PFIs and Renosyd to develop an innovative, 'piecemeal' organizational model to implement technology that was innovative in the Danish context. As such, the cases all combined networked outreach activities to form new ideas with hierarchical target setting to set direction, competitive market structures to incentivize efficiencies and institutionalized spaces for joint working to enable development and implementation of ideas.

The article suggests some adjustments to existing PPP theory. First, the article suggest that the idea that PPPs evolve through phases of hierarchy, market and network coordination is somewhat simplified. Rather, PPPs involve a mix of these organisation forms over the whole PPP process from pre-contract, to contract design and post-contract phase. Second, the article show that organizational form does matter to the success of PPPs in relation to innovation. Not in terms of the 'label' of contract or joint venture, but in terms of the specific contract design and organisation of the cooperation. Third, and in line with the second proposition, the article suggest that joint ventures are not necessarily more collaborative than

contract-based PPPs. This will depend on the specific design and management of the PPP.

For practitioners, the article points toward the need to include a mix of governing strategies in the management of PPPs over the whole process from pre-contract, contract design and post-contract phase in order to deliver innovation. Innovation is not necessarily about developing a new idea from scratch, but often rather a result of an outreach process, where from ideas are collected to new 'piecemeal' solutions. Therefore it is important to plan time for this process in the pre-contract phase as well as ensuring adequate flexibility and collaboration forums in the post contract phase. The paper also showed that joint working to a various degree took place in bureaucratic organizations. This raises a number of questions. How different are these joint working organizations from public bureaucracies? Did contracting out just create a new bureaucratic monster, where mixed interests make it even more difficult to take decisions and move forward? Might public organisations be better of innovating waste management services by themselves without having to deal with all this complexity?

In Denmark, municipalities have so far preferred the flexibility of in-house solutions for treatment to be able to continuously develop waste services along political flux, whereas the more simple collection services have been contracted out. In this context, Vejle and Renosyd provide small 'revolutions' by working towards collaboration rather than competition between public and private waste management actors. In England, local authorities have – perhaps more from need than want – included private actors in the provision of new waste infrastructure. However, as these cases show, English local authorities are continuously developing these relationships to cure some of the 'child diseases' of PPPs and incorporate needs for flexibility and innovation. As such, the English cases can

provide learning to other countries such as Denmark, which considers going down the PPP lane.

The need for developing continuous efficiencies in public services might make PPPs worth the effort. The analysed cases point towards that a bridging of public and private interests can be possible through open and thorough preparation processes, intelligent contract design and an effort towards collaborative working on both sides of the table. This demands an acknowledgement of the various interests and raison d'être of public and private organisations and perhaps also increased confidence in the other organization and a daring to trust. Although mixing seem to be a valuable and perhaps unavoidable tactic of innovating in PPPs, it might be important to remember that while targets of economic gains and social value might be aligned to some degree, partnership is essentially about learning from and prospering on each other's forces rather than trying to assimilate the other organization to your own.

References

Akintoye, A., Hardcastle, C., Beck, M, Chinyio, E. and Asenova, D. 2003: 'Achieving best value in private finance initiative project procurement'. *Construction Management and Economics* 21, 5, pp. 461-470

Albury, D. 2005: 'Fostering Innovation in Public Services'. *Public Money and Management* 21, 1, pp. 51-56

Bel, G. and Fageda, X. 2010: 'Partial privatization in Local Services Delivery: An Empirical Analysis of the Choice of Mixed Firms. *Local Government Studies* 36, 1, pp 129-149

Bennett, J.T and Johnson, M.H. 1980: 'Tax reduction without sacrifice: Private sector production of public services'. *Public Finance Review* 8, 4, pp. 363.396

Borins, S. 2002: 'The Challenges of Innovating in Government'. In M.A. Abrahamson and I.D. Littman *Innovation*, Lanham, Boulder, New York and Oxford: Rowman & Littlefield Publishers, Inc.

Bovaird, T. 2006: 'Developing New Forms of partnerships with the 'Market' in the Procurement of Public Services'. *Public Administration* 84, 1, pp. 81-102

Bradach, J. and Eccles, R. 1991: 'Price, Authority and trust: from ideal types to plural forms'. In G. Thompson, J. Frances and R. Levacic and J. Mitchell eds. *Markets, Hierarchies and Networks: the co-ordination of social life*. London: SAGE

Brogaard, L. and Petersen, O.H. 2014: 'Offentlige-private innovationspartnerskaber (OPI). Evalueringer af erfaringer med OPI på velfærdsområdet'. Copenhagen: KORA

Census 2011: 'Key statistics for local authorities in England and Wales'. Office for National Statistics, December 2012

Coase, R. 1937: 'The Nature of the Firm'. *Economica* 4, pp. 386-405

Cruz, N.F., Simoes, P. and Marques, R.C. 2013: 'The hurdles of local governments with PPP contracts in the waste sector'. *Environment & Planning C* 31, 2, pp. 292-307

Cruz, N.F., and Marques, R.C. 2012: 'Mixed companies and local governance: No man can serve two masters'. *Public Administration* 90, 3, pp.737-758

DAKOFA 2014: 'Automatiske sorteringsanlæg i Danmark?' Conference programme, Thursday 3rd April 2014, Hotel Australia, Vejle. May be downloaded from: http://www.dakofa.dk/Aktiviteter/konferencer_seminarer/140403/Materiale/03)%20030414%20program%20final.pdf, [01.08.2014]

Deloitte 2013: 'Beslutningsgrundlag. Vurdering af samarbejdsmodeller I forbindelse med udvikling af fremtidens ressourcecenter'. Vejle: Required from Vejle Waste and Recycling

Dijkgraaf, E. and Gradus, R.H.J.M. 2008: 'Introduction'. In E. Dijkgraaf, R.H.M. Gradus eds *The Waste Market. Institutional Developments in Europe*, Springer

Domberger, S. & Fernandez, P. 1999: 'Public-Private Partnerships for Service Delivery'. *Business Strategy Review* 10, 4, pp. 29-39

EC 2004a: 'Green paper on public-private partnerships and community law on public contracts and concessions'. COM (2004) 327 final, Brussels: European Commission

EC 2004b: 'Directive 2004/18/EC of the European Parliament and of the Council of 31 March 2004 on the coordination of procedures for the award of public works contracts, public supply contracts and public services contracts'. Brussels: European Commission

EPA 2011: 'Affaldsstatistik 2011'. Copenhagen: Miljøstyrelsen (Danish Environmental Protection Agency)

Esteve, M., Ysa, T. and Longo, F. 2012: 'The Creation of Innovation through Public-Private Collaboration'. *Rev Esp Cardiol* 65, 9, pp. 835-842

Frances, J., Levacic, R., Mitchell, J. and Thompson, G. 1991: 'Introduction'. In G. Thompson, J. Frances and R. Levacic and J. Mitchell eds. *Markets, Hierarchies and Networks: the co-ordination of social life*. London: SAGE

GLA 2003: 'Rethinking Rubbish in London. The Mayor's Municipal Waste Management Strategy'. London: Greater London Authority, September 2003

GMWDA 2014a: 'The Authority's work at a glance'. Oldham: Greater Manchester Waste Authority. May be downloaded from: http://www.gmwda.gov.uk/clientfiles/File/Authority%20at%20a%20glance%20pub%20090714.pdf, 01/08/2014

GMWDA 2014b: 'About us'. GMWDA website, direct link: http://www.gmwda.gov.uk/about-us , [29.07.2014]

GMWDA 2014c: 'Recycling pays as GMWDA sets budget for 2014/15'. Press Release, GMWDA website, direct link: http://www.gmwda.gov.uk/news-media/press-releases?action=view&newsID=145, [30.07.2014]

GMWDA 2012: 'Delivering the recycling and waste management contract'. Executive summary 2012 version, Oldham: Greater Manchester Waste Authority (required from GMWDA)

GMWDA 2009: 'Procurement Documents: Waste management contract'. May be downloaded from: http://meetings.gmwda.gov.uk/ecCatDisplay.aspx?sch=doc&cat=12881&path=0, [30.07.2014]

GMWDA 2004: 'Municipal waste management strategy 2004'. GMWDA and its partner authorities, may be downloaded from: http://www.gmwda.gov.uk/clientfiles/File/gmwda_waste_management_strategy%202004.pdf, [29.07.2014]

Greve, C. 2010: 'Public-Private Partnerships in Business and Government'. In D. Coen, W. Grant and G. Wilson eds. *The Oxford Handbook of Business and Government*, Oxford: Oxford University Press

Greve, C. and Hodge, G. 2005: 'Introduction'. In G. Hodge and C. Greve eds. *The Challenge of Public-Private Partnerships*. Cheltenham/Massachusetts: Edward Elgar Publishing Ltd.

Grønnegaard Christensen, J. 2001: *Affaldssektorens politiske organisering*. Danske entreprenører, Miljøsektionen

Hartley, J. 2005: 'Innovation in Governance and Public Services: Past and Present'. *Public Money and Management* 25, 1, pp.27-35

Hodge, G. and Greve, C. 2013: 'Introduction'. In G. Hodge and C. Greve eds. *Re-thinking Public-Private Partnerships*. London/New York: Routledge

Hodge, G., Greve, C. and Boardman, A. eds. 2010: *International Handbook of Public-Private Partnerships*. Cheltenham: Edward Elgar Publishing

Hodge, G. and Greve, C. 2007: 'Public-Private Partnerships: An international Performance Review'. *Public Administration Review*, May/June 2007, pp. 545-558

Hood, C. 1991: 'A Public Management for All Seasons?' *Public Administration* 69, pp.3-19

Hurst, C. and Reeves, E. 2004: 'An economic analysis of Ireland's first public-private partnership'. *International Journal of Public Sector Management* 17, 5, pp. 379-388

Huxham, C. 1996: *Creating Collaborative Advantage*. London: SAGE

Jessop, B. 1998: 'The rise of governance and the risk of failure: The case of economic development'. *International Social Science Journal* 50, 155, pp. 29-45

JMWMS 2006: 'Joint Municipal Waste Management Strategy'. Draft 2, 20 February 2006. London: Western Riverside Waste Authority and constituent councils (Hammersmith & Fulham, Wandsworth, Lambeth, Kensington and Chelsea, may be downloaded from: http://rbkc.gov.uk/howwegovern/keydecisions/reports%5Ccabinet%20member%20reg%20env%20man%20leisure%5Ckd02267ra.pdf, [08.08.2014]

Kammeradvokaten 2014: 'Kommuners deltagelse I selskaber der håndterer genanvendeligt erhvervsaffald'. Download: http://mst.dk/media/mst/8873048/Notat%20om%20L548-Kammeradvokaten.pdf, [22.05.2014]

Kickert, W.J.M., Klijn, E.-H. and Koppenjan, J.F.M. 1997: *Managing Complex Networks. Strategies for the Public Sector*. London: SAGE

Klijn, E.-H. 2010: 'Public-Private Partnerships: Deciphering meaning, message and phenomenon'. In G. Hodge, C. Greve and A. Boardman *International Handbook of Public-Private Partnerships*. Cheltenham: Edward Elgar Publishing

Kooiman, J. 1993: *Modern Governance: New government-Society Interactions*. London: SAGE

Leiringer, R. 2006: 'Technological Innovation in PPPs: Incentives, opportunities and actions'. *Construction Management and Economics* 24, 1, pp. 35-51

Letsrecycle.com 2004: 'Kensington and Chelsea tenders 16-year collection contract'. Press release on 3 February 2004, http://www.letsrecycle.com/news/latest-news/councils/kensington-and-chelsea-tenders-16-year-collection-contract, [24.7.2014]

Letsrecycle.com 2005: 'London borough signs multi-million pound contract with SITA'. Press release on 13 January 2005, http://www.letsrecycle.com/news/latest-news/councils/london-borough-signs-multi-million-pound-contract-with-SITA, [24.7.2014]

Lowndes, V. and Skelcher, C. 1998: 'The Dynamics of Multi-Organizational Partnerships: An analysis of changing modes of governance'. *Public Administration* 76, 2, pp. 313-333

Mandell, M.P. and Steelman, T.A. 2003: 'Understanding what can be accomplished through interorganizational innovations. The importance of typologies, context and management strategies'. *Public Management Review* 5, 2, pp.197-224

McQuaid, R.W. 2000: 'The theory of partnerships. Why have partnerships?' In Osborne, S.P. ed. *Public-Private Partnerships. Theory and practice in international perspective*, London: Routledge

EPA 2014: *Danmark uden affald. Ressourceplan for affaldshåndtering 2013-2018*. Vejledning fra Miljøstyrelsen nr. 4, 2014. Copenhagen K: Miljøstyrelsen (Danish Environmental Protection Agency)

MOU 2004: 'Greater Manchester Waste Authority Waste Management Strategy, Annex A: Memorandum of understanding (MOU)'. GMWDA and constituent councils, available at GMWDA website: http://www.gmwda.gov.uk/clientfiles/File/02c_annex_a_-_memorandum_of_understanding.pdf, [29.07.2014]

Moore, M. and Hartley, J. 2008: 'Innovations in Governance'. *Public Management Review* 10, 1, pp.3-20

Mulgan, G. and Albury, D. 2003: *Innovation in the Public Sector*. London: Cabinet Office

OFT 2006: 'More competition, less waste. Public procurement and competition in the municipal waste management sector'. OFT 841, Office of Fair Trading. London: Crown

Osborne, S.P. and Brown, L. 2011: 'Innovation, Public Policy and Public Services Delivery in the UK. The word that would be king?' *Public Administration* 89, 4, pp.1335-1350

Osborne, S.P. ed. 2000: *Public-Private Partnerships. Theory and practice in international perspective*. London: Routledge

Osborne, D. and Gabler, T. 1992: *Reinventing Government. How the Entrepreneurial Spirit Is transforming the Public Sector*. Reading, Mass: Addison-Wesley Publishing

Peters, B.G. 1998: *Comparative Politics. Theory and Methods*. New York: New York University Press

RBKC 2014: 'Recycling'. Website of the Royal Borough of Kensington and Chelsea, direct link: http://www.rbkc.gov.uk/environmentandtransport/domesticrecyclingandrubbish/performanceandstrategies/ourperformance/recycling.aspx, [24.7.2014]

RBKC 2004: 'Municipal Waste Management Strategy and Action plan 2004-2009'. London: The Royal Borough of Kensington and Chelsea's waste management division

RBKC 2005/2011: 'Waste Management Contract'. Downloads from the council's website: http://www.rbkc.gov.uk/councilanddemocracy/commentscomplaintsfeedback/freedomofinformation/wastemanagementcontract.aspx, [23.7.2014]

Regeringen 2013: 'Danmark uden affald. Genanvend mere – forbrænd mindre'. Regeringen, web publication: www.danmark-uden-affald.dk

Renosyd 2012: Miljøredegørelse 2012. Skanderborg: Renosyd i/s. May be downloaded from: http://ipaper.ipapercms.dk/Renosyd/Publikationer/Rapporter/Miljredegrelse2013/, [02.08.2014]

Renosyd 2010/11: *Den endelige affaldsplan 2010-2012*. Skanderborg og Odder kommuner, Skanderborg: Renosyd

Renosyd 2008: Service Partnership Contract. Skanderborg: Documents required through Renosyd

Rhodes, R.A.W. 1997: 'From Marketization to Diplomacy: It's the Mix that Matters'. *Australian Journal of Public Administration* 56, 2, pp.40-53

Rhodes, R.A.W. 1996: 'The New Governance: Governing without Government'. *Political Studies* 44, 4, pp. 652-667

Rogers, E.M. 2003: *Diffusion of Innovation*. 5 ed. New York: Free Press

Rosenau, P. M. ed. 2000: *Public Private Policy Partnerships*. London: The MIT Press

Rønne & Lundgren 2013A: 'Notat – fremtidens ressourcecenter – Redegørelse om muligheder i relation til valg af forretningsmodel'. Vejle: Required from Vejle Waste and Recycling

Rønne & Lundgren 2013B: 'Mødereferat'. Vejle: Required from Vejle Waste and Recycling

Savas, E.S. 2000: *Privatization and public-private partnerships*. New York: Seven Bridges Press

Slater, R., Frederickson, J., Thomas, C., Wield, D. & Potter, S. 2007: 'A critical evaluation of partnerships in municipal waste management in England'. *Resources, Conservation and Recycling* 51, pp. 643-664

Stark, D. 2009: *The Sense of Disonance. Accounts of Worth in Economic Life*. Princeton and Oxford: Princeton University Press

Steijn, B., Klijn, H.J. and Edelenbos, J. 2011: 'Public-Private Partnerships: Added value by organizational form or management?' *Public Administration* 89, 4, pp. 1235-1252

Stelling, C. 2014: *Public-Private Partnerships & the Need, Development and Management of Trusting. A processuel and embedded exploration*. PhD Series 17, 2014. Doctoral School in Organization and Management Studies, DK: Copenhagen Business School

Sørensen, E. 2012: 'Governance and innovation in the public sector'. In D. Levi-Faur ed. *Oxford Handbook of Governance*. Oxford: Oxford University Press, pp.215-227

Sørensen, E. and Torfing, J. 2011: 'Enhancing Collaborative Innovation in the Public Sector'. *Administration & Society* 43, 8, pp. 842-868

Udbud.dk 2013: 'Danmark-Vejle: Tjenesteydelser I forbindelse med spildevand, affald, rengøring og miljøbeskyttelse 2013/S 128-220349', direct link: https://udbud.dk/Pages/Tenders/ShowTender?tenderid=10640, [17.10.2013]

Van de Ven, A.H, Polley, D.E., Garud, R. and Venkatamaran, S. 2008: *The Innovation Journey*. Oxford: Oxford University Press

VWR 2014: 'Høringsudkast. Vejle Kommunes affaldsplan 2014-2024'. Vejle Waste and Recycling, DK: Vejle

VWR 2009: 'Affaldsplan 2012. Vejle Kommunes affaldsplan 2009-2012'. Vejle Waste and Recycling, Vejle: Vejle Municipality

VWR 2007: 'PERSPEKTIVPLAN for fremtidig strategisk bæredygtig affaldsanvendelse i Vejle Kommune'. Vejle Waste and Recycling, Vejle: Vejle Municipality

Walker, R. 2006: 'Innovation Type and Diffusion: An empirical analysis of local government'. *Public Administration* 84, 2, pp. 311-335

Walls, M 2005: 'How local governments structure contracts with private firms: Economic theory and evidence on waste and recycling contracts'. *Public Works Management & Policy* 9, 3, pp. 206-222

Weihe, G. 2008: 'Ordering Disorder – On the Perplexities of Partnership Literature'. *The Australian Journal of Public Administration* 67, 4, pp.430-442

Wettenhall, R. 2010: 'Mixes and partnerships through time'. In G. Hodge, C. Greve and A. Boardman eds. *International Handbook on Public-Private Partnerships*, Cheltenham: Edward Elgar

Williamsen, O. 1985: *The Economic Institutions of Capitalism*. New York: Free Press

Williamsen, O. 1975: *Markets and Hierarchies. Analysis and Antitrust Implications*. New York: The Free Press

WRWA 2008: 'Authority meeting its Waste Strategy Objectives'. Western Riverside Waste Authority Press Release on 5 August 2008, direct link: http://www.wrwa.gov.uk/waste-authority/press-releases/authority-meeting-its-waste-strategy-objectives.aspx [22.7.2014]

Yescombe, E.R. 2007: *Public-Private Partnerships. Principles of Policy and Finance*. Oxford: Elsevier

Yin, R.K. 2009: *Case Study Research. Design and Methods*. 4th ed. Thousand Oaks: SAGE

Ysa, T., Esteve, M. and Longo, F. 2013: 'Enhancing Innovations in Public Organizations through Public-Private Partnerships: The Role of Public Managers'. In G. Hodge and C. Greve eds *Re-thinking Public-Private Partnerships*. London/New York: Routledge

Ysa, T. 2010: 'Governance Forms in Urban Public-Private Partnerships'. *International Public Management Journal* 10, 1, pp. 35-57

Wrwa.gov.uk: 'About us'. Western Riverside Waste Authority website, direct link: http://www.wrwa.gov.uk/waste-authority/about-us.aspx, [22.7.2014]

Appendices

Appendix 1: Contract documents in the RBKC and Sita UK Ltd. partnership contract

Contract documents	
Document	**Number of pages**
Partnership charter	6
Partnership contract	53
General specification	11
Waste collection	16
Recycling (incl. appendixes)	8 (+18)
Waste disposal	2
Street cleansing (incl. appendixes)	18 (+22+5+2+3+4+1+17+1+1+2)
Waste collection, Recycling, and cleansing in the market streets (incl. appendixes)	6 (+1+3)
Public conveniences (incl. appendixes)	4 (+4+2)
Winter emergences (incl. appendixes)	7 (+46+4+3)
Stand-by	2
Notting Hill carnival	7
Special events (incl. appendix)	3 (+3)
Building maintenance (including appendix)	6 (+1)
In total: 34 documents, 292 pages	

Source: http://www.rbkc.gov.uk/councilanddemocracy/commentscomplaintsfeedback/freedomofinformation/wastemanagementcontract.aspx [23/7 2014]

Appendix 2: Contract documents in the service partnership between Renosyd i/s and Marius Pedersen A/S

Contract documents	
Document	**Number of pages**
Main contract	6
Procurement material - Procurement specifications traditional contract - Procurement specifications service partnership - Service Partnership Agreement - Bidding list traditional contract - Bidding list service partnership - Special conditions	 - 27 - 25 - 7 - 8 - 8 - 18
Specified offer (bidding list filled out)	min. 8
Financial security document	-
In total: 9 documents, 107+ pages	

Source: Material received from Renosyd by request

Appendix 3: Contract documents in the PFI joint venture contract between GMWDA and Viridor Laing Ltd.

Contract documents	
Document	**Number of pages**
Main contract	529
Project agreement schedules	
- Service delivery plans	-
- Work programmes	-
- Waste flow model	-
- CHP Roc regime	6
- Joint insurance agreement, part 1+2	11+12
- Independent certifiers appointment	42
- Fire suppression	5
- Form of annual report	6

- Payment mechanism and performance framework	218
- Forms of lease	21
- Form of professional team warranty	8
- Form of authority's direct agreements - Rail contractor agreement - Operating contractor - COSTAIN Ltd. - Keppel Seghers - Clarke Haase - Enpure Ltd - CP manufacturing (Europe) Ltd - TEG warranty - MCC to COSTAIN - TPSCo Engineer warranty	96 - 16 - 7 - 7 - 15 - 11 - 8 - 8 - 8 - 12 - 4
- Form of financiers direct agreements - Project CO subcontractor - Financiers direct agreement - Financiers TPS	100 - 28 - 48 - 24
- Site details (main + 30 docs of illustrations)	196 (11+3+2+2+2+3+2+2+2+1+2+2+4++3+2+4+2+3+2+3+3+3+3+1+2+2+2+1+1+1+3)
- Form of monthly report	4
- TPSCo Financial model	-
- Base case financial model	-
- Insurance section A – SPV insurances	50
- Insurance section B – TPSCo insurances	55
- Output specification	56
- Authority share/contractor share	-
- Longley Lane MCC facility costs	-
- List of sites and facilities	7

- Principal sub-contracts	-
- Contractor and HoldCo	
- Initial financial agreements	10
- Proposed planning schedule	-
- Royalty payments following expiry and early termination	-
- Environmental provisions (55 docs on the various facilities)	7,724 (116+128+150+216+361+117+103+166+159+192+115+58+154+147+197+2+116+262+41+36+9+5+5+17+96+40+46+22+37+13+447+94+214+45+302+138+18+4+10+42+4+7+49+80+72+54+36+32+8+22+396+282+212+108+101)
- New site minimum criteria	11
- Code dispute resolution criteria	5
- Waste law list	12
- Pensions (admission agreement + bond)	17 + 12
- Relevant discharge terms	2
- First employee list	-
- Landfill sites contracts - Biffa - WRL - Veolia - Viridor landfill	288 -72 - 72 - 72 - 72
- Commercially sensitive information	27
- Input specifications	28
- Supplementary works payment	-
- Base case adjustment protocols	2
- Escalation of disputes	1
- Actuaries letter (letter +TR1)	7+7

- Public rights of ways	-
- Contingencies, title defects	-
- Authority DBFO noviation agreement	-
- Deeds of surrender (Deed of surrender + TR1)	5+7
- Non-key services and dry recyclables	-
- Deeds and documents	5
- Dilapidations	-
- BOI supported faculty	-
- GMWL composting contracts	-
- Landfill site deed of novation - Viridor - WRG - Veolia - Biffa	17 - 6 - - 5 - 6
- Share disposal agreement	8
- Rail waggons	4
- RVC contract basis of tender obligation	-
- Budgeted schedule	-
- Online data room index	-
In total: min. 163 documents	**Min. 9,506 pages (1,780 + 7,726 of environmental provisions)**

Source: http://meetings.gmwda.gov.uk/ecCatDisplay.aspx?sch=doc&cat=12881&path=0, [30/07/2014] Some of the documents or parts of documents are redacted from the public, because they are commercially sensitive to the contractor

Appendices

Appendix 1: Interview guides

England, private organization

Thus is an example of an interview guide for interviewing a private company in a partnering contract (service partnership).

Interview guide

Nn, Nn, Royal Borough of Kensington & Chelsea, SITA uk, 24th June 2013

Themes: Personal background and position, the company, the partnership with K&C, innovation, partnerships versus traditional contracting, context: market development, transition to sustainability, cooperation with other organizations

Personal background and position in SITA

Would you tell me your background and your current position and responsibilities in SITA?

Sita UK organization

Could you provide me with some information on the background of sita - the origin, organization and different services/products etc.?

What are SITAs core competencies?

Would you say that you have a social and environmental responsibility as a company, and how is that a part of company policy?

The partnership with K&C

What is a partnership to you?

Would you tell me about the process? How did you/SITA first hear about this contract possibility/partnership? How did you feel about it being a 'partnership'?

How were you involved in dialogue with K&C in the pre-procurement and procurement phase?
How is this contract different from other traditional contracts? 'Discharge responsibilities' (see charter)?
How is the partnership organized? (How often do you meet, what do you discuss, etc.) (Partnership board)
How is the management process? Who decides what? Would you say that Sita has a say in the goals of the partnership or the means to reach goals or both? Would you consider Sita and K&C as equal partners?
Have there been conflicts or disagreements along the way, and how do you handle these?
Is there a penalty and incentives system in the contract and has it been used?
What kind of knowledge or expertise do you bring with you that the public sector did not have?
What kind of risks is involved in this contract? How do you share those risks between SITA and K&C?
Does the contract form matter to the process of cooperation after the contract award? For instance the partnership charter – is that something you use in practice and how?

Innovation and improvements

Was innovation a purpose of the contract?
How do the innovation forums work in practice? Which forums are established? Did you use the funding?
How is the tasks described in the contract - Detailed or more functional?
Did you make any changes to the original task specifications in the contract along the way?
Did the competition for the contract push/inspire you to come up with any innovative solution?
Do you develop or implement new ideas in collaboration with managers from K&C? Do you have a forum for this? Is it a prioritized part of your work process in the partnership?
How do you work with innovation in general in Sita?

Partnerships versus traditional contracts

Would you say that the results of the partnerships are better than in other traditional contracts?
Is the contract form important for having a partnership relation?
Do you participate in other partnerships?

Context

How did the market for waste collection develop over the last 10 years?

Would you say that sustainability has a greater role, and what has driven that development?

What would you say is necessary in order to get a more sustainable waste management? How far can we get with technology, and is there a specific technology that is needed right now?

Which other organisations/actors do Sita cooperate with? Are you involved in interest organizations/network organisations? (national, European, international?)

Other sources

Do you know any other examples of partnerships contracts?

Do you know an example of a partnership involving both collection and construction/managements of facilities?

England, public organization

This is an example of an interview guide for an interview with a public authority having an integrated contract for collection and disposal services. As such, I was specifically trying to find out if that made a difference in the partnership relationship or possibilities for innovation and sustainability change.

Interview guide – Nn,Nn, Sheffield City Council

Background and Organisation

What is your background? How long did you work in this organisation and in general with waste?

How is waste management organised in Sheffield? What was the background for your choice of contracting out waste services and combining collection and operation of facilities? Did you consider other solutions?

The procurement process and the contract with Veolia

Will you describe the process of procurement? How much dialogue did you have with private bidders in the different stages of the procurement process? How do you interact on a daily/weekly/yearly basis?

Would you characterize your contract as a partnership? How would you characterize a partnership?

How do you share risks, benefits and resources in the contract? And how did it work out in practice?

Do you have an incentive/penalty system built into the contract?

Are there any challenges working with private providers (in partnership), eg. conflicts of interest?

Would you say that you have a trust-based relationship? What is important to make a partnership/contractual relationship work?

Innovation

Did you buy new solutions or something that had proved to work before and why? Please get examples

Did/do innovation play a role in the procurement process, contract design and in the contract period after signing? Is innovation/continuous improvement a part of the daily management and how? Please give examples.

In which way do you cooperate with your private contractor on innovation – developing ideas/solutions together or coordinating efforts and delegating who is to find the solutions? Who is taking initiative to innovating practices?

Do you believe that private providers have other competences, knowledge or resources than the public sector? Do you think that competition gave you a better/more innovative solution? Did you do something active to encourage competition?

Context

How did the organisation of waste develop in England? Does sustainability play a bigger/smaller role?

Do you cooperate with other organisation and how? (public/private/networks/interest organisations/NGOs/national/international)

Do you have any ideas to whom else I should talk to about this?

Denmark, private company

This is an example of an interview guide for an interview with a private company participating in a service partnership on waste collection. The interview also focused on characterizing the type of company in general and regarding innovation.

Interviewguide Meldgaard

Interview med Nn Nn, Meldgaard Dagrenovation, den 9. januar 2013

Interviewpersonen

Hvad er din titel og baggrund? Hvor mange år har du arbejdet i branchen?

Hvilken funktion har du i virksomheden?

Virksomheden generelt

Vil du kort beskrive jeres virksomhed – ydelser, historie, kunder? Hvad henter i, og hvor afleverer i de forskellige fraktioner? Hvor ender affaldet?

Hvad er jeres kernekompetencer?

Mener i, at har et ansvar for at skabe en miljøvenlig og socialt ansvarlig affaldshåndtering? Hvordan arbejder i med det?

Innovation generelt

Hvordan arbejder i med innovation i virksomheden?

Kan du give nogle konkrete eksempler på, at i har udviklet noget nyt? Hvordan var processen? Hvordan fik i idéen?

Samarbejder i med offentlige eller andre private aktører om innovation?

Innovation og kontrakter med offentlige organisationer

Udvikler og implementerer i noget nyt i forbindelse med kontrakter med offentlige aktører?

Hvis ja – kan du give eksempler? Hvis nej, hvorfor ikke?

Er konkurrencen om de offentlige opgaver med til at få jer til at innovere jeres ydelser?

Skaber i innovation i samarbejde med den offentlige part under en udbudsperiode?

Hvordan er samarbejdet generelt med offentlige aktører før og under kontraktperioden? Har i en god dialog? Oplever du det som et ligeværdigt forhold? Er der tillid i samarbejdet med de offentlige?

Hvad er vigtigt for at få et godt samarbejde med den offentlige aktør? Fra jeres side – og deres?

Hvad er vigtigt for at få de bedste løsninger?

Servicepartnerskabet med Favrskov – proces, innovation, ledelse

Hvilke overvejelser gjorde i jer omkring at byde på et servicepartnerskab?

Hvordan er servicepartnerskabet anderledes end en almindelig kontraktaftale?

Hvordan var processen omkring servicepartnerskabet? Hvornår startede det, hvad gjorde i konkret, hvem er involveret?

Har der været fokus på udvikling/innovation i partnerskabet? Har der været en øget mulighed for at udvikle opgaveløsningen? Hvem sætter – eller skulle sætte – innovation på dagsordenen i partnerskabet?

Har i udviklet noget nyt i forbindelse med partnerskabet? Kan du give et eksempel? Hvad har været drivkraften? Er det sket overvejende hos jer, hos den offentlige eller i samarbejde?

Har jeres samarbejdsrelation været anderledes? Har der været tillid mellem parterne – eller er der blevet opbygget tillid?

Har der været klare rammer for samarbejdet? Hvem leder et servicepartnerskab?

Hvilke regler har i og/eller kommunen opstillet for samarbejdet? Formelle/uformelle? Hvilken rolle spiller kontrakten i jeres daglige samarbejde?

Har i udviklet normer og værdier for, hvordan samarbejdet skal fungere?

Har i forskellig viden og kompetencer – og hvordan bruger i det? Bliver det udnyttet? Positivt/negativt?

Har i fælles interesser i partnerskabet? Giver partnerskabet jer incitament til at følge kommunens interesser?

Har i oplevet konflikter? Hvordan håndterer i eventuelle konflikter?

Hvilken rolle spiller ledelse i forhold til at få samarbejdet til at fungere? Hvad er god ledelse af et servicepartnerskab? Har ledelse en betydning i forhold til udvikling/innovation?

Ville i byde på et service partnerskab en anden gang? Har det overordnet været en succes?

Affaldssektorens udvikling

Har markedet for affaldsindsamling og behandling ændret sig?

Har den private sektors rolle ændret sig?

Oplever i et øget fokus på affald-som–ressourcer, og har det ændret noget for jer?

Hvad er vigtigt i forhold til at rykke sektoren i en mere bæredygtig retning? Er der en bestemt teknologi, der mangler? Eller er der noget andet, der er vigtigere?

Denmark, public organisation

This is an example of an interview guide for an interview with a public organization in a service partnership. It was the first interview with a service partnership that I conducted. As such, the theoretical framework was in the making and the interview focused on describing the organization, partnership contract and process, partnership relationship, innovation and regulation.

Interview med RenoSyd

Nn Nn and Nn Nn, Renosyd I/S

Ramme:

Jeg kunne rigtig godt tænke mig at høre mere om jeres erfaringer med jeres servicepartnerskab med Marius Pedersen – især i forhold til samarbejdsrelation, hvordan i har arbejdet med (grøn) udvikling/innovation og eventuelle udfordringer med de lovgivningsmæssige rammer. Min overordnede overvejelse er, om partnerskaber kan bidrage til at skabe grøn innovation og dermed en mere bæredygtig udvikling i affaldssektoren, så det vil jeg især meget gerne høre jeres mening om.

Spørgsmål

Baggrund

- Hvad er jeres personlige baggrund?
- Hvornår blev Renosyd dannet?
- Hvordan er Renosyd organiseret?

Organisering

- Hvilke indsamlingsordninger har Renosyd?
- Hvilke serviceydelser udliciterer Renosyd gennem kontrakter? Har i kommunale indsamlingsordninger?
- Hvilke private samarbejdsparter har Renosyd?
- Hvor er Renosyd i planlægningsprocesserne lige nu?

Servicepartnerskabet – baggrund, organisering, styring og relation

- Hvad var baggrunden for, at I valgte et partnerskab?
- Hvad var jeres forventninger? Forventede i innovation? Var miljømæssige forbedringer en del af jeres forventninger?
- Hvordan startede i partnerskabet op? Hvordan var processen?
- Hvordan er partnerskabet organiseret? Hvilke overordnede punkter indeholder jeres kontrakt? Har i en særlig partnerskabskontrakt? Udviklede i fælles politiske målsætninger?
- Hvordan foregår samarbejdet i praksis? Fx hvor ofte mødes i, hvad diskuterer i etc.
- Har i justeret samarbejdsformen undervejs?
- Hvordan er relationen med jeres private samarbejdspart? Vil i sige, at I er ligeværdige? Hvem træffer beslutninger?
- Hvilke udfordringer har i haft undervejs?
- Har der været konflikter i forløbet?

Innovation i partnerskaber/udbud

- Har i fået indfriet jeres forventninger? Er der noget, der har overrasket jer?
- Er der sket innovation i partnerskabet? Hvordan?
- Er innovation sket hos den private part? Eller i et samspil mellem offentlig og privat?
- Har partnerskabet givet jer noget, som i ikke kunne have fået i et almindeligt udbud?
- Kan partnerskaber bidrage til at skabe en mere bæredygtig affaldshåndtering?

Regulering

- Hvordan har udbudsreguleringen spillet sammen med oprettelsen af et servicepartnerskab?
- Er der nogle reguleringsmæssige tiltag i savner?

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