AARHUS UNIVERSITY

Coversheet

This is the accepted manuscript (post-print version) of the article.

Contentwise, the post-print version is identical to the final published version, but there may be differences in typography and layout.

How to cite this publication

Please cite the final published version:

Krøtel, S. M. L. (2015). Contracting for Energy Efficiency: The Diffusion of Novel Contracting Practices at Local Government Level. *Local Government Studies*, 41(5), 794-813.

DOI: [10.1080/03003930.2015.1030070](https://doi.org/10.1080/03003930.2015.1030070)

Publication metadata

Title:	<i>Contracting for Energy Efficiency: The Diffusion of Novel Contracting Practices at Local Government Level</i>
Author(s):	<i>Sarah M.L. Krøtel</i>
Journal:	<i>Local Government Studies</i>
DOI/Link:	10.1080/03003930.2015.1030070
Document version:	Accepted manuscript (post-print)

General Rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognize and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

CONTRACTING FOR ENERGY EFFICIENCY: THE DIFFUSION OF NOVEL CONTRACTING PRACTICES AT LOCAL GOVERNMENT LEVEL

Abstract

Studies on contracting out have provided much needed knowledge about the effect of contracting on different types of services, yet much remains unknown about the antecedents driving the adoption of new contracting practices. The focus of previous studies that have addressed the antecedents of contracting has been on the financial benefit of specific services. This study incorporates the innovation diffusion literature to explore organizational and managerial influences on a novel contracting practice: the contracting out of energy efficiency improvement services in Danish municipalities. The paper finds that the antecedents driving the adoption of contracting out may result from interorganizational influences as much as managerial factors.

Keywords: Contracting, Innovation, Local Government, Energy Efficiency.

Introduction

Contracting out usually is considered as an integrated part of the “New Public Management (NPM)” reforms that have been sweeping the political scenes of the western world for the last decades (Hood, 2002, Warner and Hefetz, 2012, Fernandez, 2007, Van Slyke, 2003). The concept of contracting is generally built around the idea of introducing competition into public service delivery (Domberger and Jensen, 1997), and it has been promoted as a useful tool for public organizations facing the challenge of balancing public service provision with the requirements for economic efficiency and effectiveness. Supporters of contracting have argued for the scope of economic benefits related to the contracting out of public services whereas critics have pointed to the loss of control and accountability (Walker et al., 2013).

So far the contracting literature has presented a vast amount of studies on performance and cost efficiency, whereas the focus on what explains the level of contracting or the use of a specific contracting practice is more limited (O'Toole and Meier, 2004, Boyne, 1998). Further, when assessing the determinants of contracting in the existing literature, most research focuses on what explains current levels in traditional service areas such as transportation, healthcare, recreation (Hefetz and Warner, 2007, Domberger and Jensen, 1997) or schooling (O'Toole and Meier, 2004). However, we know very little about what drives new contracting practices and the diffusion of contracting into new service areas. This is an important gap in our current knowledge as many countries experiment with contracting out new types of task and services (Hefetz and Warner, 2004). In order to address this gap, this paper explores antecedents and the diffusion of a novel contracting practice in a local government setting.

Although the interest in the diffusion of innovation literature in public administration has been increasing, the main part of research has been conducted in a private sector setting (Damanpour and

Schneider, 2009). The focus on innovations in the public sector has seen an increase, however; despite an increased focus on learning and mechanism underlying diffusion, the factors that drive adaptation of innovations in the public sector still need further exploration (Walker, 2006). As studies on diffusion of innovation have shown, antecedents of innovations may vary depending on the type of innovation being diffused (Homburg et al., 2013). To better understand how a novel contracting practice is diffused, I bring in the context of contracting as I build a framework bridging the literature on contracting with some of the insights provided by the literature on diffusion of innovation in public sector.

In order to explore what drives adoption of a novel contracting practice, I consider how a new type of contracting called ESCO (Energy Service Company) contracting has been adopted across Danish municipalities. The case of ESCO contracting constitutes an excellent setting for increasing the understanding of organizational antecedents to the adoption of a novel contracting practice as it provides a useful case for elaborating on the drivers and barriers promoting and challenging the choice of contracting public services in a new service area. It is an area where contracting decisions are clear and observable as well as an area of high importance and salience for administrators and policy makers. From this point of departure, the paper explores the diffusion of a novel contracting practice by focusing on: *What explains the probability of a given municipality adopting ESCO contracts?*

This research question will be pursued by suggesting a model considering inter-organizational, intra-organizational as well as management factors in the exploration of how new contracting practices are adopted at local government level. Former research suggests that institutional pressures homogenize organizational practices (DiMaggio and Powell, 1983) driving municipalities to emulate and use each other for learning when adopting new practices (Homburg et al., 2013, Berry and Berry, 1990, Bhatti et al., 2011). However, organizations differ in their response to institutional pressure due to managerial factors and their institutional context (Ashworth et al., 2009, Lounsbury, 2001,

Greenwood and Hinings, 1996, Oliver, 1991). As a consequence the adoption of new practices can be viewed as a function of the interplay between environmental pressures and strategic choice at the organizational level (Van de Ven and Hargreve, 2004), where local governments might be more or less receptive due to organizational and managerial factors. In order to test the proposed framework, I apply an Event History Analysis on a 2007-2013 panel data set to explore how ESCO contracting has diffused across local governments in Denmark.

This article provides three contributions to the existing literature on contracting and diffusion of innovation in the public sector. Firstly, this study contributes by showing how a new contracting practice diffuses at local government level. Doing so, it illuminates the antecedents of a novel contracting practice as well as explores some of the drivers or barriers of the contracting decision. By focusing on the diffusion of a single practice in contrast to explaining the choice of contracting from aggregated historical levels, this paper provides new information about the actual decision-making as regards a new specific form of contracting at local government level. Secondly, this study adds to the growing knowledge on drivers of diffusion in public administration by adding to and testing some of the proposed factors in the literature. As the study builds on a longitudinal dataset, it provides the opportunity to argue for the causal mechanism driving adoption of new practices at local government level (Damanpour and Schneider, 2009). Thirdly, the paper improves the understanding of the processes through which public sector agencies use contracting to pursue energy reduction. Even though the use of ESCO contracts is increasing across Europe, very few studies have dealt with the adoption of ESCO contracts (Marino et al., 2011, Soroye and Nilsson, 2010, Sorrell, 2007). This paper brings together the contracting literature with the more technical literature on energy improvements and highlights a politically important topic that so far has been neglected in public administration research (Sorrell, 2007).

Contracting for energy improvements

In recent years the debate regarding public sector involvement in contracting out has seen a transition from an ideology-based view to a more pragmatic perspective (Hefetz and Warner, 2004, Greve, 1997), thereby arguing that involvement in contracting out is “*not a quest for a better administration philosophy, but for better functioning public organizations* (Hefetz and Warner, 2011)”. Choosing whether to contract or not has been much debated by supporters and critics of the privatization trend. The idea of introducing competition through tendering into the public sector has been proposed as one of the main drivers of economic efficiency and effectiveness (Domberger and Jensen, 1997). However, when there is lack of competition and management capacity for controlling contracts, the choice of using privatization tools is often more a political act than an economic one (Van Slyke, 2003). To date, the contracting literature has covered a large variety of perspectives on contracting. Especially the performance view on contracting has been much discussed in the existing literature (O'Toole and Meier, 2004); studies include contracting performance (Fernandez, 2007, Walker et al., 2013), insourcing and outsourcing (Warner and Hefetz, 2012, Hefetz and Warner, 2004), make or buy decisions (Brown and Potoski, 2003, Rosenberg Hansen et al., 2011) and to some extent the determinants of contracting out (Boyne, 1998, Bhatti et al., 2009, Levin and Tadelis, 2010, Fernandez, 2007).

However, the question concerning what is contracted and how contracting moves into new areas of public service delivery, has so far received little attention. Traditionally contracting at local government level has taken place within most local governments' core functions, such as construction, healthcare, elder care, transportation, and schooling. This leaves the question of why organizations use contracting to different degrees and why some organizations tend to embrace new contracting opportunities while others prefer in-house production. Transaction costs theorists have argued that some areas are more suitable for contracting than others due to asset specificity and

monitoring problems; however, research has produced inconsistent results (Domberger and Jensen, 1997, Hefetz and Warner, 2007). In order to address this gap, this paper explores antecedents and the diffusion of a new contracting practice called ESCO contracting.

The introduction of a new contracting practice – ESCO contracts

ESCO is the contracting out of energy-related services to a third party by means of a tender process among private sector firms (Sorrell, 2007). In the ESCO contracts the yearly savings on energy are specified and the contractor provides an embedded guarantee on reaching the target securing savings are reach every year. Large scale energy improvement projects are not a traditional area for contracting in most local governments. However, despite most of the political debate on energy consumption taking place at the national level, repeatedly calls are made to contemplate the potential for achieving the energy goals at the local government level with the intention to boost commitment to energy reductions at the national level (Bale et al., 2012). The concept of ESCO contracting has regained its influence with the intensification of the energy consumption debate in most parts of the world (OECD, 1999). By increasingly displaying environmental concerns in a financial light, the economic challenge arising from energy-saving investments has shifted the public agenda making way for the introduction of ESCO as a new way of reaching lower energy consumption in a more cost-efficient way. Parts of the European market have seen ESCO projects since the late 1980s, especially in Germany, France and the UK (Bertoldi et al., 2007), and lately they have gained ground in other European countries, e.g. Denmark. As a result the concept of ESCO can be viewed as a product innovation as it is a new service that is introduced to meet a new market need (Walker, 2006).

The diffusion of ESCO contracts: Hypotheses

The question of how new practices and ideas spread across a field of organizations has been a central starting point in much organizational literature (Van de Ven and Hargreve, 2004). Both in institutional theory and the literature on diffusion of innovations, it has been pointed out how internal as well as

external factors impact organizations' decisions to adopt a new practice (Homburg et al., 2013, Wang and Zhao, 2014). One dynamic that has been forcefully demonstrated is imitation. Assessing the differences across sectors, Frumkin and Galaskiewicz (2004) argue that public sector organizations are more likely to imitate as imitation seems to thrive where accountability is low, and measurement and control weak or imprecise. The more uncertain the relationship between means and ends, the greater the extent to which an organization will model itself after organizations it perceives as successful (DiMaggio and Powell, 1983). Increased uncertainty, in particular, will foster greater attention to the choices made among peer organizations. Therefore, the decisions to contract out services at local government level are rarely made by managers looking only inside their own organization. Research has illustrated that to a great extent organizational practices are shaped by institutional factors (Homburg et al., 2013) and inter-organizational relations as well as by managerial decision-making (Lounsbury, 2001). When assessing the diffusion of new practices, managerial characteristics such as tenure, experience and education have been argued to be influential (Damanpour and Schneider, 2006, Damanpour and Schneider, 2009, Hansen, 2011). This suggests a need to consider contracting in a more general interplay between its societal context and managerial influences when exploring why contracting is adopted across a field. In order to elaborate on how contracting spreads from a field perspective, I derive a series of hypotheses combining inter-organizational, organizational and managerial drivers of local government adoption of ESCO contracts.

Inter-organizational factors

Okhmatovskiy (2010) argues that when conceptualizing inter-organizational relationships, researchers have begun viewing those relationships as associated with norms, expectations, and responsibilities instead of just arms-length practices of co-operation. Former studies of contracting out have indicated that this propensity for emulation is likely to trigger a pattern of adoption among

neighbors due to the existence of formal regional municipal organizations, employee transfers and regional cooperation in service provision (Bhatti et al., 2011). Strang and Meyer (1993) argue that *'when adoption is socially meaningful, it is common to think of actors as making different choices cognitively available to each other, developing shared understandings, and exploring the consequences of innovation through each other's experience'* (Strang and Meyer, 1993). Neighbor municipalities that are closely tied together are therefore more likely to engage in transactions with each other, which in turn fosters the development of similar internal structures.

The newness of ESCO projects in most local governments might trigger some degree of uncertainty regarding the adoption and successful outcome of a new practice. Uncertainty regarding ESCO projects and the energy efficiency prospects can serve as drivers of local cooperation and sharing of experience across municipality boarders. In Berry and Berry's (1990) study of adoption of state lotteries, they argue that state policy makers tend to view nearby states as "experimental laboratories" for policies and because predicting the consequences of adopting a new program can be very difficult, knowledge about effects of the program in a similar state can help overcome uncertainty. DiMaggio and Powell (1983) argued that organizations tend to become more similar due coercive, normative and mimetic pressures for increasing conformity and similarities of internal structures. In the same vein Villadsen, Hansen and Mols (2010) found support for technological uncertainty as a driver of imitative behavior in contracting decisions. Thus, the adoption of ESCO contracts in a nearby municipality will advance knowledge on how to reduce cost thereby easing the uncertainty related to making the contracting decision.

Summing up the preceding discussion, the argument for neighbor emulation is threefold. Firstly, neighbors provide cues about the adoption of a new practice as a palatable solution; secondly, neighbors are more likely to engage in knowledge sharing and learning; and thirdly, with the institutionalization of a new practice, legitimacy of how to carry out energy efficiency measures is

developed increasing the organizational environment's normative pressure for adoption. As a result, the adoption of ESCO contracts is expected to be related to adoption of ESCO in neighbor municipalities. The first hypothesis therefore reads as follows:

H1_{emulation}: The adoption of an ESCO project in a neighboring municipality is positively related to its adoption in any given municipality.

Organizational factors

Controlling costs and staying within budget is an everlasting issue faced by most public organizations (O'Toole and Meier, 2004) – a situation that was intensified with the financial crisis and economic downturn in 2008. The prospect of controlling expenditure with an embedded guarantee provided by an ESCO contract is likely to become an attractive solution for municipalities that have trouble staying within budget. For most local governments, the main objective is to meet their financial targets. Large deficits require heavy cutbacks in following years, whereas large surpluses imply underspending and excessive financial slack for public organizations whose main purpose is the provision of the best possible service. Financial instability results when the gap between actual and budgetary result increases. Financially unstable municipalities are likely to engage in contracting that runs on closed circuits because risk opportunity for cutting back on public sector spending is low. Municipal risk aversion makes ESCO contracting palatable due to the lack of financial concerns regarding possible budget impact. The choice of adopting ESCO guided by financial instability is likely to be expected. Hence:

H2_{financial instability}: Financial instability is positively related to adoption of an ESCO project.

Besides financial concerns, organizational capacity to manage contracting in new or on previous occasions is likely to influence the choice of whether or not to engage in new contracting practices (Fernandez, 2007, Amirkhanyan et al., 2007). Fernandez (2007) argues that previous experience with

contracting is positively related to the choice of contracting out. The importance of experience may not only be understood as experience in itself; later lack of experience may foster a culture of fear around contracting out and this may permeate the municipality creating a barrier for future contracting. Previous studies have argued for the presence of administrative professionals as a driving force of contracting in public service provision (Bhatti et al., 2009, Rho, 2013, O'Toole and Meier, 2004). Administrative professionals bring a higher education in administration to the table and consequently increased knowledge, skills and experience of handling contracting. A high concentration of administrative professionals in an organization will increase the likelihood of contracting out due to their ability to handle such contracts. On the other hand, a low concentration of administrative professionals cannot display the same knowledge and ability and consequently not have the same interest in engaging in new contracting practices. Consequently the extent to which a given municipality employs a large number of administrative professionals is expected to have a positive effect on the probability of a municipality choosing to adopt the ESCO contracting practice. The third hypothesis is:

H3_{administrative professionals}: The proportion of administrative professionals in an organization is positively related to the adoption of an ESCO project.

Managerial factors

'If we want to understand why organizations do the things they do, or why they perform the way they do, we must consider the biases and dispositions of their most powerful actors – their top executives' (Hambrick, 2007). Even though a shift towards stronger inter-organizational relationships increases institutional pressure to adopt new practices, local government managers arguably maintain an important impact on the contracting decision in their own organization. Ashworth et al. (2009) argue that local policy makers have significant scope for “deviant” behavior influencing institutional pressures for conforming. This implies that top managers exercise some choice when confronted with

pressure to adopt a rapidly spreading practice. Damanpour and Schneider (2009) introduced the importance of managerial characteristics in their study of innovation characteristics and adoption in public organizations. Strang and Meyer (1993) argue that actors can be viewed as carriers of diffusion through their drive and capacity for reform and innovation. Top executives have values and experience from their former workplaces as well as educational insight, values and experience that to some extent influence their organizations' strategic (Hambrick and Mason, 1984, Petrovsky et al., 2014, Villadsen, 2012). As a result, top executives with prior work experience in the private sector are arguably likely to have values as well as a larger network and general insight into the possibilities the use of private suppliers may offer. Researchers have argued that highly-educated managers will be more receptive to new ideas and as innovation tends to increase uncertainty, in the same manner educated managers will have a greater ability to gather information on how to reduce uncertainty (Damanpour and Schneider, 2006, Damanpour and Schneider, 2009). Top executives with an administrative professional background are likely to be more positively predisposed towards engaging private suppliers due to their superior skills in, and experience of, dealing with contracting (Bhatti et al., 2009). Hypotheses four and five are therefore:

H4 Directors work experience: Municipal directors with private sector work experience are more likely to adopt an ESCO project.

H5 Directors education: Municipal directors with an education in professional administration will be more likely to adopt an ESCO project.

A third managerial factor that influences the decision to adopt a new contracting practice is the importance of tenure. Tenure has been argued to reduce the likelihood of adopting new practices, because as tenure increases so do familiarity and experience with administrative practices and culture which may hamper engaging in new and unfamiliar administrative practices (Hansen, 2011,

Damanpour and Schneider, 2006). Conversely, new CEOs are more likely to make important strategic changes due to their fresh view on things; a managerial drive for reform and innovation might make them more inclined to copy new ideas and practices (Strang and Meyer, 1993). The final hypothesis is:

H6 Director tenure in position: Director tenure is negatively related to adoption of an ESCO project.

Research setting

This study considers how ESCO contracts spread across Danish local governments. ESCO contracts usually come as a combined package covering a variety of elements such as energy information, control systems, energy audits, installation, operation and maintenance of equipment, competitive finance, and fuel and electricity purchasing (Sorrell, 2007, EU, 2006). The winner of the public tender carries out the energy improvements at the same time guaranteeing the savings to be obtained by the contract holder. This embedded guarantee on the cost reduction allows the public organization to reduce its energy costs at the same time transferring the risk to the contracting firm. Even though part of the savings are accrued by a private sector partner, the ESCO contracting practice has been proposed in Denmark and many other European countries as an optimal solution for bridging energy reduction and cost efficiency. Recent studies discussing the use of ESCO in the EU concluded that there were as many as one thousand ESCOs in hand at present, but that the potential market is far from depleted (Marino et al., 2011).

The interest in ESCO projects has been rising during the last decades, but only recently have ESCO projects entered the Danish scene seeing a rapid diffusion across municipalities since 2007¹. The choice of ESCO represents one among many options when it comes to dealing with energy efficiency.

¹ As a consequence of the EU sharing committee on reduction on emissions from the Kyoto protocol (1997), Denmark is committed to reducing its emissions by 21 %. OECD 1999. *National Climate Policies and the Kyoto Protocol*, Paris, OECD (Organisation for Economic Co-Operation & Development).

Some municipalities perform energy improving services in house or they hire external consultants for short-term projects. Since the ESCO concept is far from the only way to carry out improvements in energy efficiency, it is an especially useful case for studying the drivers of and barriers to the contracting out of public services. Up till now there has been no regulation or requirements for local governments to decrease their energy consumption; however since the financial crisis in 2008, most local governments have started to realize the economic potential in reductions on their energy consumption. A study carried out by Local Government Denmark showed that nearly all Danish municipalities² engage in energy saving practices (Larsen, 2013). The operating companies in the field of ESCO cover a large variety of engineering firms, of which most operate across the entire country. ESCO contracts in Denmark vary in size and run up to EUR 20 million. Figure 1 display how ESCO contracts have diffused across the 98 Danish municipalities from 2007 to 2013. The first adoptions took place at three distinct locations in Denmark and have since spread from these centers. In 2013, 29 out of 98 municipalities had adopted ESCO contracts.

(Figure 1)

Historically, the level of contracting out municipal tasks to private suppliers in Denmark has not increased significantly during the past two decades (Greve, 2003). However, to some extent the use of contracting is inherent in most parts of government today but varies greatly across municipal settings (Greve and Ejersbo, 2005). In all municipalities the formal executive is the Mayor. Mayors are elected every four years and are mainly concerned with political decision-making. On the administrative level, municipalities are headed by the municipal director who is in charge of the administrative organization. Municipal directors are powerful bureaucrats who remain in office across political elections and they have the main responsibility for providing public services within

² 97 % of the municipalities argued for a higher commitment to energy savings.

their municipality (Villadsen, 2012). The Danish municipal environment is very suitable for analyzing adoption of new practices because the municipalities are fairly similar. This provides a useful foundation for exploring variations in organizational responses to a new contracting practice.

Methods

In order to test the proposed hypothesis, I gathered a panel dataset including data from seven years from 2007, when the first ESCO was adopted, to 2013. The data for the statistical analysis originates from various sources. The financial data is obtained through the “Municipal key figures³” website, Statistics Denmark⁴, and KREVI⁵ (Danish Evaluation Institute for Local Government). Information regarding a given municipality’s choice of ESCO was hand collected and coded using municipal websites and crosschecked with information on the official governmental public tender website⁶. The data on managerial background is coded by information from “Mayor facts⁷” and occasional newspaper articles in order to construct a full dataset on managerial background for all Danish municipalities.

Dependent variable

The dependent variable included in the analysis is coded as a dummy variable indicating whether or not a given municipality adopted an ESCO contract in a given year. The first ESCO was adopted in December 2007. However, due to the municipal amalgamation in January 2007, adoption is coded as having taken place in 2008 in order to avoid possible data breach.

³ www.noegletal.dk

⁴ www.dst.dk

⁵ <http://kreivi.dk/noegletal>

⁶ <http://www.udbud.dk/>

⁷ www.borgmesterfakta.dk

The independent variables

Neighbor emulation is coded as a dummy variable for whether or not a given municipality had at least one neighbor that had engaged in an ESCO contract the previous year. Municipalities are coded as neighbors when they share borders. *Financial instability* is measured as the absolute difference between the annual budget and actual yearly result of the total municipal budget for every year. *Administrative professionals* are measured as DJØF members – a union representing lawyers and masters of economics, political and social science. The variable is coded as the number of administrative professionals as a ratio to number of inhabitants in the municipality (then centered, so that 100 is the mean for all municipalities). *Top executive education* is measured as a dummy variable where a municipal director with a degree in professional administration is coded 1 and 0 otherwise. Municipal directors were chosen as the level of managerial influence as ESCO contracts are big scale contracts that will require top level approval. The size of these contracts usually varies from about 3 to 20 million Euros. Despite other managers at lower levels in the administration might influence the decision making as well, projects of this scale in a Danish context requires support and approval at the highest level of management. Education in professional administration is defined as a master degree in public administration, political science, law or economics. *Tenure* for directors is coded as years in current position and *former experience* is coded as a dummy variable with 1 for managers with private sector work experience and 0 otherwise. Generally all independent variables and controls are included as lagged effects as it is hypothesized that last year situations are related to adoption in the current year.

Controls

The following variables are included in the analysis as controls due their likely influence on the adoption of new contracting practices. In previous literature the impact of *Political ideology* on the choice of contracting out in a municipal context has produced mixed results (Bhatti et al., 2009). One

of the central arguments presented is the influence of the conservative/liberal ideology on contracting due to ideological recognition of contracting as an important tool for modernization increasing efficiency in public service delivery. This implies that a more intense focus on contracting out at the political level is likely to be related to the diffusion of contracting out in municipalities (Ashworth et al., 2009). The possible impact of conservative/liberal ideology is included as a control in the analysis measured as a dummy variable coded 1 for conservative/liberal ideology and 0 otherwise. Earlier studies have found that *municipal size* as an important antecedent for determining the adoption of New Public Management innovations (Hansen, 2011), which implies a need to control for the potential impact of municipal size. I have included two financial measures, *per capita spending* and *service level*, the latter being measured as the ratio of local government per capita spending to the funding needed due to societal composition hereby controlling for cost and efficiency in service delivery. *Director age* is included in the analysis as a control for managerial independent variables. *Membership of Energy Forum Denmark*, which is an association for both private and public organizations on energy matters, is included to control for the possible influence of alternative inter-organizational relationships than the one hypothesized between neighboring municipalities. *Income tax* reports the level of income tax per capita. The last control is *use of private suppliers*, which indicates the level of contracting of services in general measured as a percentage of how much the municipalities are allowed to contract out. This provides a control for the differences in the previous interest in contracting.

Estimation

In order to explore the diffusion of ESCO contracting, I use discrete event history modeling. Event history modeling has some advantages over other regression models due to its ability to examine the underlying causal mechanisms of event occurrence as well as the possibility of modeling time-varying covariates. The risk set includes all 98 municipalities for the first year (2007) and decreases as the

municipalities that have adopted ESCO are removed from the risk set after adoption. The municipalities are set to be removed from the risk set since only the first adoption of ESCO is the focus of this analysis. To estimate the model, the complementary log-log transformation is used. It takes a variable with the values of 0 and 1, marks the occurrence of the event in a given year, and changes it to a continuous value ranging from minus infinity to plus infinity where the coefficients estimated by this procedure have a relative risk interpretation (Dobbin and Kelly, 2007). This kind of model is suitable when the precise time of adoption in a given year is unknown (Dobbin and Kelly, 2007). Since the data has a “cross-sectional times series” structure, the model was initially estimated with the panel structure with controls for unobserved heterogeneity (‘frailty’). Initial tests showed that the variation accounted for by the panel structure (“rho”) was not significantly different from zero. Consequently the models were estimated without the panel data estimator (though these coefficients are very similar – available on request). The statistical program STATA was used for estimating models using the complementary log-log function “*cloglog*”. The variance inflation factors for the variables included in the analysis are all less than 3.5 so there is no sign of multicollinearity biasing the analysis.

Results

Table 1 reports the descriptive statistics for the dependent variable, independent variables and controls included in the analysis.

(Table 1)

Table 2 reports the results of the discrete event history analysis, where model 1 presents the test for the control variables, and the following models report the tests of the six hypothesis.

(Table 2)

The results support Hypothesis 1 and the hypothesized relation of neighbor emulation on the choice of ESCO contracting. This indicates that ESCO contracting is driven forward by neighbor emulation, cooperation and exchange of ideas between the municipalities. Model 3 shows support for Hypothesis 2 regarding the impact of financial instability on the likelihood of adopting ESCO contracts, which supports the argument that municipalities that have large budgetary discrepancies, are more likely to adopt ESCO contracting than municipalities that find it easier to stay within their budgets. Considering Hypothesis 3 on the importance of administrative professionals, the results of model 4 at first offer support for the hypothesis; this relationship, however, becomes insignificant in the full model (model 6) suggesting no support for the hypothesis. The hypothesis was expected to reveal a positive effect but the results show no relationship between the number of administrative professionals and the likelihood of adopting ESCO contracting. Turning to the impact of managerial influence, model 5 confirms the positive impact of private sector experience (Hypothesis 4) on the choice of ESCO contracting, which supports the argument that public managers bring experience and values from prior work engagement which fosters encouragement for the use of private suppliers. The test of Hypothesis 5 on the expected positive impact of an administrative professional background on the adoption of ESCO reveals no relationship. The results for director tenure (hypothesis 6) confirm the expected negative association between years in position and the adoption of ESCO contracting, based on greater reluctance to change administrative practices among those public managers who have remained in their position for many years.

Discussion

This paper focuses on how the adoption of ESCO projects is diffused at local government level. By illuminating local governments' varying susceptibilities to collaborate and engage in partnerships with private sector actors in the case of ESCO contracting, this study contributes to the literature on local government contracting. Domberger (1998) argues that even though many aspects of contracting

have been analyzed there is still a long way to go before all possibilities have been explored. The diffusion of ESCO across Danish municipalities provided a new setting for the study of contracting out and consequently the possibility for analyzing how such a practice is spreading. Event history modeling was used to uncover antecedent of a new contracting practice over time contrary to static perspectives using cross-sectional data, thereby adding further confidence to the findings.

The test of the proposed hypotheses revealed support for the idea that neighbor emulation, financial instability, managerial work experience and managerial tenure in position all are important drivers of ESCO contracting. However, the study was unable to support the expected impact of administrative professionals on the adoption of ESCO both on an organizational and a managerial level. The lack of support challenges former studies that have argued that administrative professionals drive contracting (Bhatti et al., 2009, Rho, 2013, O'Toole and Meier, 2004). This might be due to the fact that former studies were either focused on historical levels or aggregated measures of contracting, whereas this study focuses on a new contracting practice within a service area not usually contracted out. As this study finds little support for the relationship by tracking a novel contracting practice from its first appearance, it raises the hen-and-egg discussion regarding the relationship between bureaucrats and the degree of contracting out.

In line with some of the previous suggestions from the literature on diffusion of innovation in public administration (Damanpour and Schneider, 2006, Damanpour and Schneider, 2009), results show support for the importance of management characteristics. Public managers carry with them values and experience which influence their perceptions and decisions and in turn their commitment to engaging in new administrative practices. Likewise, the results support the expected effect of neighbor emulation between municipalities, stressing the role of institutional forces as drivers of adoption of new practices. This highlights the interplay between public sector organizations illuminating that public organizations are, like private ones, susceptible to cross-organizational

learning and imitation. Frumkin and Galaskiewicz (2004) argue that public organizations have been neglected not only as creators of institutional pressure but as vulnerable to such pressure themselves. The fact that emulation and learning serve as a driving force for contracting out implies that new practices are carried forward by recognition of opportunities and encouragement for sharing experience and knowledge regarding these new practices. Hence, some of the obstacles for engaging both in ESCO contracting and in other contracting areas might be overcome by increased sharing of experience. Further research exploring this important issue would be extremely valuable.

This study is different from most other studies on contracting as it focuses on a discrete contracting practice and not an aggregated measure of the level of contracting in municipalities. This holds several advantages with implications for existing knowledge. First, the aggregated level of an organization's contracting is likely to reflect a long series of decision points. The finer details of specific decisions may be hidden to aggregated analyses. By focusing attention on a discrete contracting event, this study gains precision and can surface the important role that neighbor emulation plays in making high-uncertainty decisions. A second advantage of studying a discrete contracting event is that it allows gaining substantial knowledge about a specific contracting practice which is impossible in studies with aggregated measures. ESCO contracts have been suggested as an attractive solution to the conundrum of achieving energy reduction in a cost effective way. While this study cannot disclose about whether the contracts actually achieve this goal, I point to a number of factors which make the diffusion of this contracting practice more or less difficult. Policy makers committed to ESCO contracts should acknowledge the great uncertainty inherent in this type of projects and facilitate cross-organizational collaboration and inspiration which appear important.

Finally, this study has some limitations that should be recognized. ESCO contracting constitutes a specific form of contracting in a field that provides good opportunities for measuring and specifying goals and outcomes. Consequently, specifying and handling these types of contracts is likely to differ

somewhat from “softer contracts” where goals and outcomes are difficult to measure. The possibility of transferring a “known” risk – an embedded guarantee – to the contracting firm might make it easier for municipalities to venture into new practices compared with contracting where a larger proportion of the financial risk remains with the municipality. This study has examined the diffusion of contracting from a macro-perspective. One avenue for future research is to explore the macro-mechanism uncovered in this article by elaborating on how the municipalities engage in sharing of experience and knowledge from a micro-perspective. Another suggestion for future research is to illuminate the performance side of ESCO in order to test the frequently proposed link between cost efficiency and the use of ESCO contracts.

References

- AMIRKHANYAN, A. A., KIM, H. J. & LAMBRIGHT, K. T. 2007. Putting the pieces together: a comprehensive framework for understanding the decision to contract out and contractor performance. *International Journal of Public Administration*, 30, 699-725.
- ASHWORTH, R., BOYNE, G. & DELBRIDGE, R. 2009. Escape from the iron cage? organizational change and isomorphic pressures in the public sector. *J-PART*, 19, 165-187.
- BALE, C. S. E., FOXON, T. J., HANNON, M. J. & GALE, W. F. 2012. Strategic energy planning within local authorities in the UK: a study of the city of Leeds. *Energy Policy*, 48, 242-251.
- BERRY, F. S. & BERRY, W. D. 1990. State lottery adoptions as policy innovations: an event history analysis. *The American Political Science Review*, 84, 395-415.
- BERTOLDI, P., BOZA-KISS, B. & REZESSY, S. 2007. Latest development of energy service companies across Europe - a European ESCO update -. *JRC Scientific and Technical Reports*. Institute for Environment and Sustainability - Joint Research Center - European Commission.
- BHATTI, Y., OLSEN, A. L. & PEDERSEN, L. H. 2009. The effects of administrative professionals on contracting out. *Governance*, 22, 121-137.

- BHATTI, Y., OLSEN, A. L. & PEDERSEN, L. H. 2011. Administrative professionals and the diffusion of innovations: the case of citizen service centres. *Public Administration*, 89, 577-594.
- BOYNE, G. A. 1998. The determinants of variations in local service contracting. *Urban Affairs Review*, 34, 150-163.
- BROWN, T. L. & POTOSKI, M. 2003. Transaction costs and institutional explanations for government service production decisions. *J-PART*, 13, 441-468.
- DAMANPOUR, F. & SCHNEIDER, M. 2006. Phases of the adoption of innovation in organizations: effects of environment, organization and top managers. *British Journal of Management*, 17, 215-236.
- DAMANPOUR, F. & SCHNEIDER, M. 2009. Characteristics of innovation and innovation adoption in public organizations: assessing the role of managers. *Journal of Public Administration Research and Theory*, 19, 495-522.
- DIMAGGIO, P. J. & POWELL, W. W. 1983. The iron cage revisited: institutional isomorphism and collective rationality in organizational fields. *American Sociological Review*, 48, 147-160.
- DOBBIN, F. & KELLY, E. L. 2007. How to stop harassment: professional construction of legal compliance in organizations. *The American Journal of Sociology*, 112, 1203-1243.
- DOMBERGER, S. 1998. The contracting organization: a strategic guide to outsourcing. *Oxford Scholarship Online*. Oxford: Oxford University Press.
- DOMBERGER, S. & JENSEN, P. 1997. Contracting out by the public sector: theory, evidence, prospects. *Oxford Review of Economic Policy*, 13, 67-78.
- EU 2006. Directive 2006/32/EC of the European Parliament and of the Council of 5 April 2006 on energy end-use efficiency and energy services and repealing Council Directive 93/76/EEC. In: COUNCIL, T. E. P. A. (ed.).
- FERNANDEZ, S. 2007. What works best when contracting for services? an analysis of contracting performance at the local level in the US. *Public Administration*, 85, 1119-1141.
- FRUMKIN, P. & GALASKIEWICZ, J. 2004. Institutional isomorphism and public sector organizations. *J-PART*, 14, 283-307.
- GREENWOOD, R. & HININGS, C. R. 1996. Understanding radical organizational change: bringing together the old and the new institutionalism. *The Academy of Management Review*, 21, 1022-1054.
- GREVE, C. 1997. *Privatisering, selskabsdannelser og udlicitering: et politologisk perspektiv på udviklingen i Danmark*, Århus, Systime.
- GREVE, C. 2003. Public sector reform in Denmark: organizational transformation and evaluation. *A Global Journal*, 3, 269-280.
- GREVE, C. & EJERSBO, N. 2005. *Contracts as reinvented institutions in the public sector: a cross-cultural comparison*, Westport, Conn., Praeger Publishers.
- HAMBRICK, D. C. 2007. Upper echelons theory: an update. *The Academy of Management Review*, 32, 334-343.
- HAMBRICK, D. C. & MASON, P. A. 1984. Upper echolons: The organization as a reflection of its top managers. *Academy of Management Review*, 9, 193-206.
- HANSEN, M. B. 2011. Antecedents of organizational innovation: the diffusion of new public management into Danish local government. *Public Administration*, 89, 285-306.
- HEFETZ, A. & WARNER, M. 2004. Privatization and its reverse: explaining the dynamics of the government contracting process. *J-PART*, 14, 171-190.
- HEFETZ, A. & WARNER, M. 2007. Beyond the market versus planning dichotomy: understanding privatisation and its reverse in US cities. *Local Government Studies*, 33, 555-572.
- HEFETZ, A. & WARNER, M. E. 2011. Contracting or public delivery? The importance of service, market and management characteristics. *J-PART*, 22, 289-317.
- HOMBURG, V., DIJKSHOORN, A. & THAENS, M. 2013. Diffusion of personalised services among Dutch municipalities: evolving channels of persuasion. *Local Government Studies*, 1-22.
- HOOD, C. 2002. Control, bargains, and cheating: the politics of public-service reform. *J-PART*, 12, 309-332.

- LARSEN, P. 2013. Kommuner energirenoverer på livet løs. *Momentum* [Online]. Available: <http://www.kl.dk/Momentum/momentum2013-7-2-id127990/?n=1>.
- LEVIN, J. & TADELIS, S. 2010. Contracting for government services: theory and evidence from U.S cities. *The Journal of Industrial Economics*, 58, 507-541.
- LOUNSBURY, M. 2001. Institutional sources of practice variation: staffing college and university recycling programs. *Administrative Science Quarterly*, 46, 29-56.
- MARINO, A., BERTOLDI, P., REZESSY, S. & BOZA-KISS, B. 2011. A snapshot of the European energy service market in 2010 and policy recommendations to foster a further market development. *Energy Policy*, 39, 6190-6198.
- O'TOOLE, L. J. & MEIER, K. J. 2004. Parkinson's law and the New Public Management? Contracting determinants and service-quality consequences in public education. *Public Administration Review*, 64, 342-352.
- OECD 1999. *National Climate Policies and the Kyoto Protocol*, Paris, OECD (Organisation for Economic Co-Operation & Development).
- OKHMATOVSKIY, I. 2010. Performance Implications of ties to the government and SOEs: a political embeddedness perspective. *Journal of Management Studies*, 47, 1020-1047.
- OLIVER, C. 1991. Strategic responses to institutional processes. *The Academy of Management Review*, 16, 145-179.
- PETROVSKY, N., JAMES, O. & BOYNE, G. A. 2014. New leaders' managerial background and the performance of public organizations: the theory of publicness fit. *Journal of Public Administration Research and Theory*, forthcoming.
- RHO, E. 2013. Contracting revisited: determinants and consequences of contracting out for public education services. *Public Administration Review*, 73, 327-337.
- ROSENBERG HANSEN, J., MOLS, N. P. & VILLADSEN, A. R. 2011. Make and buy - an alternative to make or buy? An investigation of four theoretical explanations in Danish municipalities. *International Journal of Public Administration*, 34, 539-552.
- SOROYE, K. L. & NILSSON, L. J. 2010. Building a business to close the efficiency gap: the Swedish ESCO experience. *Energy Efficiency*, 3, 237-256.
- SORRELL, S. 2007. The economics of energy service contracts. *Energy Policy*, 35, 507-521.
- STRANG, D. & MEYER, J. W. 1993. Institutional conditions for diffusion. *Theory and Society*, 22, 487-511.
- VAN DE VEN, A. H. & HARGREVE, T. J. 2004. Social, technical, and institutional change: a literature review and synthesis. In: POOLE, M. S. & VAN DE VEN, A. H. (eds.) *Handbook of organization change and innovation*. New York: Oxford University Press, Inc.
- VAN SLYKE, D. M. 2003. The mythology of privatization in contracting for social services. *Public Administration Review*, 63, 296-315.
- VILLADSEN, A. R. 2012. New executives from inside or outside? The effect of executive replacement on organizational change. *Public Administration Review*, 72, 731-740.
- VILLADSEN, A. R., HANSEN, J. R. & MOLS, N. P. 2010. When do public managers imitate each other? Mimetic decision making in contracting decisions of danish municipalities. *Public Organization Review*, 10, 357-376.
- WALKER, R. M. 2006. Innovation type and diffusion: an empirical analysis of local government. *Public Administration*, 84, 311-335.
- WALKER, R. M., BREWER, G. A., BOYNE, G. A. & AVELLANEDA, C. N. 2013. Market orientation and public service performance: New Public Management gone mad? *Public Administration Review*, 71, 707-717.
- WANG, Y. & ZHAO, Z. J. 2014. Motivations, obstacles, and resources: Determinants of public-private partnership in state toll road financing. *Public Performance & Management Review*, 37, 679-704.
- WARNER, M. E. & HEFETZ, A. 2012. Insourcing and outsourcing: the dynamics of privatization among U.S. municipalities 2002-2007. *Journal of the American Planning Association*, 78, 313-327.

Figure 1: Diffusion of ESCO contracts from 2008, 2010, 2012 and 2013.

Table 1: Descriptive statistics

Variable	Mean	Std.	Min	Max
ESCO	0.047	0.212	0	1
Emulation	0.329	0.470	0	1
Financial instability	1322	1389	5	17560
Administrative professionals	87.74	45.64	0	249
Director education	0.581	0.494	0	1
Director tenure	3.22	4.39	0	26
Director experience	0.185	0.388	0	1
Director age	53.16	5.87	38	65
Service level	1.01	0.049	0.91	1.25
Liberal mayor	0.46	0.499	0	1
Municipal size (log)	10.62	0.766	7.55	13.13
Expenditure pr. capita	74049	9542	51071	106459
Membership energy association	0.675	0.469	0	1
Tax base	34549	5074	26630	57880
Use of private suppliers	24.07	3.96	15.6	44.1

Table 2: Results of complementary log-log regression

	<u>Model 1</u> ESCO	<u>Model 2</u> ESCO	<u>Model 3</u> ESCO	<u>Model 4</u> ESCO	<u>Model 5</u> ESCO	<u>Model 6</u> ESCO
Constant	-22.61(-3.62)***	-23.14(-3.64)***	-20.60(-3.26)***	-18.95(-2.90)**	-28.73(4.17)***	-25.49(3.46)***
Emulation		0.78(1.62)*				0.9(1.84)*
Financial instability			0.00 (1.67)*			0.00(1.93)*
Administrative professionals				0.01 (2.13)*		0.01(1.45)†
Director education					-0.11(-0.25)	0.14(0.28)
Director experience					0.83(1.98)*	0.81(1.89)*
Director tenure					-0.17(-1.77)*	-0.19(-2.05)*
Director age					0.06(1.60)	0.08(2.08)*
Service level	13.87 (2.63)**	14.76(2.77)**	12.49(2.35)*	14.33(2.71)**	15.62(2.77)**	15.17(2.66)**
Liberal mayor	-0.16 (-0.38)	-0.01(-0.03)	-0.09(-0.21)	-0.02(-0.04)	-0.19(-0.46)	0.11(0.25)
Municipal size (log)	0.94 (3.00)**	0.95(2.89)**	0.88(2.93)**	0.87(2.93)**	1.01(2.83)**	0.86(2.67)**
Expenditure pr. capita	-0.00 (-1.45)	-0.00(-1.52)	-0.00(-1.41)	-0.00(-2.08)*	-0.00(-1.17)	-0.00(-1.50)
Membership energy association	-0.49 (-1.24)	-0.50(-1.25)	-0.54(-1.35)	-0.66(-1.63)	-0.51(-1.27)	-0.72(-1.75)†
Income tax pr. capita	-0.00 (-0.49)	-0.00(-0.86)	-0.00(-0.37)	-0.00(-1.33)	-0.00(-0.29)	-0.00(-1.08)
Use of private suppliers	0.00(0.06)	-0.00(-0.11)	-0.03(-0.37)	-0.02(-0.38)	-0.00(-0.02)	-0.05(-0.76)
Wald Chi ²	30.90 (12)**	33.80(13)***	33.55(13)***	35.07(13)***	39.99(16)***	49.99(19)***
N	520	520	520	520	516	516

Significance level: † p < 0.10; *p < 0.05; **p < 0.01; ***p < 0.001. One tailed test for hypothesized effects and two tailed test for controls (z value in brackets). Year dummies controlled for but results not reported.