Key Factors for Public Utility Efficiency and Effectiveness: Waste Management Services in the Czech Republic[1]

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Abstract

The article is focused on empirical analysis of municipal waste management services in the Czech Republic. Authors have identified the following key factors for public utility efficiency and effectiveness: recycling, competition, form of company ownership, the effects of economies of scale, inter-municipal cooperation, distance to landfill and hybrid organization. The aim of the article is to analyse these factors, and to discuss their relationship to cost efficiency and effectiveness with a focus on the impact of municipality size. Waste management expenditure in municipalities is most influenced by the achievement of economies of scale. Additionally, it was found that if a waste collection company is under public ownership, this has a similarly strong impact on expenditure. Another two important factors associated with cost savings and the management of waste collection companies are inter-municipal cooperation and hybrid organization, which are of equal importance.

Keywords: *waste management, efficiency, Czech Republic, economies of scale, inter-municipal cooperation*

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Introduction

Current local waste management expenditure accounts for approximately half of the total current environmental protection expenditure in municipalities in the Czech Republic. Czech municipalities are responsible for management in the

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area of municipal waste (MW) as this obligation has been included amongst the independent powers of municipalities. According to Act No. 185/2001 Coll., on Waste, municipalities are empowered to stipulate obligations. The Act on Waste, in connection with Act No. 128/2000 Coll., on Municipalities (The Municipal Order), concurrently enables municipalities to stipulate by means of a generally binding decree the system of waste collection points in their cadastral area, and the collection, transport, separation, utilization and disposal of municipal waste generated within that area, including the system for the disposal of building rubble. Not-inconsiderable expenses are needed for the production/provision of these public services. However, the majority of Czech municipalities are struggling with a lack of relevant resources, so it is not surprising that local governments have to look for effective as well as efficient means of managing the resources that are available to them. Our paper is focused on the still marginalized and insufficiently investigated area of local waste management expenditure in the Czech Republic. It contains an analysis of certain selected factors (namely recycling, competition, form of company ownership, the effects of economies of scale, inter-municipal cooperation, distance to landfill and hybrid organization) and their influence on the efficiency and effectiveness of local waste management.

We have investigated the influence of these factors in the case of 40 examples of best practice in local waste management in the South Moravian Region of the Czech Republic. The aim of the article is to analyse the factors influencing the cost of municipal waste management, and to discuss the relationship of these factors to cost efficiency and effectiveness with a focus on the impact of municipality size and type.

The article consists of several parts, the first of which covers the conceptual framework of our investigation. The state of the art in the field of public utility efficiency and effectiveness is presented there, and mention is made of different theoretical approaches which are used in research in the field of waste management. In addition, we try to identify those research issues which are insufficiently explained or have somehow been completely overlooked by researchers. In the second part we define our research questions and objectives, while the third section contains an explanation of our methods and provides relevant information about the collected empirical data. The next part contains an analysis of our data, and this is followed by the conclusion, which also includes a discussion.

The main contribution of this study is of a multi-dimensional nature. Within the discussion and conclusion part we try to formulate a theoretical summary of previous research results in the field of local waste management efficiency. While most previous studies have focused on the analysis of individual factors, our article contains more complex analysis, and we test several factors that affect the afore-mentioned efficiency. In addition, besides testing, we try to measure the influence of those factors, and we deal with the synergy effect, too.

1. Conceptual Framework of the Investigation

Waste management service efficiency and effectiveness is one of the most topical issues in present research in the field of public economics. Contemporary theories linked to the study of public service delivery which include, inter alia, the delivery of municipal waste management services, consist of various theoretical approaches and paradigms for solving issues connected with their efficiency and effectiveness. The first group of these approaches includes those which emphasize the active involvement of public authorities in the processes by which public services are delivered. One of the classic arguments supporting this choice is the potential failure of the market (Bailey, 2001). Opposite approaches, e.g. Neo-Taylorism or New Public Management, are based on the suggestion that the role of the public sector should be limited; they refer to the non-efficiency of the public sector when providing public services. These approaches have appeared particularly in recent decades, i.e. an era that is seeing the transfer of private sector corporate governance principles to the public sector (Bouckaert, 2014). Within the context of discussions about public administration reform (Pollitt and Bouckaert, 2011), these two theoretically contradictory groups of approaches are accompanied by a search for new alternative forms of public service provision based on the multilateral and mutually fruitful cooperation of the public, private and non-profit sectors (see e.g. Aucoin, 1990).

Even though the above-mentioned approaches and the individual theories contained within often differ significantly in their proposals regarding how public services should be delivered, what they have in common is that they seek an answer to the question of how to increase the efficiency of provided public services, and they analyse the role various factors play in the resultant economic effect. There are many international studies (e.g. Bel and Fageda, 2010; Bel and Warner, 2015; Citroni, Lippi and Profeti, 2013; Zafra-Gómez et al., 2013; Simões and Marques, 2012; Dijkgraaf and Gradus, 2013; Nemec, 2002; Mikušová Meričková and Nemec, 2013) as well as studies based on Czech data[2] (e.g. Soukopová and Struk, 2011; Soukopová et al., 2016) which have been published recently. Their analysis leads us to the conclusion that there are various factors influencing municipal waste management expenditure, such as price, quality of services, frequency of services, conditions of contract, previous experience, the technical equipment of a given company, the form of payment

[2] Due to the fact that municipal expenditure on solid waste management from 2012 to 2014 was more than 60% of current environmental protection expenditure, and accounts on average for 3% of total current municipal expenditure in the Czech Republic (Soukopová, Struk and Hřebíček, 2016), it is obvious that the area of waste management is an integral and indispensable part of municipal budgets and also a suitable area for measures aimed at saving public resources and seeking factors influencing the efficiency of their use.

for services, transportation capacity, the provision of other waste management services, the form of company ownership, ownership of an incinerator or landfill, and political influence. These factors may play a significant role in the determination of efficiency and effectiveness, and both the effectiveness and efficiency of local service delivery have been recognized as important research issues by the authors listed above. However, there are other factors which have remained outside the research spotlight with the result that their influence is still not clearly explained, e.g. recycling, competition, form of company ownership, effects of economies of scale, inter-municipal cooperation, distance to landfill (incinerator) and hybrid organization. Our basic research question is the following: "Which factors have a significant influence on the cost of municipal waste management?" In order to answer the question, it was necessary to take into account our research aims and, subsequently, to collect relevant data, choose suitable methods, and analyse the collected data by means of those methods.

2. Data and Methods

The basic variable selected for the analysis and comparison of individual municipalities in the Czech Republic was expenditure per capita. The research was performed with respect to data collected for the five-year period from 2010 to 2014. The input analysis was based on a sample of 6,223 municipalities in the Czech Republic, which is more than 99.5% of all Czech municipalities.

Data collection and processing were organized into several steps. First of all, the availability of the necessary data regarding all Czech municipalities was checked. Linked open data on municipal areas and populations from the Czech Statistical Office (CZSO) was used for the analysis alongside linked open data on municipal solid waste management expenses/costs (MSWE) from the Czech Ministry of Finance's MONITOR database. The described research was performed using data collected for the five year period 2010 – 2014. The initial sample consisted of 6,223 municipalities with complete data in the MONITOR database, though this sample was reduced to 5,913 municipalities to ensure normal distribution of the sample. First, we reduced the sample by removing all municipalities reporting the absence of (or a zero value for) municipal waste management expenditure (MWME), and then we sorted the sample based on MWME per capita level and removed the extreme values from the top and bottom of the list (trimming the top and bottom 2.5% (155 + 155) municipalities from the list), resulting in a final sample of 5,913 municipalities. Besides that, no adjustments to the sample were made. Table 1 displays descriptive statistics for both samples. It shows that the standard deviation of the reduced sample is much lower.

T a b l e 1

Descriptive Statistics for the Samples

	Number of municipalities	MSWE per capita [CZK/capita]				
		min	*max*	*mean*	*median*	*st. dev.*
Total sample	6,223	4.12	69,815.87	944.56	772.46	1,612.52
Reduced sample	5,913	408.64	8,919.71	877.68	774.64	551.17

Source: Authors, based on the MONITOR database.

In the second step we proposed population size clusters (Table 2). Our decision was based on one of our objectives, namely "the analysis of key factors of public utility efficiency and effectiveness in the cases of small and medium size municipalities (i.e. those with a population of up to 20,000 residents)". Subsequently, 40 municipalities with the lowest waste management costs in the South Moravian Region were selected as examples of best practice in terms of cost efficiency for use in the examination of the factors that affect cost efficiency and effectiveness. While selecting the mentioned municipalities, we kept in mind that we need proportional representation of all identified size clusters. At the same time, selected municipalities were required to meet the "best practice" criteria in the area of waste management in relation to the circular economy, namely the sorting of bio-waste, recycling, etc. Representatives of each selected municipality (i.e. representatives of the relevant local governments) took part in the research, during which the required data were obtained via a questionnaire-based survey and in-depth interviews. The survey was carried out from September 2014 to the end of January 2015. Table 2 shows the structure of the sample of best practice examples.

T a b l e 2

Descriptive Statistics for "Best Practice" Examples

Population size	Number of municipalities	MSWE per capita				
		min	*max*	*mean*	*median*	*st. dev.*
Less than 500	10 3,328*	411.22	712.93 52,315.93*	521.39 897.70*	468.60 791.74*	105.21 1,062.33
501 – 1,000	9 1,290*	450.89	844.09 52,302.15*	564.38 934.16*	538.41 757.47*	113.44 1,801.55
1,001 – 4,000	9 983*	408.64	873.61 22,058.29*	626.38 967.36*	616.36 802.51*	146.62 953.98
4,001 – 10,000	8 193*	589.31	1,002.35 5,658.95*	689.98 982.18*	666.36 897.12*	136.39 491.98
10,001 – 20,000	4 57*	658.24	1,214.93 3,464.73*	957.95 975.11*	979.30 936.69*	235.70 416.49

* Whole sample.

Source: Authors.

The methodological tools used for the analysis were set theory and cluster analysis, which were employed to classify the municipalities into groups (sets) by population size, region and district. Subsequently, we used descriptive statistics

tools and then applied hierarchical cluster analysis, performing decomposition into groups. The number of inhabitants (the population size of municipalities) and population density were selected as the basic variables for the cluster analysis algorithm.

2.1. Factors Selected for Analysis

A lot of research activities regarding factors influencing the effectiveness of the provision of waste management services have been conducted in recent years. Giving consideration to the relevant literature we selected the following factors for examination:

1. *Recycling* (e.g. Bel and Costas, 2006; Bel and Fageda, 2010)

We investigated the following areas with regard to this factor: the ratio of sorted waste to the total communal waste produced (a reference value of 33%[3] was selected for effective recycling); whether or not the municipality has organized the collection of sorted bio-waste (the year 2013[4] was selected to provide a reference value for efficient behaviour).

2. *Competition* (e.g. Bel, Fageda and Warner, 2010; Simões and Marques, 2012)

For this factor we performed an analysis of the Herfindal-Hirshman index for each given region (which hardly differed) and then investigated the number of competing companies in close proximity to the municipality (the presence of 2 or more competing companies was chosen as the borderline value for a competitive environment of medium strength).

3. *Form of company ownership* (e.g. Bel and Warner, 2008; Simões and Marques, 2012)

For this factor we investigated whether company ownership was public/private/mixed.

4. *Effects of economies of scale* (e.g. Dijkgraaf and Gradus, 2013; Bel and Warner, 2015; Simões and Marques, 2012; Zafra-Gómez et al., 2013)

Since the 1970s, the structure of the waste market and economies of scale have been targets of research. While for waste collection services the optimal scale (according to several previous studies) ranges between 10,000 and 50,000 inhabitants, we established this latter scale (20,000 inhabitants) as a reference value.

[3] According to research studies by authorized packaging company EKO-KOM, the basic items of waste that can be reused (paper, plastic, glass, metal, cardboard, or drinks-textiles, wood, etc.) account for nearly 33% of municipal waste The proportion of recycled items is lower, however, fluctuating around 29% of the total production of municipal waste from municipalities (Pačesová, 2013). In contrast, the common EU target for recycling is 65% of total MW and 75% of packaging waste by 2030.

[4] The obligation to separate biowaste has been in effect in the Czech Republic since 1 January 2015 (Decree No. 321/2014 Coll.).

5. *Inter-municipal cooperation* (e.g. Bel and Warner, 2015; Dijkgraaf and Gradus, 2013; Zafra-Gómez et al., 2013)

This factor is a phenomenon which has appeared in studies related to local waste management costs over the last decade. A range of studies draw attention to the fact that inter-municipal cooperation can lower costs.

6. *Distance to landfill (incinerator)* (e.g. Soukopová and Struk, 2011)

This factor is more common in studies of the more technical type in connection with regression analysis. Notwithstanding, we investigated it because we had already confirmed its significance in previous studies (we used a distance of 15 km as a reference value).

7. *Hybrid organization*

We selected this factor for the deeper analysis of the factor of company ownership. During in-depth discussions with municipal representatives we discovered that many waste collection companies are actually in public ownership (owned 100% by municipalities), yet have a market-oriented character (they are companies with limited liability or joint-stock companies) and generate profit. This factor is not typically included in international research studies in relation to waste management services, but it is a factor that is increasingly mentioned in relation to the commercialization of public services (e.g. Hulst and van Montfort, 2012) or public owned enterprises (Grossi, Papenfuß and Tremblay, 2015).

3. Results

While evaluating 40 examples of best practice drawn from municipalities and towns in the Czech Republic, several factors appeared to be of key importance (Table 3).

T a b l e 3

Factors Influencing the Cost-effectiveness of Municipal Waste Management Services

Factor	Absolute frequency*	Relative frequency**
Recycling	13	0.325
Competition (more than 2 competing companies)	12	0.300
Form of company ownership – public form	25	0.625
Effects of economies of scale	31	0.775
Inter-municipal cooperation	21	0.525
Distance to landfill (incinerator)	19	0.475
Hybrid organization (form of company)	21	0.525

Note: * The *absolute frequency* is a statistical term describing the total number of trials or observations within a given sample. ** The *relative frequency* (or empirical probability) of an event is the absolute frequency normalized by the total number of events. It describes how often something happens divided by all outcomes.

Source: Authors.

It can be seen from the table that expenditure on waste management in municipalities is most influenced by economies of scale, and additionally by the public ownership of the waste collection company. The inter-municipal cooperation and hybrid organization factors have the same frequency. We have examined these four factors in greater detail and analysed whether they have a greater effect in smaller or larger municipalities (see Table 4).

T a b l e 4

Relative Frequency Results for the Four Selected Factors Influencing the Cost-effectiveness of Municipal Waste Management Services in the Largest Manner, Arranged According to Municipal Population Size

Population size	Number of municipalities	Economies of scale	Form of company ownership (public)	Inter-municipal cooperation	Hybrid organization
Less than 500	10	0.500	0.600	0.400	0.500
501 – 1,000	9	0.888	0.666	0.555	0.444
1,001 – 4,000	9	0.888	0.555	0.555	0.555
4,001 – 10,000	8	0.875	0.625	0.500	0.500
10,001 – 20,000	4	0.750	0.750	0.500	0.500

Source: Authors.

While evaluating the relationships between population size and the selected factors, we ascertained an interesting point which is not explained in any international study. Results show that the most diverse results are linked to the smallest municipalities, particularly in case of the factor – economies of scale (see Table 4).

For the smallest municipalities up to 500 inhabitants is more important public form of waste collection company as the factor of cost efficiency. One of the possible explanations is based on the assumption that the local managers of these municipalities (particularly those that are part time mayors without proper economic or legal education) have insufficient expertise at their disposal. Likely, they are not able to take advantage of economies of scale. Obviously, there are other possible factors (e.g. Půček et al., 2016) but this issue should be investigated via further research.

4. Discussion

4.1. Economies of Scale

According to existing research, potential economies of scale at the municipal level are primarily related to administration and the costs of political representation. Within this context, we can mention the classical “Dahl-Tufte dilemma”, which stipulates that larger municipalities tend to be more effective providers of various local services while, on the other hand, smaller municipalities tend to be

more democratic. Or, putting it another way, while larger municipalities are less democratic, smaller municipalities are less efficient (Dahl and Tufte, 1973). There is an assumption that fixed costs are higher in more capital-intensive production. Thus, economies of scale are likely to be found in capital-intensive municipal services (road maintenance, waste management) and not so often in personnel-intensive production (Dollery and Fleming, 2006).

From the point of view of previous research (e.g. Bel, Fagenda and Warner, 2010; Bel and Warner, 2015), the theory holds true that the larger the serviced area, the higher the optimization of the whole waste management system that can be achieved by the operators of refuse management services, including the full utilization of the capacity of facilities that utilize and dispose of waste. As a result, the unit costs of the system decrease and the load on municipal budgets is lower.

The results from the analysis of economies of scale in waste management in the Czech Republic correspond to the outcomes of international studies and are in accordance with the research of other authors who deal with similar issues using data from the Czech Republic (e.g. Matějová et al., 2014; Plaček et al., 2014). The expected effect of savings derived from economies of scale is a determinant motive for the establishment of inter-municipal cooperation. During more detailed investigation it was found that this factor is obvious mainly in municipalities which participate in the ownership of the waste collection company (e.g. EKOR, RESPONO) and have the chance to profit from the savings from economies of scale, which are then reflected to a great extent in the lowering of the costs of these municipalities. However, the effect of savings from economies of scale is also obvious in municipalities which are in partnership with those private companies that rank among the most important firms in the area of waste management (particularly multinational corporations SITA CZ and A.S.A.).

Interviews with the representatives of local governments have revealed another potential research issue which is, however, beyond our initial research intention. Some of the representatives have pointed out that management expertise may have some influence on waste management efficiency. It is, however, debatable whether the individual expertise of local managers influences the efficiency of total (i.e. municipal) waste management in a significant way. This issue might be an interesting subject for future research. In addition, one can asks whether the efficiency of overall municipal waste management is clearly connected with the price policy of waste collection companies and the municipal waste charges.

4.2. Form of Ownership

The form of ownership of waste management services is another topic which is widely discussed within the context of the evaluation of efficiency. This is mainly due to the assumption that privatization reduces the costs of public

service delivery. The major theoretical approaches to privatization suggest that competition can have a positive effect on cost savings. The results of studies by Bel et al. (2014) and Bel and Warner (2008) do not show cost differences between private and public production, however, and a number of other studies indicate that ownership is not important. A key factor is tendering. Domberger et al. (1986) point to the fact that tendering is cheaper than in-house production, but when contracts are awarded by tender, public and private units do not show significant differences in costs.

The factor of the public ownership of companies is associated with some seemingly surprising findings. Previous studies (e. g. Hirsch, 1995) show that private companies attain better values for the cost efficiency indicator. Our research did not confirm this conclusion. In more than 80% of the municipalities with the lowest waste management costs, collection was provided by 100% public companies – owned by the municipalities themselves. We consider the unambiguously positive factor of the public ownership of waste collection companies to be explained by the role of competitive effect, by the previously-explained influence of savings from economies of scale, and by the influence of the factor of inter-municipal cooperation on cost-effectiveness. The Czech Republic is generally among those countries in the EU where a below-average number of applicants participate in public tenders, and the field of waste management is no exception to this rule. There is therefore a weak competitive environment, the result of which is that private companies that win waste collection tenders are able to charge a relatively high price for their services. This helps to explain why more than four fifths of the municipalities with the lowest waste management costs use companies which are owned by the municipalities themselves.

The analysis of ownership form opens up some new areas for expert discussion. As was previously mentioned, there are many mixed collection companies in Czech municipalities. These companies are co-owned by both the municipalities and private enterprises. This fact highlights a sensitive issue: what is the relationship between the effort to compete (the influence of private ownership) and the effort to achieve economies of scale (the influence of inter-municipal cooperation)? Another research issue is linked to the potential relationship between service delivery type (e.g. in-house, outsourcing) and the population size of a given municipality. Although it was not the aim of our analysis, we can assume that smaller municipalities prefer internal forms of delivery (e.g. in-house or via a company they own), while larger municipalities prefer outsourcing.

Taking into account non-economic factors, it should be stressed that the current state of the art in this field is based mainly on economic studies, and there is a lack of other approaches, including those that are interdisciplinary in nature.

For instance, the decision of a small municipality on the in-house delivery of services linked to waste management can be based not only on strictly economic criteria, but also on personal distrust towards the representatives of neighbouring municipalities, an effort to decrease local unemployment, the desire to cling to some local traditions, etc.

4.3. Inter-municipal Cooperation

Those authors who support inter-municipal cooperation usually give emphasis to the reduction of costs and the improvement of the quality and availability of local services (Mäeltsemees, Lõhmus and Ratas, 2013). In other words, they stress that inter-municipal cooperation improves both cost-effectiveness and administrative efficiency (e. g. Dollery and Akimov, 2008).

As municipal waste management costs have seemed to rise in recent years in the Czech Republic, there is an increasing demand for efficient and effective solutions from municipalities. The increasing cost of waste disposal (especially waste landfilling in conformity with national regulations) and waste separation (the rising number of collection points and greater hauling frequency needed), alongside increasing wage levels, etc., call for measures that can utilize the positive effects of economies of scale, or economies of density – i.e. inter-municipal cooperation. More than half of the analysed municipalities where the lowest waste management costs were indicated are involved in some form of inter-municipal cooperation. Most examples of such cooperation involve service delivery either via an organization which is co-/owned by the cooperating municipalities, or via a voluntary association between the cooperating municipalities. These facts support the general assumption that inter-municipal cooperation might play an important role in lowering costs. Furthermore, 13 out of these 21 municipalities are small, with populations of up to 2,000 inhabitants, and another two municipalities are relatively small, with populations of up to 5,000 inhabitants. This fact confirms the assumption that inter-municipal cooperation will have higher positive impacts in the cases of small municipalities.

The behaviour of municipalities engaged in inter-municipal cooperation can be viewed as that of rationally and honestly behaving principals and agents. One of the positive effects of inter-municipal cooperation is the fact that it involves low staffing costs.[5] Municipalities do not hire any additional workers for the realization of inter-municipal cooperation, using their available personnel instead. The needed amounts of qualified staff for the performance of new activities related to the implementation of inter-municipal cooperation are obtained

[5] These are costs induced via inter-municipal cooperation within the "principal – agent" relationship. These costs are incurred by municipalities as a result of their involvement in inter-municipal cooperation.

via reengineering and the restructuralization of activities. This fact also confirms the rationality of the behaviour of relevant municipal actors who efficiently use their knowledge of their environment to make effective decisions.

The result of inter-municipal cooperation is the foundation of the municipalities' own waste collection company. Such a company is a hybrid (a company with limited liability or a joint-stock company), as it is in public ownership while generating profit. A company created in such a way is a rationally-behaving economic actor which acts to expand its action radius and also seeks clients who are not directly connected to inter-municipal cooperation. The result of such "company expansion" is an increase in the waste collection area in which the company operates. It has a positive impact on the growth of profits and savings from economies of scale. A synergic effect is once again in evidence.

4.4. Hybrid Organization

Concerning local services and their delivery, it must be stressed that 'service provision' is not the same as "service production" (Oakerson, 1999). It is thus no surprise that a rich variety of forms of service provision have been developed by local governments. It can be concluded from the results of our investigation of good practice examples that municipalities use service delivery organizations (Hulst and van Montfort, 2012; Grossi and Thomasson, 2015) of a so-called hybrid nature since they are in public ownership but have a market-oriented (profit- -making) character, which is another key factor for waste management cost efficiency. In the Czech Republic this factor is closely connected with the inter-municipal factor when voluntary associations of municipalities establish waste-collection companies which behave in a completely market-oriented manner (they are market-oriented types of company, such as firms with limited liability and joint-stock companies, and are controlled by professional managers) and even generate profit. This type of hybrid organization thus plays its part in the increasing degree of commercialization of municipalities. Moreover, municipalities which have higher shares in the ownership of waste collection companies have greater decision-making rights and subsequently greater influence over their own costs and waste management.

While examining the factors of inter-municipal cooperation and hybrid organization, we can observe an interesting phenomenon: 1. Almost public hybrid waste collection companies are established through inter-municipal cooperation. 2. Public ownership is typical for each company which has been established through inter-municipal cooperation. This phenomenon can be explained by the fact that the actors involved behave in an economically rational manner while possessing good knowledge of the environment in which they operate. As they

are closely familiar with this environment, they have enough information available for their decision-making. They can therefore seek and choose optimum solutions for the execution of their activities. The result of this choice is an impact on the lowering of costs.

Conclusion

The effectiveness of waste management is influenced by many factors. Out of these, the following were identified as being of key importance: savings from economies of scale, public ownership of the waste collection company, inter-municipal cooperation and the use of a hybrid form of company organization. The listed factors are dependent on one another and generate a synergic influence on cost effectiveness. An analysis of these factors is examined in the form of an example of best practice which is a generalization from the examination of a set of 40 municipalities in the Czech Republic which have been achieving excellent results with regard to the factor of the cost effectiveness of waste management.

The investigation proved that cost savings can be derived from economies of scale. It confirmed that the expected effect of such savings is a key motive for the establishment of inter-municipal cooperation, which reciprocally reinforces the aforementioned savings from economies of scale. In other words, besides various forms of outsourcing and public-private initiatives, inter-municipal cooperation was confirmed as a suitable instrument to overcome deficiencies linked to the fragmented structure of local authorities (compare this conclusion with, for instance, the results of Citroni, Lippi and Profeti, 2013; Dowding and Feiock, 2012). The result of inter-municipal cooperation is namely the founding of the municipalities' own waste collection company, which operates over a larger area and achieves lower costs. International research shows better cost indicators for private companies (Dollery and Akimov, 2008), but this conclusion is not valid in the Czech Republic, where higher cost effectiveness is achieved by companies in public ownership. This conclusion is mainly the result of the weak competitive environment as regards public tendering in the Czech Republic, and also of the fact that waste collection companies founded through inter-municipal cooperation are hybrids which behave as rational economic actors with an interest in the results of their activities. Within this context, it is possible to state that the "one size fits all" approach to environmental policy integration is neither desirable nor practicable (Watson et al., 2008). In conclusion, the results of the investigation can be summarized as a set of interesting findings which can be used in further research involving comparisons with other EU countries (e.g. Dijkgraaf and Gradus, 2007; Sørensen, 2007; Tavares and Camões, 2010; Zafra-Gómez et al., 2013).

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