Business in Waste Treatment

Ivana Faltová Leitmanová, Filip Petrách, Jaroslav Šetek, Jiří Alina

Abstract: Waste seem to be one of the major phenomena of 21. century, mainly due to the growing consumption in the broadest sense. The waste must be collected, sorted, processed and as small as possible to store. Submitted paper focuses on activities in branch of waste treatment (including collecting, sorting proceeding waste) except dangerous waste. The amount and structure of this waste can be considered as fundamental factors influencing the business in this area, as well as factors of economic, administrative and environmental.

Key words: Waste treatment · Business

JEL Classification: D22 · Q53 · M21

1 Introduction

In the context of valid legislation, Act No. 185/2001 Coll., on waste, defines waste management, including but not limited to, as activity aimed at waste treatment and follow-up care for site where waste is permanently deposited.

Framework for all considerations regarding waste, both municipal and industrial, is fundamentally determined by the extent of sustainable consumption. Consumption behaviour and following waste treatment are determinative factors that create prerequisites for elimination of waste dumping. It is proved that it is an activity of economic-environmental dimension in the Czech Republic by the 41. notice of the OPE, that enables applicants to get subsidies for projects aimed on construction and modernization of facilities for collecting, sorting and processing of waste in total amount of CZK 1,85 billion. Not negligible amount of money is considered also for the field of construction and modernization of facilities for waste material utilization and biogas stations. The goal of the waste processing is to effectively reduce amount of waste ending in waste dumps.

Economic dimension of considerations in the field of waste is partly depicted by following chosen financial characteristics of economy of business entities from the field of waste collecting, sorting, processing and elimination per CZ-NACE with more than 50 employees. For example, the outputs reached more than 41 billion CZK in 2011, almost 40 billion in 2014. The added value reached almost 2 billion in the whole period.

The chosen financial indicators in waste collecting, elimination and processing industry, 2011 – 2014, Czech Republic, (in CZK thousands)

<table>
<thead>
<tr>
<th>CZ-NACE</th>
<th>Production (CZK thous.)</th>
<th>Production Index</th>
<th>Production Consumption (CZK thous.)</th>
<th>Production Consumption Index</th>
<th>Added Value (CZK thous.)</th>
<th>Added Value Index</th>
<th>Profit Margin (CZK thous.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>39 220 683</td>
<td>104.1</td>
<td>27 463 073</td>
<td>102.7</td>
<td>11 757 610</td>
<td>107.5</td>
<td>337 651</td>
</tr>
<tr>
<td>2013</td>
<td>37 505 025</td>
<td>97.6</td>
<td>26 221 761</td>
<td>95.7</td>
<td>11 283 263</td>
<td>102.4</td>
<td>549 131</td>
</tr>
<tr>
<td>2012</td>
<td>39 261 593</td>
<td>95.1</td>
<td>27 767 207</td>
<td>94.3</td>
<td>11 494 386</td>
<td>97.1</td>
<td>720 164</td>
</tr>
<tr>
<td>2011</td>
<td>41 043 850</td>
<td>108.0</td>
<td>29 119 930</td>
<td>110.6</td>
<td>11 923 920</td>
<td>102.2</td>
<td>624 966</td>
</tr>
</tbody>
</table>

Source: www.czso.cz

Private firms as well as organizations in public property are involved in activities of waste management.

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Analysis made by Ochnara, Šumpiková, Nemec, Pavel, J., & Meričková (2007) says that evaluation of efficiency of individual forms of providing services will not be possible before systematic reform of public sector accounting. It will be possible to correctly compare internal and external means of services arrangement only when the municipalities use actual accounting and cost centres. Pavel (2007), on the grounds of pilot study, it seems that municipal companies as such does not have to mean wasting of public finances. If the competition is permitted and municipal company gets a commission in fair public procurement, the costs are similar to the costs using external provider. The costs are even lower in some cases. This conclusion confirms argument that the key driving force in increasing efficiency of public sector is competition and not the change of ownership (Rais, Benko, Rod, 2016).

Volek and Novotná (2012) also warn, in the context of time horizon, of influence of phases of entrepreneurial cycle productivity during investigation of productivity, Meričková and Nemec (2013) conclude that probably the most important factor is level of competition in the field of the commission and that more satisfactory level of observance of contracts among involved sides in Slovak conditions requires interventions. The interventions lead to improvements in partial processes as well as to better overall results.

Soukupová and Malý (2012) state in the conclusion of their study that the form of ownership of a waste collecting company is important factor influencing the amount of costs. The considerations about lower possible expenditures are influenced by frequency of the collections.

Waste collection among individual municipalities improves efficiency of waste collection in terms of “returns to scale” via increased amount of waste as well as in terms of “optimization of transportation flows” via collection routes. Increase in volume of waste can lead to increase of competition in the field of public procurement, because of the increase of attractiveness of the business for potential entrepreneurs.

On the other hand, if the waste is dealt with in the place of its origin, the large amount of costs connected with its collection and transportation is saved. It is especially important in rural areas. This fact has increasing importance in developing countries (Wu, Zhang, Lü, Shao, He, 2014). Sorting and separation of waste is generally hard to execute in rural areas both from economic and ecological perspective. Jana Poldnurk (2015) states that there is no direct pressure coming from law regarding sorted waste in rural areas, if the mixed waste is being burned. Specifically, separated waste collection can be applied in cities and rural municipalities with higher density of population, for example in case of bio-waste. If an anaerobic rotting reservoir was too far away and so the decrease of CO2 emissions would be degraded by an increase of emissions related to transportation flows. Even Uz Zaman and Lehmann (2011) analysed optimal positioning of waste collection place station. They concluded that the optimal position is in the centre of a city, because the companies pay transportation costs and decide whether to collect waste together simultaneously or gradually. The waste collection station behaves as centripetal force that attracts companies with the goal of cost minimalization. This way involved companies are located closer to each other which can result in lower prices. In this fact Homolka, Slaboch and Švihlíková (2014) did research of operating efficiency at biogas plant in years 2010 – 2013 in Czech Republic.

Tendency of the society towards crucial changes in the pricing method of waste and its recycling are constantly growing. However, changes of behaviour and educational programs with the goal to increase awareness about this area are necessary to make recycling the reality in the economy of 21st century. Consumers must be informed about the fact that the waste is rare resource. For example, the value of food waste, electronic waste, glass and cardboard – the waste is valuable. Also the legislation must be valid and enforceable so that producers and construction companies were more material efficient and less wasteful (Bárcena-Ruiz, Casado-Izaga, 2015). Pakpour et al. (2014) on the ground of extensive research in Iranian households, that attitude, subjective norms, control of behaviour, moral obligation, identification with the problem of waste, intention, prospect and behaviour in the past play important role in “production” of waste as well as in the process of waste treatment.

Slavík and Pavel (2013) had a thought about motivation potential of variable fees set in dependence on the amount of sorted recyclable waste but also on the amount of waste saved in dumps. This way set fees which reflect costs fulfil also satisfactory fiscal as well as informative role. Households would get information about preciousness of capacities for waste processing and could adjust their behavior accordingly.

Systemic solution that has the character of holistic approach to problems connected with waste in 21st century is concept of so called zero waste. Professionals have come up with various ideas, plans, policies and strategies and applied them in their cities to achieve goals of zero waste. However, it is essential to rebuild holistic strategy in dependence on its execution and practicality of its feasibility. In this moment, the zero-waste strategy is focused towards zero dumps via redirection of waste. However, it is currently not possible to achieve 100% degree of redirection, neither in production nor in consumption. It is need to universally transform contemporary systems.
of mining, production, market entry and consumption. It follows that the partial goals need to move towards zero waste (Uz Zaman, 2015).

In December 2014, the government of the Czech Republic approved Waste Management Plan for period 2015-2024. Main goals of the strategy are to prevent formation of waste, increased recycling and usage of waste as a material. The plan is a key document for realization of long term strategy for treatment of waste, wrappers and expired products.

Kalina (2012) in connection with these intentions speaks about second definition according to which “Integral Waste Management System is functional, environmentally acceptable, cost effective and socially acceptable system for waste management in area that requires minimal state interventions, the system has minimal or no negative effects on environment and is able to ensure fulfilment of waste management policy approved at the given area.”

2 Methods

In this paper are analysed enterprises with prevailing activity in category 38110 – Waste collecting, waste treatment, except dangerous waste according to classification CZ - NACE. In terms of analysis in total 116 companies were monitored on the basis accounting dates availability having legal form joint-stock company and limited liability company. These enterprises were at the same time under reviewed also according to their ownership structure – private (owner is personal entity or corporate body, total 34 companies), municipal (owner is town or municipality, total 49 society) and mixed (co - ownership private and public sector, in total 16 companies). At remaining 17 joint - stock companies authors were unsuccessful in finding owner. At these companies in years 2008 – 2014 values of average and median chosen indicators of financial analysis were analysed (assets profitability, operating profit margin).

The indicators of financial analysis were found according to following relations:

\[ ROA = \frac{EBIT}{A} \times 100 \]  \hspace{1cm} (1)

\[ OPM = \frac{EBIT}{sales} \times 100 \]  \hspace{1cm} (1)

where:

OPM is operating profit margin

Further productivity of labour was monitored in years 2010 – 2014 (accounting value added/personal costs), indebtedness (extraneous sources/capital in total), portion of short - term loan capital (short-term liabilities + short - term bank loan and aid/external sources), portion of long term load (bank loan and aid/extraneous sources), portion of personal expenses (personal expenses/costs in total) and further index of gross value added, index of long - term property at above - mentioned companies.

Source data was gained from portal www.justice.cz, database Czech Statistical Office referred to as Registr economic entity and database Albertina.

Sources and methodology:

- Analysis of companies with predominant activity in category 38110 – Collection of non-hazardous waste per classification CZ-NACE
- Time series 2008 – 2014
- 116 companies (municipal, mixed, private ownership)
- Assets profitability
- Operating margin
- Added Value Index
- Productivity Index
3 Research results

Analysed sample of companies was compared with chosen indicators on level line 38 Collection, removing waste, treatment of waste for reusing. In graph 1 is evident that at monitored companies the lowering of value added was happening. This decline wasn't however so expressive, as a change in whole branch. This is to some level caused by the fact, that in division 38 Collection, removing waste, treatment of waste for reusing are included enterprises whose aim at waste disposal and processing wastes for reuse.

**Figure 1** Added Value Index

![Graph 1](image1.png)

Source: Own processing

Year by year labour productivity index was dropping down until 2013 in whole section 38 Collection, removing waste, treatment of waste for reusing also in monitored sample of companies. The moderate growth was reached as far as in the year 2014. Value added was gently dropping down in the framework of all branch, while employees allowance was approximately same in the whole time series. Branch 38 Collection, removing waste, treatment of waste for reusing and analysed companies so didn't correlate much with general economy development.

**Figure 2** Labour Productivity Index

![Graph 2](image2.png)

Source: Own processing
Companies in mixed ownership, in the framework of monitored period, reached maximum value of assets profitability. Median value of assets profitability was in interval 8 – 12%, as can be seen on picture 1. This form of ownership didn’t record any loss-making enterprise in the year 2014. On the other hand the highest percent representation of loss-making enterprises in same year was recorded at private ownership forms, where approximately 25% of all companies with this ownership form gained loss. Municipal companies in case of this indicator recorded steadiest tendency along the whole time period.

Figure 3 Median of Assets profitability

![Figure 3 Median of Assets profitability](image)

Source: Own processing

The indicator of operating profit margin is closely connected with assets profitability indicator. Considering this linkage municipal companies were the most stable at this indicator, when median of operating profit margin was moving in interval 2,8 – 5% in the framework of all monitored period. The highest value of operating profit margin median was recorded at companies in mixed ownership form, whereas no company in those group reached negative operating profit margin. On the other hand, most companies with negative operating profit margin were found in case of private ownership form, when average negative operating profit margin in the year 2014 got in value - 12%.

Figure 4 Median of Operating margin

![Figure 4 Median of Operating margin](image)

Source: Own processing
Considering positive economic development in recent years this paper also aims at development of basic indicators related with development of personal expenses and financial resource of particular companies. In abbreviated time series following indicators were to be monitored.

### Table 2 Development of chosen indicators - companies with prevailing activity in category 38110 – Collecting waste, waste treatment, except dangerous waste

<table>
<thead>
<tr>
<th>Year</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labour productivity in CZK</td>
<td>2.16</td>
<td>1.88</td>
<td>1.83</td>
<td>1.76</td>
<td>1.79</td>
</tr>
<tr>
<td>Portion of personal cost in %</td>
<td>28.00</td>
<td>28.56</td>
<td>29.09</td>
<td>29.72</td>
<td>29.91</td>
</tr>
<tr>
<td>Indebtedness in%</td>
<td>28.92</td>
<td>29.09</td>
<td>33.97</td>
<td>32.85</td>
<td>33.31</td>
</tr>
<tr>
<td>Portion of short - term loan capital in %</td>
<td>75.74</td>
<td>77.91</td>
<td>79.50</td>
<td>83.92</td>
<td>80.89</td>
</tr>
<tr>
<td>Portion of loan load in %</td>
<td>10.55</td>
<td>11.37</td>
<td>10.64</td>
<td>9.90</td>
<td>9.50</td>
</tr>
</tbody>
</table>

Source: Own processing

From above - mentioned table is evident downward trend of labour productivity, which was in relation to increasing portion of personal expenses probably caused by growth of wages at steady development of value added. Short - term indebtedness of monitored companies gently growths in time series, whereas at the same time the lowering of companies loan load was happening and recorded. Companies were operating with approximately thirty per cent of loan capital.

### Table 3 Development of chosen indicators – companies with above average labour productivity and with prevailing activity in category 38110 – Collecting waste, waste treatment, except dangerous waste

<table>
<thead>
<tr>
<th>Year</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labour productivity in CZK</td>
<td>5.36</td>
<td>3.61</td>
<td>3.50</td>
<td>3.14</td>
<td>3.39</td>
</tr>
<tr>
<td>Portion of personal cost in %</td>
<td>14.66</td>
<td>18.26</td>
<td>20.10</td>
<td>20.52</td>
<td>21.41</td>
</tr>
<tr>
<td>Indebtedness in%</td>
<td>43.75</td>
<td>35.05</td>
<td>32.42</td>
<td>36.40</td>
<td>37.07</td>
</tr>
<tr>
<td>portion of short - term loan capital in %</td>
<td>63.99</td>
<td>69.44</td>
<td>65.20</td>
<td>73.86</td>
<td>61.12</td>
</tr>
<tr>
<td>portion of loan load in %</td>
<td>7.89</td>
<td>10.38</td>
<td>11.04</td>
<td>7.23</td>
<td>10.76</td>
</tr>
</tbody>
</table>

Source: Own processing

Relative percent occurrence of companies with above average labour productivity in monitored time series proceed between 20 and 30% from the whole sample. In case of these companies (with above - average labour productivity) it was possible to record markedly lower portion of personal spending on all-in cost in comparison with all analysed companies. by all means These companies operated with higher average indebtedness and higher portion of loan load.

### 4 Conclusions

When thinking about business in the field of waste, it is necessary to take account of several things. First, is it really the field which is primarily about business? Or is it primarily about public interest satisfaction? It turns out that currently it is probably about business with more or less obvious entry of public resources. Another thing that needs to be taken in account is fact that realization of systemic solution in the form of so called zero waste is perspective goal. The fulfillment of the goal requires longer time horizon. Corresponding framework have to be build step by step via legislative and educative tools and measures during the horizon. The goal can be fulfilled only if the framework connects utility and costs as well as their individual and social dimension.

### References


