What motivates people to separate waste and how to improve it – comparison of Taiwan and the Czech Republic

Michal Struk, Ekaterina Vasileva

Faculty of Economics and Administration
Masaryk University
Introduction

- Performance of waste management policies (WMP) and waste separation
- Attitudes of residents at municipal level
- Different tools to affect attitudes
  - „Mandatory“, based on incentives and monetary effects
  - „Moral“, based on moral obligations, like environmental concerns
Motivation

- Different countries approach the goal of increased waste separation in different ways
- Evidence from Taiwan shows very good levels of municipal waste separation
  - What are the drivers and factors that influence this, how is the system set? Are there any problematic aspects?
- What can we learn from these practices?
  - Can we somehow utilize the knowledge and experience?
Goal of the study

- Comparison of municipal waste management practices in Taiwan and the Czech Republic
- Identify good practices and drivers
- Propose how can one learn from the other to improve WM practices (both ways)
Taiwan and the Czech Republic

- Taiwan – a high density (650/km²) island in East Asia, 24 mil. population, 36k km²
  - Semi-mandatory source waste separation since 2000
- Czech Republic – landlocked country in central Europe, 11 mil. population, 79k km²
  - Voluntary source separation slowly growing since 2010s
- WM is under municipal jurisdiction in both cases
Comparison of WM aspects

- People generate cca 0.8 kg waste/day in both
- Dominant flat fee per capita (CZ) X combination of fixed fees and penalties (TW)
- Bins at specified places with regular pick-up, unlimited time access (CZ) X scheduled door-to-door pick-up by trucks (TW)
Composition of recyclable waste:

Composition of recyclable waste: Czech Republic, 2018
- Paper: 30%
- Plastics: 25%
- Glass: 23%
- Other: 15%
- Metal: 7%

Composition of recyclable waste: Taiwan, 2018
- Paper: 39%
- Food: 29%
- Metal: 17%
- Plastics: 8%
- Glass: 6%
- Other: 1%
Waste separation results

Waste separation rate of municipal waste, % of total waste generated

<table>
<thead>
<tr>
<th>Year</th>
<th>TW</th>
<th>CZ</th>
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<tbody>
<tr>
<td>2004</td>
<td>24.01</td>
<td>5.50</td>
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<tr>
<td>2005</td>
<td>29.42</td>
<td>6.20</td>
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</tr>
<tr>
<td>2008</td>
<td>41.80</td>
<td>10.40</td>
</tr>
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<td>2009</td>
<td>45.48</td>
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<td>2010</td>
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<td>2015</td>
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<td>2016</td>
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8th International Conference on Sustainable Solid Waste Management, Thessaloniki, 23. 6. 2021
Waste separation results

Recyclables generation in the Czech Republic and in Taiwan, kg per capita per day

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Reasons of TW’s good results?

– Waste pickups only using designated bags
  – Different prices according to volume, basically volume-based fees
– Free disposal of recyclables (incl. kitchen waste)
– Much stricter control over waste separation
– Very few bins with unlimited public access
– Inspectors + volunteers check compliance
  – Post online photos for public shaming of non-compliers
  – Photos are deleted after penalty is paid (up to 30x avg. annual fee)
But what about the perception?

- Qualitative aspects of citizens’ perception of WMPs in both countries
- Semi-structured interviews with people with experiences of living in both countries
  - 10 Taiwanese, 11 Czech, spent at least 3 months in country and thus experienced WMP in practice
Values and knowledge

Ecological concerns typically trigger positive waste sorting behavior

Significant difference between TW and CZ:

- All TWs were taught at schools and families, regular lessons about waste separation importance, engaging activities at schools
- On the other hand, while CZs received some information at schools, it was not regularly emphasized, little to no practice, not compulsory part of the curriculum
Social factors

– Social background can play an important role
  – TWs consider waste separation to be a common practice that is beneficial to the society, they basically consider it as a civil duty
  – CZs consider waste separation to be an activity for minority, or that it is just becoming something more common
  – CZs often expressed feeling of social pressure and demotivation
  – But majority of CZs agree that such activity is beneficial for the society, and it is likely to eventually become a social norm
  – TWs consider waste separation as norm, no social pressure at all, rather a natural activity
Convenience

- Convenience strongly influences decision to sort
  - TWs have to bring their waste to the pick-up trucks at certain times
  - All types of recyclables can be brought to the same place
  - Some residences offer temporary storage of waste, thus accessible
  - Convenient as long as people are used to it, and the timetable fits, but generally prefer permanently accessible alternative

- CZs disliked fixed timetables, sometimes resulting in improper behavior, once they missed the pick-up
- Unlimited access to bins much more preferred by both TWs + CZs
- Czech system offers much room for irresponsible behavior
  - Sometimes not all bins for all fractions at one place
Incentives

- Presence of incentives is often found to significantly influence one’s behavior
  - TW and CZ utilize the opposite approaches, with TW focusing on penalties, while CZ focusing on rewards (if present)
  - TWs do not consider positive incentives as necessary, as waste separation is a norm, why deserve any reward?
  - CZs welcome rewards and consider them motivational

- On the other hand, TWs see themselves as polluters, while CZs consider producers to be the main problem and shift responsibility
Summary

- Essential motivation for waste separation is habit
  - In TW strongly rooted in systematic education

- Availability and convenience help greatly
  - TWs in the Czech Republic tend to separate less carefully
  - CZs in Taiwan separate more thoroughly

- Strict control and penalties result in better rates
  - Being under different system influenced behavior both ways
Suggestions

- Critical role of education – separation a norm
- Strict penalties and public shaming questionable
- Permanently accessible waste storage preferred
  - But not publicly available
- Collective penalties demotivational
- Flat fee can lead to carelessness in separation
Conclusion

- Taiwan shows impressive waste separation rates
  - Combination of education, tradition, incentives and availability

- Czech Republic represents much younger system with significantly worse results
  - Great potential to learn from practices

- Both approaches show pros and cons
  - Minor changes based on experiences could further improve results
Thank you for your attention

Michal Struk, Ekaterina Vasileva
struk@muni.cz