

## DETERMINANTS OF CONSUMER INCLUSION INTO CIRCULAR ECONOMY. CASE STUDY OF CITY OF LODZ

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**Abstract:** Development of a circular economy is one of the goals of the European Union. It is hard to picture a success in this field without the engagement of households. In the paper an attempt to answer the following research question was made: “What factors impact human behaviour that engages them into circular economy?” In the research, a thorough survey has been carried out in Lodz in July 2019. The results are diversified in terms of gender, age, and education. One of the main factors hindering the initiative of municipal waste segregation is the complexity of the process, resulting in high time consumption. Also, it is worth mentioning that people do not identify environment protection and profitability as linked phenomena.

**Keywords:** Municipal waste management, circular economy, city of Lodz, discontinuous innovation.

### 1. Introduction

As human population develops and consumes more and more goods, the amount of waste produced is also growing. Concept of discontinuous innovation was an inspiration for research in terms of the municipal waste management system and circular economy in the city of Lodz (Poland). According to Article 3 Waste Framework Directive 2008/98/EC waste means “any substance or object which the holder discards or intends or is required to discard”. In the paper an attempt to answer the following research question was made: “What factors impact human behaviour that engages them into circular economy?”.

The Parliament of the European Union in Directive 2008/98/EC set a goal to recycle at least 50% of all collected waste by 2020. In this document definitions of waste, recycling and recovery are also included. For waste management following definition are of great importance: “recovery means any operation the principal result of which is waste serving a useful purpose by replacing other materials which would otherwise have been used to fulfil a particular function, or waste being prepared to fulfil that function, in the plant or in the wider economy.

Annex II sets out a non-exhaustive list of recovery operations”; “recycling means any recovery operation by which waste materials are reprocessed into products, materials or substances whether for the original or other purposes. It includes the reprocessing of organic material but does not include energy recovery and the reprocessing into materials that are to be used as fuels or for backfilling operations”.

## **2. Methods of research**

Social inclusion is crucial in circular economy. Without an efficient waste recycling system, one cannot speak of a circular economy and the cycle is not complete. Literature analysis based on documents of the European Union and domestic ones was carried out. Moreover, in the research, a survey has been carried out in Lodz to determine what is the current state of mind of Lodz’s citizens regarding waste segregation and recycling, as well as their awareness and willingness to participate in it. An in-depth interview according to the adopted scenario was used in the study. The results of own research were confronted with the data available from other sources.

## **3. Circular economy as a social innovation – a theoretical approach**

Development of municipal waste management for circular economy requires a radical change in social behaviour, what from the theoretical point of view can be described as discontinuous innovation. There are three types of innovation approaches:

- Continuous Innovation: That which only adds something or a new feature to an already existing concept.
- Dynamically Continuous Innovation: There is more than one addition, but one characteristic that defines the product changes. However, without changing consumption patterns.
- Discontinuous Innovation: A new product is launched, totally different from the previous, leading to a significant change in consumption habits (Shavinina, 2003).

In case of inclusion of households in the circular economy, there is a radical change that can be described as discontinuous innovation. This means that there is a revolution in the management of the municipal waste stream and business operations, associated with the creation of a new market. Henkel and von Hippel (2005) explored the social welfare implications of user innovation. They found that, relative to a world in which only manufacturers innovate, social welfare is prone to be increased by the presence of innovations

developed by users. This finding implies that policy-making should support user innovation, or at least should ensure, that legislation and regulations do not favour manufacturers at the expense of user-innovators. (Von Hippel, 2005).

#### **4. Waste municipal segregation in Poland**

According to one of the most recent surveys in Poland regarding waste segregation and management, more than 90% of Poles segregates their trash. This is a peculiar case, as simultaneously roughly only 69% thinks that their neighbours are paying attention to which waste goes to which bin (Ćwiek, 2019). Other recent surveys indicate that roughly 65% actively commits to segregating waste within their households (Pawłowski, 2019).

There is a big incongruity between those statements even at first glance. The official data based on actual waste analysis is even more alarming. Based on Eurostat data only 33.8% of municipal waste in Poland was recycled. This is an estimate, as there is a problem with getting reliable data on this matter. Reaching the goal of recycling at least 50% of all waste collected seems hardly achievable. The remainder – unsegregated trash, that (hopefully) goes to waste segregation plants is harder to process and therefore to recycle in the future. The sad statistic is that in Lodz alone 27.6% of all waste finds its way to a landfill site, not to be reused in any form ever again (Pawłowski, 2019).

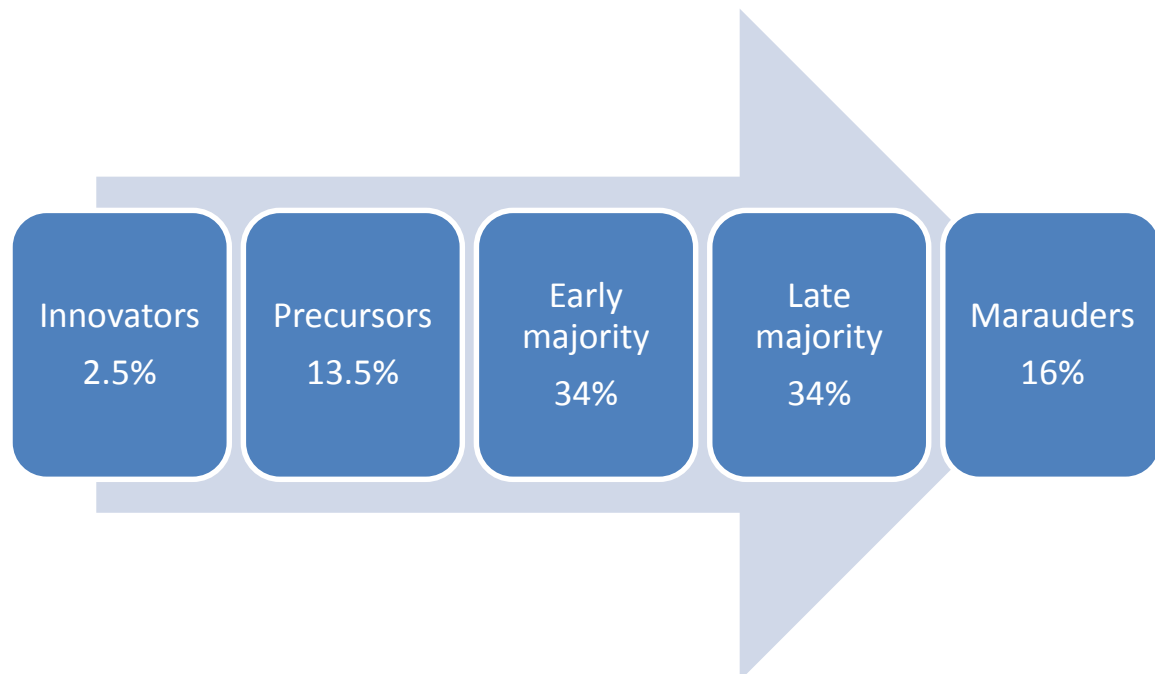
The awareness of Poles in regards to wastes segregation, recycling, and environmental solicitude has been rising over the years, not only in their own opinion, but the rise in recycled waste also seems to confirm this statement (Recycling rate...). However, with current growth rate of recycled wastes (2.61% per annum – based on 10 year period), the goal of simply reaching the desired level of 50%, will have been achieved in more than six years. Another analysis indicates that complying with EU regulations may take even longer, that is the year 2027. Moreover, it is worth mentioning that there are no signs pointing to a correlation between higher wastes recycling and increasing due diligence in segregating wastes in households. Higher recycled materials yields were observed almost only in places that developed better sorting techniques.

The refundable deposit system can boost the eagerness of people to segregate and hence improve the entire collect-recycle-reuse chain. More than 30 years ago the refundable deposit system in Poland had a much bigger outreach than it has now. Nonetheless, only glass bottles were collected there. Moreover, there are symptoms in the market, that may foretell a renaissance in this matter. Kompania Piwowarska has recently set up a bottle collection point in Poznan (Kompania Piwowarska otworzyła...). Some municipalities like Cracow have installed automated bottle collection devices on their premises ([http://www.dlahandlu.pl/...](http://www.dlahandlu.pl/)). The one in Cracow accepted plastic bottles and paid for them from PLN 0.1-0.2.

After two months it was taken down. Why? Because high interest in it caused the budget for this initiative to run out. Due to this big success of Cracow, other municipalities have shown interest in bottle collection machines. However, a new approach was developed in terms of “profit” for the citizens. Some collection machines are giving discounts, or tickets for public transport, cinema, etc. In addition, for the automated waste collection system to work a cooperation from the producers is needed. More responsibility should be cast on the producers. It is called “Extended Producer Responsibility”. The entity actually producing waste (like plastic bottles) should be held accountable for paying for the costs of its recycling. This idea stated in Article 15 in the Directive 2006/12/EC of the European Parliament and of the Council of 5 April 2006 on waste. Effective recyclable waste collection systems were successfully organised in Austria, Belgium, Denmark, Finland, Germany, Holland, Norway, Sweden, and Switzerland.

However, every innovation gets its enthusiasts in batches. This is based on the human’s acceptance of anything that is new. Basically, the human population can be divided into five groups (Rogers, 2003). These are:

- Innovators that account for roughly 2.5% of the population;
- Early adopters (Precursors) that account for roughly 13.5% of the population;
- Early majority that account for roughly 34.0% of the population;
- Late majority that account for roughly 34.0% of the population;
- Laggards (Marauders) that account for roughly 16% of the population.



**Figure 1.** Consecutive groups of people adopting an innovation.

Each adopter's willingness and ability to adopt an innovation depends on their awareness, interest, evaluation, trial, and adoption. Each and every group of consumers differs from one another in terms of willingness to accept “new”. Every single group has a unique psychological

profile being a mixture of their character traits and demographic background that determine their reactions toward novelties. Understanding these profiles and mutual relations among these groups is crucial in order to successfully implement innovations such as an automated waste collection system for example.

Innovators are those who actively seek new solutions. No matter how minuscule the effects are, they are relentlessly striving for novelties just for the sake of being first in a good way. In a society, there are not so many innovators. However, what is so important about this group is their ability to light up a spark of interest among others. It is crucial to get innovators' attention to even dream about full-scale success. One may think of innovators as "little fanatics" in some cases. Members of this group want to be first and to be able to say: "I made the change". Sometimes they are even ready to go against the current in trends if they feel that they are making a change. Their attitude is an important source of information to others, not only about the innovation itself but also about the arisen problem this innovation addressed.

The second group called the precursors are also innovation-geeks and implement novelties rather sooner than later. Nonetheless, this group is not so "anything for the higher goal" frenzy. Precursors actively analyse the advantages and disadvantages of the proposed solution and tie them to their personal needs. If this tie is strong enough they consciously decide to go with the change. As this is still a very early stage of implementing change they often have to "trust their gut" due to lack of large-scale research of both short- and long-time effects of a particular innovation. Because of the number of precursors in a society, they do make a change. They are much better in spreading the word, but also have a bit easier task, as they have already tied together the innovation to their personal needs, which is more appealing to the next group – early majority.

The third group called early majority or opportunists is one the most numerous ones. Early majority shares the enthusiasm of precursors toward novelties, but the most important aspect for them is pragmatism of the innovation. One could say that in decision-making they are a bit more self-centred than the groups mentioned earlier. The innovation must serve their needs first. If it also addresses some other global problems then it is a win-win situation, but it is not a goal itself. Before they change their habits while adhering to the novelty, they need to be somehow reassured that innovation is going to be there also in the future, not just for a fleeting moment. Members of this group tend to do some research before accepting the new way of things. As the early majority constitutes for roughly a third of the market it is crucial to keep them interested and engaged.

The penultimate group called late majority shares all the doubts of the early majority and one more. They are waiting longer to see where this new innovation is going to. Members of this group wait longer with making their decisions because they want to see if this novelty becomes a standard. If they see that about half the society is already abiding the rules of new way of things, they will follow. However, peer pressure and a possible threat of penalties is

exactly what nudges them the right way. This group is too big to be omitted when planning an introduction of any large-scale operations like for example a new waste collection system.

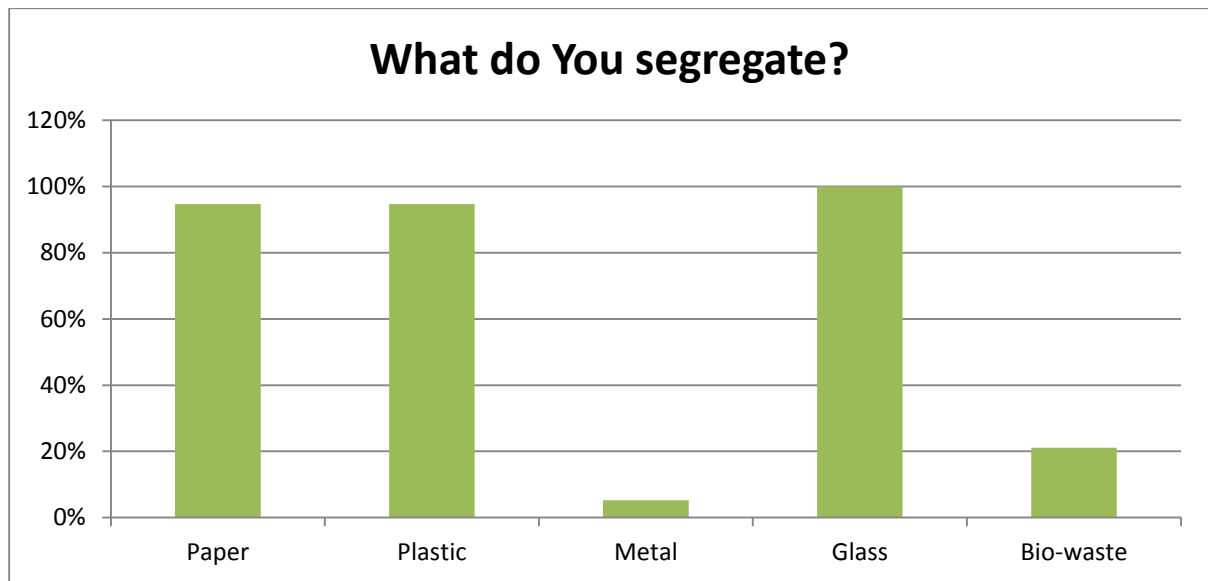
Finally, the last group is called laggards or marauders. Members of this group will resist to changes, no matter what. They will always find a reason not to “go with the flow”. In business, this group is sometimes considered a “no-go” group. However, accounting for roughly 16% of the population, their impact is not to be overlooked in situations like wastes segregation, and as a result environment protection.

Each group is motivated and demotivated by a set of different factors. Therefore, it is important to think ahead and come up with a comprehensive solution for wastes segregation and recycling system beforehand. A precursor is at readiness to accept flaws and defects of typical for every innovative solution. Moreover, he is also willing to overcome some initial difficulties to get to the desired goal of his. The situation with opportunists is quite the contrary. A solution must be complete and verified to catch the attention of theirs. This group is harder to convince, but loyal in decisions. Precursors and early majority are one of the most, if not the most important groups. Success with these two determines the overall success of an undertaking. For a new wastes segregation and recycling system to thrive, one must take care of the system itself, but also see to it, that there are pilot actions, media coverage, information campaigns, and adequate incentives. The overall solution is a series of smaller products, each bringing new value, and hence enriching the primary goal.

In terms of the mentioned earlier wastes segregation and recycling system, one can define the primary goal as a “segregated collection of recyclable wastes”. The smaller products bringing value would be separate containers, refundable deposit machines collecting plastic or glass bottles, etc. In this case the end-product would be a highly recyclable, clean mass of waste to be processed in waste-sorting plants and finally valuable elements and materials would be reintroduced into the consumer value-bearing product cycle. Hence, the cogs of the circular economy would turn.

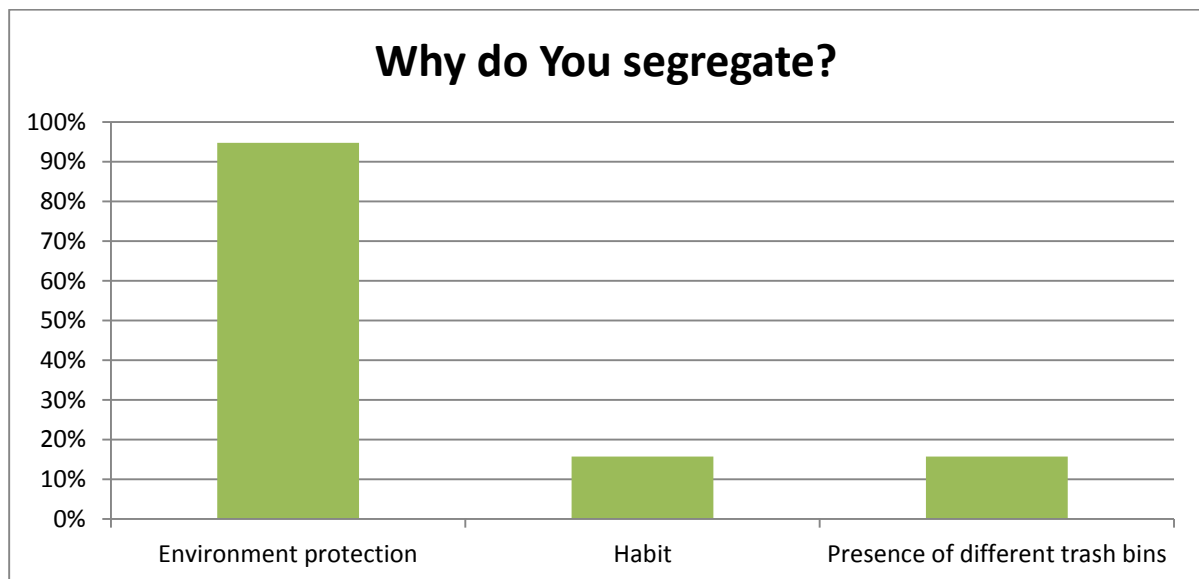
## 5. Research

Surveys, based on in-depth interviews, were carried out in Lodz in July 2019. Focus group consisted of 20 people, 10 men, and 10 women. Their age ranged from 23 to 70. 55% of respondents had graduated university, 20% had graduated high school, and 25% vocational school. Half of the respondents lived in blocks of flats and the other half in single-family houses. All respondents claimed that the natural environment is important and should be protected. Also, all respondents had separate bins for different types of wastes in their neighbourhoods. Only one person said openly that she does not segregate in any way.



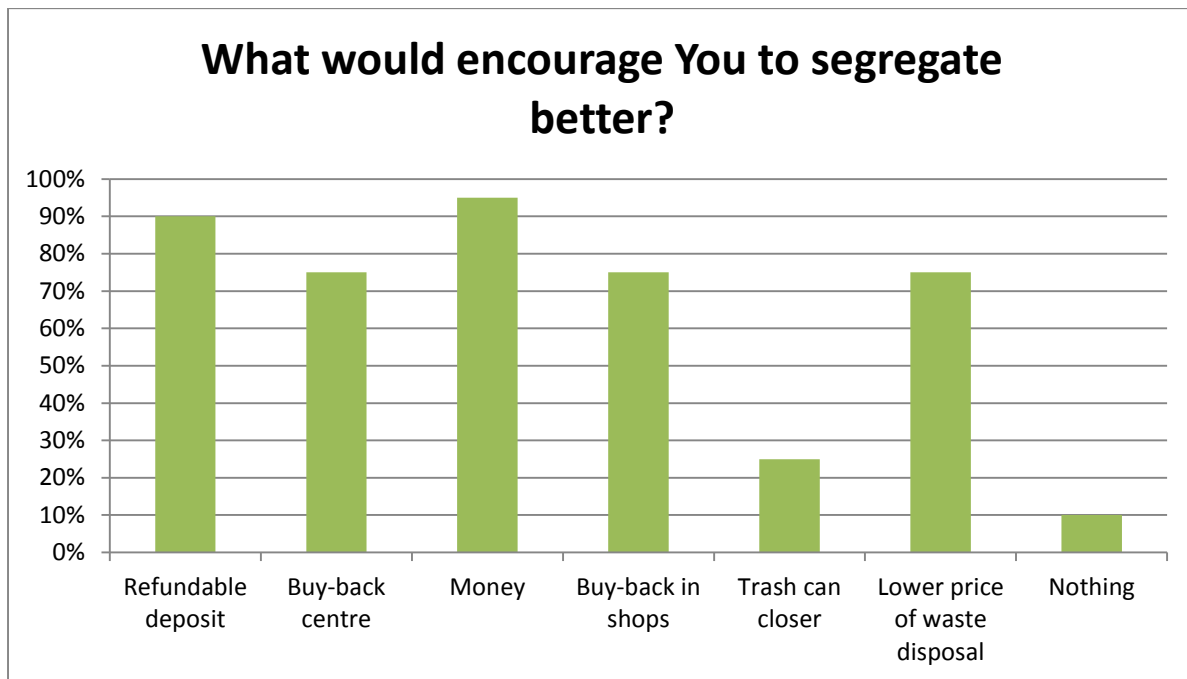
**Figure 2.** Declared waste segregation types.

All respondents who segregate, separate glass from other wastes. In cases of paper and plastic it is 90%. One person throws all the metal to a separate bin. Bio-waste is collected to a designated bin by four respondents.



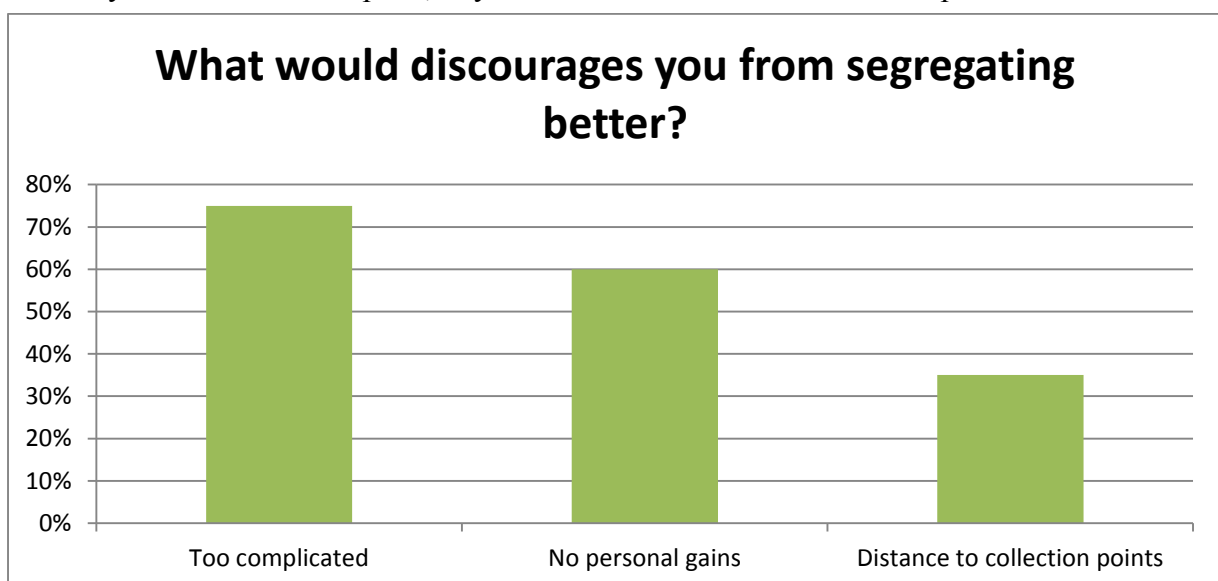
**Figure 3.** Reasons respondents named for waste segregation.

Figure 3 indicates that reportedly almost everyone segregates because of caring for the natural environment. 15% does it out of habit and just because there are separate bins present in their neighbourhood.



**Figure 4.** Factors encouraging people to segregate waste.

In the figure, one can observe that the most appealing factor is money. 95% of respondents said money is the best motivator. This seems consistent with other answers indirectly pointing to money like refundable deposit, buy-backs and lower costs of waste disposal.



**Figure 5.** Factors discouraging people from waste segregation.

Figure 5 presents that the most impactful factor discouraging people from segregation is the complexity of the process. Which in turn affects the amount of time needed to segregate properly. Nonetheless, if they were somehow compensated for segregation, they would be accepting it (fig. 4) The second important negative factor is the lack of personal gains with 60% of respondents claiming so. Last reason mentioned was the distance to collection sites, which also included bins.



## 6. Summary

Municipal waste may not be a big fraction of overall waste production. However, working on the reduction of unsegregated and unrecycled trash generated by citizens is of prime importance due to the educational impact. Surely, one can say that more attention should be paid to industrial waste, as there is more of it. Nonetheless, actively focusing on municipal waste reduction will simultaneously bring one more profit, which is hard to overestimate. That is the awareness of the society about how their waste can be and will be serving a better purpose. Finding worth in waste is crucial in the circular economy. It is to be decided in the future how and to what extent people will actively participate in obtaining secondary raw materials. The first solution requires more work from the people in their households, where they segregate wastes and deliver them to designated points of collection (both paid and unpaid). The second solution is to rapidly develop waste segregation at waste-sorting plants and make people pay for the indulgence they would be getting indirectly. Answering the research question in the article, one can say that the most important factors, which impact human behaviour that engage them into a circular economy are economic reasons. Growing ecological awareness also holds significance. This is in line with Rogers's observations on the diffusion of innovation. In Lodz innovations in municipal waste management is reaching the level of the early majority.

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