Investigating Household Recycling Barriers in Westminster City, UK

Saeed Oluwadipe[1,2], Diane Purchase[1], Hemda Garelick[1], Simon McCarthy[1], Huw Jones[1]

[1]Department of Natural Sciences, Faculty of Science and Technology, Middlesex University, London, NW4 4BT UK.
[2]Environment and City Management, Westminster City Council, London, SW1E 6QP, UK.
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Presenting author email so764@live.mdx.ac.uk

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Abstract

The Westminster City Council (London, UK) has consistently failed to meet the annual recycling target of 50% of household waste set by the UK government. This research aimed to investigate the issues surrounding the low recycling rate to inform the design and implementation of an effective waste management policy. The key research questions are what are the barriers to achieving high a recycling rate in the City of Westminster and how can these barriers be removed? The research utilised a quantitative method to collect data. Data were collected through residents' online surveys. The quantitative analysis revealed that the following factors are affecting the council recycling rate: communication and public engagement, human factors, socio-economic factors, service constraints, policy constraints, use of incentives, and environmental protection. Findings from the research allowed a sustainable recycling indicator to emerge as a functional tool to increase the council recycling rate. It is concluded that despite positive socio-demographic factors and positive human behaviours, most respondents continued to face situational barriers bordering on physical factors and the level of recycling service provided by the council that has affected the council recycling rate. Also, the sustainable recycling indicator designed provides opportunities for the council and other urban local authorities to increase their recycling rate.

1.0 Introduction

The City of Westminster is part of the 32 London boroughs that share local government powers with the Greater London Authority (GLA). The city is designated as Inner London Borough with a very wide diverse resident population of 250,000. All data quoted in the review of the city profile range from 2010 to 2017 [26]. The borough is divided into 20 wards with different levels of deprivation across the wards. The local areas are among the most and least deprived areas in the UK. 88% of the population are educated and in employment with 56% graduating from the UK Higher Education Institution [26].

Westminster currently produces 195,000 tonnes of municipal waste per year. The City Council manages this volume of waste with over 1 million collections per week, including over 23,000 households having access to daily waste collection services [25]. The local authority has consistently failed to meet the annual recycling target of 50% set by the national government. The Westminster City Council (WCC) recycling rate ranges from 19% to 25% over the 10 years between 2008 and 2018. It starts with 23% in the year 2008/09 and then drops down to 19% in the year 2018/19

1.1 Research Aims and Objectives

The research aims to understand the barriers and challenges in achieving a high recycling rate. The result of the research will then be used to develop a new strategy and policy approach to urban waste management based on information obtained from service users. Two main broad questions will be explored:

- What are the barriers to a high-level rate of recycling?
- What can be done to overcome such barriers?

2.0 Methods

The research utilised a quantitative method to collect survey data. All adult residents living within the 20 wards in the Borough of Westminster were targeted for the research, as the research problems emanate from households within the borough. The research data was collected between April and December 2020. A total of 417 respondents completed the online survey with an average completion of 10 minutes. The survey respondents were recruited by sending the request for participants to all the residents through emails, social media, the council website and the council online magazine.

3.0 Results and Discussion

Quantitative analysis (descriptive and inferential) was used to analyse the survey data. The results of the chi-square test using four explanatory variables of age, education, type of residence and ward level against various response twenty variables reveal different factors that affect recycling activities (Table I). The test result indicates that age is not a factor that influences general recycling behaviours such as habits and commitment of the sampled population in Westminster. However, age was found to be a factor that influences interest to recycle food waste, which is a subset of recycling behaviour. These findings agree with the two contrasting results of different studies carried out by Dai et al. [3]; Du Toit and Wagner [6]. Dai et al. [3], in their study, concluded that age has no substantial effect on recycling behaviours. This agrees with the test result for the age factor against recycling behaviour.

Table I: Significant Relationship between the Explanatory and the Response Variables

Explanatory Variables	Response Variables																	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Age										■	■	■	■	■	■	■		
Education	■				■						■			■				
Resident Type							■			■							■	■
Ward Level							■										■	

Key:

1= Recycling Habit, 2= Motivation, 3= Barriers, 4= Incentives, 5= Commitments, 6= Micro Recycling Facility Use, 7= Micro Recycling Facility Proximity, 8=Recycling Destination, 9= Service, 10= Enabling Factors, 11= Bin Infrastructure, 12= Food Waste Collection, 13= Communication Method, 14= Communication Effect, 15= Recycling Events, 16 = Legislation, 17= Recycling Bag and 18= Collection Frequency.

■ **significant relationship**

In contrast, Du Toit and Wagner [6] in their study found that the older the participants surveyed, the more likely they participate in recycling activities. This finding matches the direct responses of the respondents in my survey without any test analysis. This is because the descriptive data of my survey indicates that the millennials (22-38 years) recycle less than the older generation. The difference in research outcomes on recycling behaviours is stemmed from the complexity of human behaviour which is determined or affected by other different underlying factors which may or may not be localised [9].

Communication and public engagement were also found to be a factor that affects recycling behaviours. Westminster council employ different methods of communication to provide recycling information to the residents. 75% of the respondents confirmed receiving one form of recycling communication or the other. 70% confirmed that the recycling information received was useful and clear.

Surprisingly, 81% of the respondents were not aware of the council's organised recycling events. It seems the council is not utilising its communication medium adequately to mobilise residents to recycling events or the residents are missing these events information on the communication received. Lee and Krieger [10]; Chan [2]; Mee and Clewes [14]; Mofid-Nakhaee et al [15], all agreed that effective communication and public engagement play a vital role in facilitating recycling activities.

In terms of the influence of waste legislation on recycling activities, the test result indicates a relationship, especially with the age groups. All the respondents agreed that there is a need to change the current waste legislation to improve the recycling rate. Popular among the demand for change in waste regulation is the prohibition of manufacturing non-recyclable packaging and the consistency of recycling regimes throughout the country. This outcome is aligned with studies [1,17] that have called for the co-production process in terms of understanding the user's needs and situations, to formulate waste policies. Drimili et al [5], went further to surmise that the non-involvement of householders in designing waste strategies has cast doubt on such policy, which in the long run affects its effective implementation.

Education was found to be a factor that influences the behaviour and commitment to recycling activities of the sampled population. The survey analysis reveals that the majority of the respondents are educated and have basic knowledge of recycling, which in turn influences the exhibition of the prevailing positive recycling behaviour identified in the survey. The result indicates that 88% of the respondents always or sometimes recycle. Also, 80% of the resident population in Westminster have a university degree which positively impacts their recycling behaviour as evidenced in the result. Studies carried out by Seng et al [16]; Vieira and Matheus

[20], confirm that level of education is a factor that affects recycling behaviour. A high level of literacy skills will facilitate an effective understanding of recycling communication or information.

In terms of the type of residence influence on recycling activities, the test results show no direct relationship between residence types and waste infrastructure (internal and external space) available for recycling storage, for the sampled population. This outcome is in contrast to previous studies by Díaz-Meneses and Vilkaite-Vaitone [4]; Timlett and Williams [18]; WRAP [23] that have established that housing type is a crucial factor that influences recycling activity.

It is important to note that this survey is more of a recycling population than a non-recycling population, which could explain the disparity between this survey finding and previous studies. However, between 18% to 29% of the sampled population cited a lack of internal and external space for recycling storage as a barrier to recycling activities. However, residence type is found to have an indirect influence on internal and external space availability when analysed together with other enabling factors such as bin labelling formats, clear recycling information, internal segregation of waste and provision of external recycling facilities.

As a critical note to the earlier studies on residence types of impact on recycling behaviours, the influence or impact on recycling behaviours is more about the availability of internal and external space for source segregation than the residence types. It could be argued that both houses and flats when devoid of space to enable source segregation would result in low recycling output. Therefore, the main physical factor that is influencing recycling behaviour is space availability, not the residence types, this was proved in this research.

The test analysis of the available internal space against the available external space in my survey shows a very significant relationship between the two. To be exact, 80% of the respondents that adequate internal space to segregate waste into recycling and rubbish. However, out of that 86%, only 40% have the exact external facility matching the internal facility. Therefore, the efforts of the remaining 46% are put to waste as there is a high likelihood of their mixed recycling being collected as rubbish. This is one of the main factors affecting the council recycling rate.

The test analysis also found that residence type influences the use of public recycling facilities in terms of proximity. The facilities are known as micro recycling centres (MRC) and are installed all over the borough. 65% of the sampled population confirmed that there is a close-by MRC to their residence and 53% of the sampled population use it because of its proximity. This result agrees with Letelier et al [11] study that shows lesser participation of residents in recycling activities when the distance to recycling infrastructure was increased. Although Li et al [13], argued that this factor is not a major barrier as shown in their study.

The test analysis also indicates collection frequency is a factor that can affect recycling activities. The majority of the respondents want the council to maintain the current rubbish collection frequency and increase the frequency of collection for recycling. 71% of this category are located in flatted properties that lack spaces for effective recycling. An increase in recycling collection frequency for residents in such a situation would eliminate the loss of recyclable materials to rubbish collection [8, 19].

The result also indicates that incentives play a minor role in nudging respondents to increase their recycling behaviour. 60% of the respondents are not interested in any incentive schemes. This may be because they are already motivated by environmental benefits. 91% of the respondents cited environmental concern as a motivation to carry out recycling activities.

Furthermore, only 12% of the respondents cited incentive schemes as one of the enabling factors to recycle. Li et al [12]; Halvorsen [7] corroborated this deduction when they concluded that incentives, fines and penalties have a weak influence on recycling behaviour.

The test results show no major trends in the recycling behaviours, interest in food waste collection and attendance at recycling events when tested against ward level. This indicates that the various ward locations do not influence these factors stated above. However, the analysis indicates otherwise, in terms of accessibility to the council free recycling bag and proximity to micro recycling centres. Lower participation in recycling activities in some of the wards sampled is due to recycling bag accessibility issues and the absence of a close-by MRC. Therefore, the recycling service provided by local authorities is key in enabling recycling activities. Previous studies by Tsalis et al [19]; Yukalang et al [24] and WRAP [23] have confirmed this assertion.

A sustainable recycling indicator (Fig. I) was devised based on the research results. The Westminster City Council is in Category D of the sustainable recycling indicator. This is based on the council's current recycling rate of 22% (2018/19), the respondents' responses, and the age/education adjusted data. Table II indicates the definition of the availability and the effectiveness of the enabling factors.

Categories	Enabling Factors / Recycling Output	Users Peculiar Situations	Education and Environmental Awareness	Clear Packaging Labelling	Clear Bin Labelling	Internal Source Segregation	External Recycling Facility	Recycling Bag Accessibility	Separate Food Waste Collection	Public Recycling Centres	Frequent Collection of Recyclable materials	Effective Communication	Public Engagement
A	High												
B	Medium												
C	Low												
D	Low												
E	High												
F	High												
G	Low												
H	Medium												
I	Medium												
J	Medium												
K	Medium												
L	Low												
M	Medium												

Recycling Output Key	
Output	**Rate**
Low	0% - 39%
Medium	40% - 59%
High	60% - 100%
Enabling Factors Key	
	Not Available/Effective
	Somehow Available/Effective
	Available/Effective

Fig. I: Sustainable Recycling Indicator

Initially, the council would need to make effort to achieve category B before moving to category A. Therefore, an initial target of around 45% needs to be set for the next 10 years. This recommendation is in line with the council waste strategy, which aims to increase the recycling rate to 35% by 2020, 40% by 2025 and 45% by 2031. The sustainable recycling indicator designed, can also be utilised by other local authorities in the UK, to determine their current recycling service status against the current recycling rate, and to set meaningful targets for achieving a high recycling rate.

Table II: Definition of Availability and Effectiveness of Enabling Factors

Definition of Availability and Effectiveness of Enabling Factors	Available/Effective	Somehow Available/Somehow Effective	Not Available/Not Effective
Residents Peculiar Situations	This refers to residents' motivation and attitude to recycling. If the residents are highly motivated and exhibit a positive attitude toward recycling. This enabling factor is available and effective	If the residents are not highly motivated but nudged slightly by incentives to carry out recycling, or they exhibit a lukewarm attitude towards recycling activities This enabling factor is somehow effective	If the residents are not motivated at all to recycle and display a negative attitude toward recycling activities, the enabling factor is not available
Education and Environmental Awareness	This enabling is effective or available if the majority of the residents are highly educated or have a high degree of environmental awareness	This enabling factor is somehow available if the majority of the residents have lower educational qualifications or have a low perception of the environmental benefits of recycling	This enabling factor is not available if the majority of the residents have no educational qualifications or no awareness of the environmental benefits of recycling
Clear Packaging labelling	This enabling factor is effective if the recycling information on the packaging labels is very clear with no ambiguity	This enabling factor is somehow effective if the packaging labels which may contain recycling information, the information is not enough to make a right decision	This enabling factor is not available if the packaging label contains no recycling information
Clear Bin Labelling	This enabling factor is effective if the recycling information on the bin labels is very clear and legible with no ambiguity and different waste streams bins have distinct colours	This enabling factor is somehow effective if the bin labels are clear but not legible and the bins for different waste streams have the same colours	This enabling factor is not available if the bin labels are not clear, not legible and the bins are in the same colour
Internal Source Segregation	This enabling factor is available if there is adequate internal space to allow two or more separate storage of segregated waste streams	This factor is somehow available if there is no adequate internal space for two bins, but residents still manage to store recycling in a makeshift recycling bag and have a bin for rubbish	This factor is not available if there is no adequate internal space, and residents only have one bin for both recycling and rubbish
External Recycling Facility	This enabling factor is available if there is adequate external space to allow two or more separate storage of segregated waste streams	This factor is somehow available if there are no adequate external space for two bins, but residents still manage to leave full recycling bag on the pavement for collection and have an external bin for rubbish	This factor is not available if there is no adequate external space, and residents only have one bin for both recycling and rubbish
Recycling Bag Accessibility	This enabling factor is available if the recycling bags are easily accessible when needed with no waiting time for the recycling bag to arrive	This factor is somehow available if the recycling bags are not easily accessible and there is a waiting time for the bags to arrive	This factor is not available, if the residents are not aware of how to access the recycling bag and requests for bags are not completed within the agreed waiting time
Separate Food Waste Collection	This enabling factor is available if there is a food waste collection service and there is storage space to store food waste	This enabling factor is somehow available if there is a food waste collection service but there is no storage space to store food waste	This enabling factor is not available if there is no food waste collection service and there is no storage space to store food waste
Public Recycling Centres	This enabling factor is available if the public recycling centres are widely available in all the wards and easily accessible for residents to use	This enabling factor is somehow available if the public recycling centres are not widely available in all the wards, and it is not easily accessible for residents to use	This enabling factor is not available if there are no public recycling centres for residents uses
Recycling Collection Frequency	This enabling factor is available, if the mixed recycling materials are collected more than twice a week	This enabling factor is available if the mixed recycling materials are collected twice a week and rubbish is collected up to four times a week	This enabling factor is not available if the mixed recycling materials are collected once a week and rubbish is collected more than twice a week
Communication	This enabling factor is effective, if social media are used heavily in addition to the traditional communication methods to communicate recycling information to the residents	This enabling factor is somehow effective if social media are under-utilised. But the traditional communication methods are used heavily to communicate recycling information to the residents	This enabling factor is not effective, if social media are not used at all. And efforts are only concentrated on the traditional communication methods
Public Engagement	This enabling factor is effective, if the public engagement activities are very popular with residents coupled with high attendance. Also, if the public forums are organised online in addition to physical attendance at organised events.	This enabling factor is somehow effective, if the public engagement activities are not well publicised resulting in low attendance. Also, if the public forums are not organised online in addition to physical attendance at organised events.	This enabling factor is not effective, if the public engagement activities are not very popular with residents. Also, if the public forums are not organised online in addition to physical attendance at organised events.

4.0 Conclusion

The survey also, suggests that despite positive socio-demographic factors and positive human behaviours, most respondents are still facing situational barriers bordering on physical factors and the level of recycling service (Fig. II) provided by the council, which is affecting the council recycling rate or output.

In terms of physical factors, the barriers faced are lack of adequate internal storage to allow source segregation of waste, lack of adequate external space for recycling bins, lack of an adequate number of recycling bins and non-availability of recycling bins in some dwellings.

The main challenges concerning the recycling service provided by the council relating to the infrequent collection of recyclable materials, non-collection of residential food waste, and residents' difficulties in accessing the council free recycling bags. These challenges can be mitigated using the sustainable recycling indicator as a functional tool to enable effective resident recycling activities.

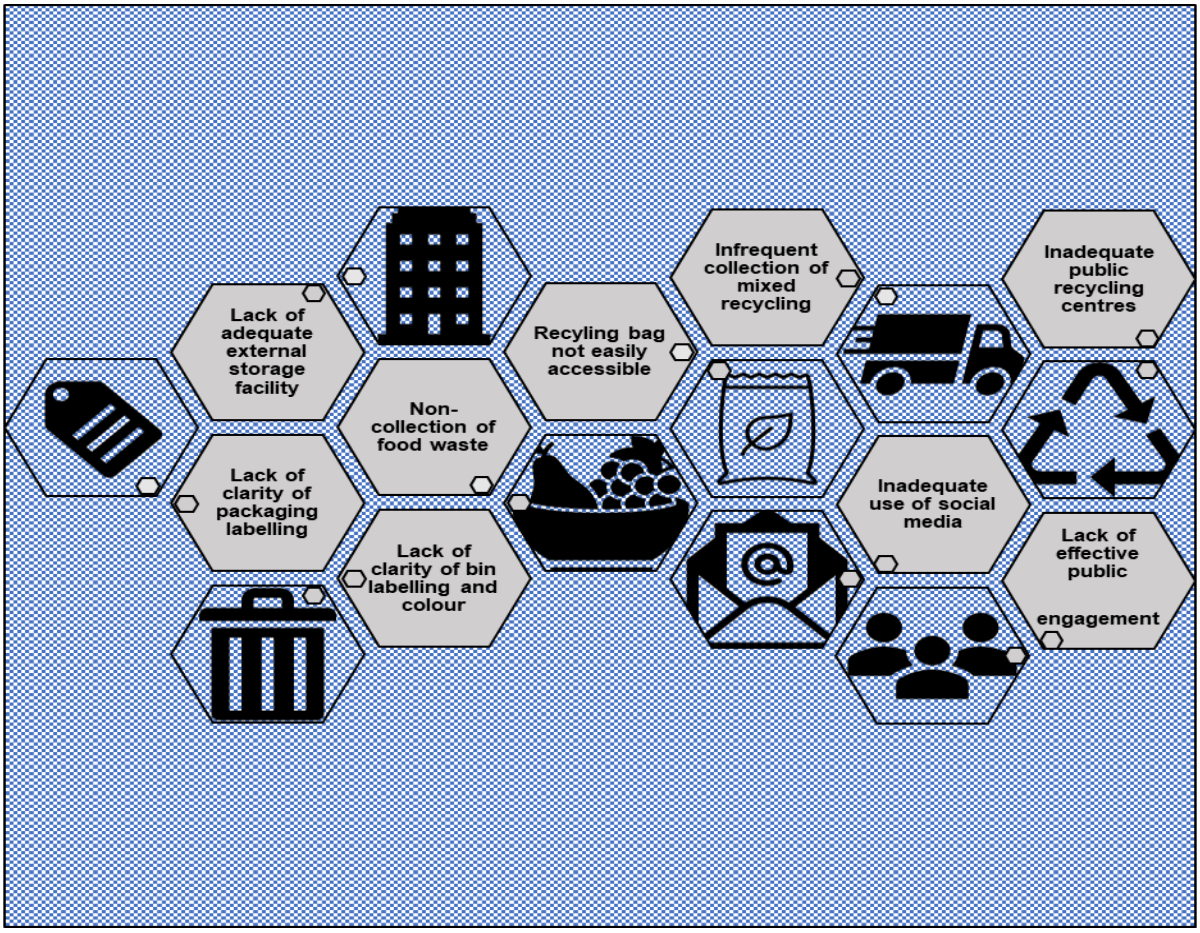

Fig. II: Factors affecting Westminster City Recycling Output

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