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UNRAVELING THE WEB OF ECOPOLITICS: APPLYING ANT TO WASTE MANAGEMENT RESEARCH IN FRONTLINE KHARKIV

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The article analyses the possibilities of applying actor-network theory (ANT) to food waste management practices and techniques and waste management policies in Kharkiv. The article presents the results of the Fusilli grant project 'Promoting the transformation of the urban food system through the introduction of innovative living laboratories', which was carried out using such empirical sociological research methods as expert interviews, desk research, and a questionnaire survey of Kharkiv residents. Particular attention is paid to the complexity and challenges of waste management policy in extreme situations, in particular in war, when the interaction of people and things is extremely dynamic. It is argued that martial law creates unique obstacles to waste sorting and recycling practices, affecting the behaviour of citizens and the material and technical infrastructure required for effective waste management. Based on the main tenets of ANT as a theoretical and methodological framework, the article analyses the various actors involved in the waste management network of frontline Kharkiv, including city residents, businesses and waste processing enterprises, as well as the items necessary for waste collection and removal, such as garbage cans or trucks. It is demonstrated how these elements of the urban system form a network of interdependent relationships that affect both the efficiency of the waste sorting process and the environmental policy in Kharkiv in general. It is noted that the study revealed a rather significant gap between environmental awareness and the practical behaviour of Kharkiv residents when sorting waste. It is emphasised that, in general, citizens recognise the importance of proper waste management, but the infrastructure necessary to support such practices (specialised containers and recycling points) is underdeveloped. The impact of the war on the exacerbation of the problem with the logistical support of the municipal waste management system is determined. It is concluded that the actor-network theory provides an adequate tool for analysing the relationship between the subjects and objects of waste management. The need to improve the infrastructure, legal framework and public awareness of this issue is emphasised in order to develop and support sustainable waste management policies, in particular in war-affected cities such as Kharkiv.

Keywords: waste policy, waste management, waste sorting practices, waste recycling, Actor-Network Theory, Fusilli project, Kharkiv

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Human society sustains itself by transforming nature into garbage.
Mason Cooley

Setting the problem in its general form and its connection with important scientific or practical tasks

Contrary to the intuitive philistine opinion of the secondary nature of ecological issues during war, we emphasize the relevance of the issue of environmental safety in general and waste policy in particular: this directly



affects both the quality of life now and the possibilities for normal post-war recovery. The problem lies in the ontological complexity and epistemological uncertainty of waste management processes in a frontline city, in particular due to the composite nature of this object – a clear combination of human and non-human participants. Along with this, it is worth taking into account the specific conditions in which Ukraine is now, so it should be assumed that this experience may not be relevant there due to the constant situation of danger and the lack of an opportunity to reproduce certain steps. In particular, new challenges appear for sociologists regarding the analysis, generalization and conceptualization of this issue, highlighting those aspects that are specific in extreme conditions, when the practices of safe consumption of products and work with waste are changing. In this context, it is interesting to study the front-line cities, which are subject to constant destructive influence in the conditions of war events, for example, the city of Kharkiv.

The lack of connection between living conditions and the awareness of the need to sort waste, as well as the lack of a clearly formed sorting system, calls for further scientific research in this direction, the search for opportunities for such justification in sociological theories that have the potential to analyze the connection between human and environment. To analyze these problems, we propose to use the once "fashionable" but already aged badly actor-network theory (ANT): this theory itself was developed precisely for sociological analysis of the material and technical component of social life; the heuristic potential of the ANT is focused on the analysis of sociotechnical interrelations between "animate" and "inanimate" in the categories of the so-called principle of symmetry [12]. This perspective is best suited for our object of study – urban socio-ecosystem (or socio-ecological network) of waste management, which includes both human subsystems (citizens, companies, etc.) and non-human subsystems (equipment, machinery, waste itself, etc.).

Analysis of recent researches and publications

The theoretical basis of the article is the works of Bruno Latour [11, 12] which are quite actively analyzed and interpreted in Ukrainian scientific periodicals: research on the potential of the theory for understanding agency [3], explanation of social interaction [7], sociology of professions [9], example of television news [21], the heuristic potential of the actor-network approach in modern sociological theorizing [8, 20], the effectiveness of the theory [4]. Along with this, it is important to take into account the results of studies that prove the limitations of the ANT for explaining social processes [1, 5]. Instead, we note the lack of systematic studies of waste policy issues from the standpoint of ANT.

Modern researchers have proven that it is important to understand and "study network interaction not in the categories of the hierarchical construction of society, but as a dynamic horizontal network of agents forming the processes of mutual relations, influencing each other" [20, p. 80]. Thus, according to V. Shcherbyna and Y. Romanenko, the actor-network theoretical orientation presented by Bruno Latour can be considered as one of the paradigmatic horizons of the modern meta-theoretical level of social cognition. The proposed approach outlines the prospect of updating the corpus of theoretical knowledge about society by introducing things and intellectual products as independent agents of social influence into the subject area of social reflection [20, p. 82]. For example, according to E. Domańska, thanks to the works of B. Latour, the understanding of the effectiveness of factors unrelated to people and their resources has been significantly changed. The author substantiates the demand for addressing the problems of materiality, things, new materialism, and sees the value of Latour's idea of a collective gathering of people and non-people [4].

Analysis of the potential and possibilities of the ANT in solving issues of working with waste on the example of specific cases is presented in foreign studies by S. Rath & P. Swain [19], S. Méndez-Fajard & R. González [13], M. Cvetinovic et al. [2] etc. This article can be considered the first (at least one of the first) examples of the application of the ANT to waste policy issues within the Ukrainian scientific and sociological discourse. In terms of successful examples of the application of the ANT to the issue of waste, Sandra Méndez-Fajardo and Rafael A. Gonzalez [13] in their article give the example of a university campus and consider the application of this theory to find the key elements that should be considered for sustainable management of heavy waste. The authors prove that different actors and relationships between them are needed to achieve this goal, as well as their dynamics throughout the history of heavy waste management, proving the effectiveness of the ANT to explain these processes.

Another example is the paper of S. Rath & P. Swain [19] that justify the relationship between the human and the environment, considering this relationship as a prominent discourse of many scientific disciplines. Analyzing the problems of environmental pollution, climate change and vulnerability associated with waste, the authors proved the inconsistency in the theoretical justification of this problem and emphasized that waste is a physical and external phenomenon, therefore it is difficult for social science researchers to consider all their socio-cultural aspects with the help of any existing theoretical concept. The multidimensional nature of waste and waste management has been established through research in both political ecology and ANT. On the one hand, the limitations of this theory are pointed out, on the other hand, its potential and possibilities of application for justifying the problem of waste sorting in combination with other theories are emphasized.

Worthy of special attention is the study by Khaustova & N. Trushkina [6] on the infrastructure provision of regional waste management in the context of the circular economy, which also concerns the Kharkiv case: the

authors provide a number of reasoned management decisions and policies to improve the waste policy logistics scheme. If the readers expect to see management recommendations for improving Kharkiv's waste policy, then we can direct them to the source indicated above, where it is done at a fairly high level. Within the framework of this article, we will try to apply the ANT methodology and theses from articles that are close both in subject matter and methodology [2, 13, 19] to data and cases that were collected without special operationalization of ANT.

Thus, we are going to make an attempt to demonstrate the application of the ANT in the study of waste sorting and recycling processes in Kharkiv, which can be considered the *purpose* of this work.

This article is part of the realization of the Fusilli project: Fostering the Urban food System Transformation through Innovative Living Labs Implementation (under Grant Agreement No.101000717 HORIZON2020). The Fusilli project is an international research project that aims to develop urban nutrition plans in their local contexts to achieve an integrated and safe holistic transition to healthy, sustainable, safe, inclusive and cost-effective food systems and waste policy. Fusilli includes not only all relevant processes but also all types of actors (e.g. farmers, researchers, consumers), policy sectors (e.g. health, agriculture, environment), levels of governance (e.g. local, national, global) and functional capabilities (e.g. healthy nutrition, food access, employment, etc). Among other things, we are interested in examining citizens' and city's levels of waste management development.

Empirical basis

The article is based on the results of a comprehensive sociological study, which used the following methods:

- Desk research of open sources on the topic.
- Participant observation and mapping of the city's infrastructure, 2022-2023.
- Expert interviews (~20) with representatives of local authorities, NGOs involved in waste management and waste policy, 2022-2023.
- Online survey (CAWI) of Kharkiv citizens, spontaneous sample, N=409 respondents, October-December 2023.

Presentation of the main research material. Theoretical lens

ANT provides a specific angle of view on sociotechnical systems (through the implementation of the principle of symmetry), within which there is an opportunity and need to consider human and non-human participants in the waste policy process in Kharkiv "equally"; it allows us to reveal complex interactions between different elements of the system. We suggest considering the categories of key actors of the waste management network available for analysis:

1) *Kharkiv citizens*. The population of Kharkiv (according to the Ministry of Finance, ~1.4 million people on January 1, 2022) acts as a heterogeneous actor, including different social groups with different levels of environmental awareness and prevalence of waste sorting practices. In the context of ANT, each resident is not just a producer of waste, but an active participant in a network whose actions (or inactions) regarding waste sorting affect the entire system. It is important to consider the population not as a homogeneous mass, but as a network of individual actors, each of which has its own "connections" to the network, embodied in intentions, motivations, knowledge and capabilities regarding waste management.

2) *Factories, enterprises, companies*. The set of different actors that systematically produce many different types and kinds of waste, and the variability of this waste is much wider than from citizens. At the same time, this category of actors is subject to higher control by the state and local authorities, including on the quantity and quality of waste.

3) *Waste bins and waste trucks*. These non-human actors play a key role in shaping the material infrastructure of waste sorting. Dumpsters, especially specialized containers for separate collection, are "obligatory passage points" in ANT terminology, through which sorted waste must pass. Their presence or absence, design and location significantly affect people's sorting practices. Waste trucks, in turn, are mobile actors that provide communication between different network nodes. They do not just transport waste, but also play the role of "mediators", transforming, translating, and modifying the meaning of the elements they carry.

4) *Waste processing enterprises*. Several key waste processing enterprises operate in Kharkiv, in particular KP "Municipal Waste Management Company" and LLC "Kharkiv Eco Service". These enterprises are powerful actors forming "centers of calculation" in the waste sorting network. They not only process waste, but also generate knowledge, set standards and influence policy in the field of waste management.

5) *Recycling points*. Recycling points act as "intermediaries" between the population and waste processing enterprises. They create economic incentives for sorting and form specific socio-economic relationships in the network. From the perspective of ANT, these points can be considered as "hybrid forums" where the interaction between technical, economic and social aspects of waste sorting takes place.

6) *Storage points (landfills)*. Landfills, such as the municipal solid waste landfill in Derhachi district of Kharkiv region, are complex actors performing a dual role. On the one hand, they are final destinations for unsorted waste, on the other – sources of environmental risks. In the context of ANT, landfills can be considered as "black boxes" that hide complex processes and interactions. In the constant interaction of these agents, a network of waste policy, waste practices, interactions on waste issues is created and reproduced. This network is characterized by

constant processes of "translation", where the interests and actions of some actors affect others, creating complex chains of interdependencies. It is important to note that this network is not static. It is constantly reconfigured under the influence of various factors, including changes in legislation, technological innovations, economic fluctuations and changes in public consciousness. Of particular interest is the impact of military conflict on this network, which creates new challenges and opportunities for the waste management network.

7) *A set of external actors* that are not directly connected to the waste policy / waste management network, but are involved thematically and institutionally. In particular, these are:

- Mass media, broadcasting (or not) the relevant messages, articulating (or not) the relevant issues, etc. We have not conducted a systematic analysis of the representation of waste policy themes in media discourse; nevertheless, regular monitoring of local media allows us to say that this topic is articulated often enough not to be forgotten, but too rarely to be sustainable.
- Educational system that fosters (or not) relevant values and practices. As an example, during the FUSILLI project implementation, events were held for Kharkiv schoolchildren to promote the 5R principles [22]. Another "fresh" case – February 1, 2023, in the STEAM laboratory of Simon Kuznets KhNUE passed the master class "Culture of garbage sorting and ecological labeling" as part of the "Eco Packaging" project. However, the scale and distribution of these events were extremely limited since they were not carried out within the framework of an institutionalized educational process.
- Legal system and separate laws, creating a legal framework of possible behavior with waste, allowing or forcing to implement a certain waste policy. The most important here are the Law of Ukraine *on Waste* (1998); *On Waste Management* (2023); *the National Strategy for Waste Management in Ukraine until 2030* (2017), *the National Waste Management Plan until 2030* (2019), etc.
- Local authorities organize the work of public utilities and control their work. The efficiency of the local authority that deals with waste (utility company "Household waste removal complex") is rated quite highly by residents (KVBO, 2023).

Applying ANT to the analysis of the waste sorting system in Kharkiv allows us to go beyond the traditional understanding of this problem as purely technical or economic on the one hand, or as a matter of consciousness, values and practices on the other. Instead, we get the opportunity to consider it as a complex sociotechnical process, where material objects, technologies, social practices and discourses are intertwined, forming a unique ecology of waste management and waste policy in a frontline city.

Data Analysis

I. Waste sorting practices. Waste sorting practices play a key role in effective waste management and waste policy. In Kharkiv, the introduction of special containers for waste sorting has shown positive results, but there are still many limitations related to lack of public awareness and infrastructure, lack of space for containers in densely populated areas, and low cooperation from residents who often are not connected to the waste management network enough to have the appropriate cognitive attitudes to operate in it (in other words, do not see the need to separate waste). Despite the availability of sorting equipment, residents often do not actively participate in sorting due to the lack of immediate economic benefits and inconvenience [2]. In practice, waste sorting can be limited by physical conditions such as lack of space for container placement in densely populated areas. In some cases, successful implementation of sorting systems requires active participation and support from local authorities and communities.

The results of our research show that among Kharkiv citizens waste sorting is not formed into a regular practice and is situational: 28% of respondents do not do it at all, another 42% sometimes sort separate types of waste (see Table 1). Moreover, we are inclined to consider these figures complementarily overestimated because the survey sample was spontaneous, and those potential respondents who are not at all interested in this topic were less probable to be included in the sample.

Table 1

Prevalence of waste sorting practices among Kharkiv residents

<i>Is it usual in your family to sort waste?</i>	
No. we do not sort waste at all	28%
Yes. sometimes we sort separate types of waste (glass, paper, metal)	42%
Yes. we periodically sort certain types of waste	21%
Yes. we sort all waste regularly	9%

At the same time, the measurement of the perception of the idea of waste sorting shows that Kharkiv residents perceive this practice as important and necessary even in the current realities: negative stereotypes about sorting are rather rejected, and positive stereotypes are accepted (see Table 2 for details).

Table 2

Stereotypes about waste sorting

<i>To what extent do you agree with the following statements about waste sorting?</i>	Completely disagree	2	3	4	Completely agree
There is no sense in sorting waste in the current realities	59%	19%	13%	5%	3%
Professionals only should do waste sorting	62%	20%	12%	4%	2%
People do not sort waste because they do not know how to do it properly	14%	17%	24%	25%	19%
If conditions are provided (e.g., special containers on the streets or indoors), people will quickly get used to sorting	5%	11%	19%	24%	41%
Every responsible citizen should sort waste	2%	12%	16%	18%	52%

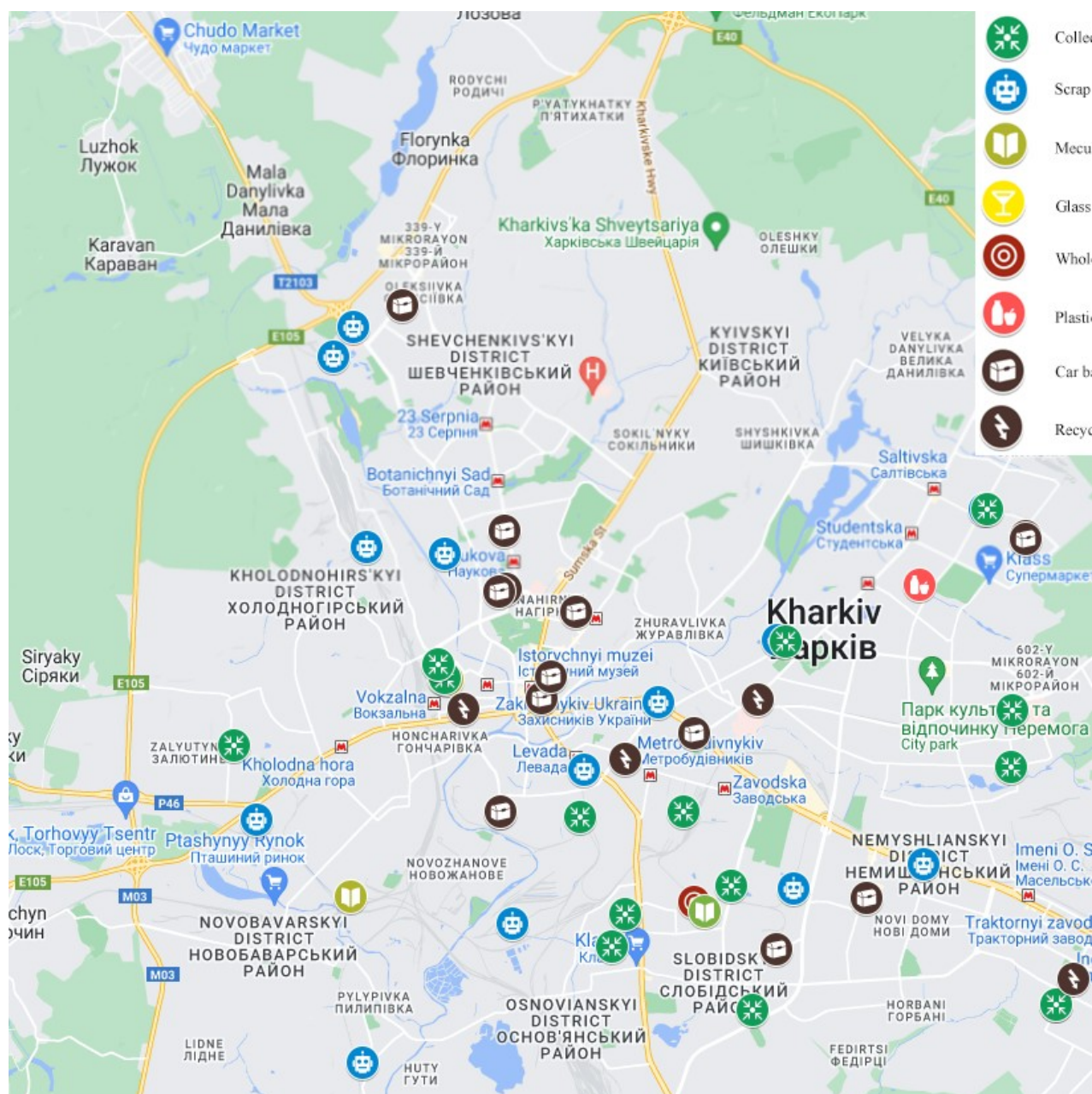
This gap between the declarative level and the practical level can (and should) have a series of explanations, but we propose to focus our argumentation around the logistical, material, and institutional conditions that Kharkiv citizens have for the implementation of waste sorting practices. The ANT toolkit is great for this purpose, as it provides a framework for understanding the complex interactions between human and non-human actors in the waste management process [13]. The described mental attitudes about waste sorting (which, in its turn, can be considered as a result of successful connection to the relevant informational and educational networks – education, mass culture, propaganda of "green" ideologies, etc.) we can assess as sufficiently developed for working intensification in the waste management network. But the real absence of this work in the network is a consequence of weak and inconstant connection to the relevant passage points. This is exactly what the following paragraph shows.

II. Waste disposal practices. Practices of waste disposal is a natural extension of the practice of sorting waste and include various methods and approaches to organizing the collection of recyclables. For example, in university campuses, systems are effectively implemented that allow students and staff to dispose of recyclable materials in designated areas [13]. These practices highlight the importance of clear organization and the availability of accessible disposal points to increase participation levels. However, despite the availability of infrastructure, there are significant limitations associated with the lack of motivation among citizens to dispose of waste. This is due to the lack of economic incentives, in particular, the search for one's own benefit from this process, as well as a limited understanding of the environmental benefits of recycling, and a lack of awareness of the general practices of waste sorting in the world, the possibilities of individual cities and communities to participate in this process.

Another issue is that in the current conditions in Kharkiv there are problems not only with the introduction of "innovative" waste disposal technologies, but also with the operability of "traditional" means is under threat. The map of Kharkiv (see Figure 1) shows those points of recyclable materials reception, which are working as of the end of 2023 and which are available for the population. Even if we do not go into details about the capacity of these points, it is still obvious that there are "white spots" in the city logistics of waste recycling.

The presence of "blind spots" and gaps in the waste management network is also clearly visible in the data "from below", i.e. in the results of the survey of citizens: 64% of respondents do not know where the recyclable waste collection points are located. The situation is similar with special containers or waste bins for sorting waste – 42% of respondents have not seen them in their area at all, and 19% have met them, but have not remembered the exact location (see Table 3).

The limited prevalence of obligatory passage points – special containers or waste bins – certainly does not fully explain the fact of low prevalence of waste sorting practices at the grassroots, but still provides a general, albeit self-evident, answer. The situation is similar with intermediaries in the form of recycling points: their prevalence is even lower; on the other hand, the throughput capacity of such points is higher, and there are network accelerators – financial rewards for the delivery of recyclable materials. Nevertheless, the overwhelming majority (79%) of the city residents surveyed have never used a recycling collection point during the full-scale invasion; only 9% did it for free, 12% – for money (that is, this accelerator in this format works at the level of statistical error).



Picture 1. Map of waste management infrastructure of Kharkiv in 2023,

Source: <https://www.google.com/maps/d/embed?mid=1vHWY8VF60oMEQRdTVqcQxid3ZOUuagM&hl=en&ehbc=2E312F>

Table 3

Proximity of waste management infrastructure to Kharkiv residents

	No, I have not seen anything like that	Yes, there are, but I am not sure where exactly	Yes, there are in the next street / yard	Yes, there are in my street / yard
Are there any special containers or waste bins in your area for sorting waste?	42%	19%	14%	26%
Are there any recycling points in your area (waste paper, glass, plastic, etc.)?	22%	42%	32%	4%

If we talk about the nodal sections of the network, experts note that with the beginning of a full-scale war and, in particular, the occupation of the Mariupol ports, the logistical chains of sending recyclable materials for processing were cut off. Ukraine, and the Kharkiv region in particular, currently has no plastic recycling industry, and it is difficult to recycle scrap metal and batteries (they have to be sent to EU countries by land transport), which

is often unprofitable and time-consuming; the situation with waste paper and glass is more or less normal, but still it is not the pre-war level of recycling. And the problems of interregional and international logistics for the delivery of recyclable materials are naturally affecting the reduction in the number of collection points; in addition, bomb threats and mass mobilization are having a negative effect.

III. Waste removal and transportation process. Waste transportation is a crucial link in the waste management system. Returning to the study, we have already cited several times, in university campuses waste transportation is organized through regular routes, ensuring timely waste removal and reducing the risk of waste accumulation [13]. However, major issues remain with the high costs of transportation and the need for coordination among various participants in the process. The logistics of waste transportation in urban settings often face challenges related to traffic congestion and the high cost of operations [2]. As the authors of a similar study claim, improving waste transportation can benefit from principles of the ANT, which allows for considering the interactions of all participants in the process and identifying bottlenecks and opportunities for optimization. By mapping the interactions between different stakeholders and technologies involved in waste transportation, ANT helps in identifying bottlenecks and improving efficiency [13]. Initially, we also planned to build a waste transportation plan in Kharkiv, but objective restrictions of wartime did not allow us to do this. Therefore, in analyzing this issue, we will make do with classical sociological data – quantitative (population survey) and qualitative (expert interviews).

Starting with the citizen survey, we received rather optimistic results on the corresponding question about the regularity of waste removal: 2/3 of respondents said that waste is removed regularly, another 1/4 said that it is removed regularly, although sometimes there are delays; that is, real problems with this issue are emphasized by <10% (see Table 4).

Table 4

Reliability of the waste removal process

<i>Is waste regularly removed from your yard/street during this year (2023)?</i>	
Not removed at all	2%
Rather. irregularly	1%
Sometimes they take it out. sometimes they don't	5%
Rather. regularly. but sometimes there are delays	27%
Yes. regularly. without failures	65%

Experts note that this issue was particularly acute in the first months of the war, when there was a shortage of fuel and part of the fleet of garbage trucks was lost as a result of enemy attacks; access to the Derhachi landfill was also limited. Now the situation has stabilized, although there is a shortage of drivers. In addition, there is no appropriate equipment for the separate removal of different types of waste; that is, even if sorting is carried out at temporary storage sites (in waste bins), there is no possibility of centralized removal of different types of waste; therefore, the removal of sorted waste falls on the shoulders of the population and low-level employees of public utilities, who have to deliver it to recycling collection points (the network of which, as we found out above, is far from perfect). The network operates in a simplified mode, without connecting sorting intermediaries and, for the most part, without differentiating waste streams. At a minimum, this can be explained by external influences on the network - destruction, limited budgets for equipment, personnel shortages, etc.

IV. Waste processing and recycling. Waste recycling is one of the key elements of sustainable waste management. Universities implement programs for recycling various types of waste, including plastic, paper, and organic materials. These programs have demonstrated significant reductions in the volume of waste sent to landfills [13]. Research shows that having well-equipped recycling centers and local government support are critical success factors. Effective recycling programs require significant investment in recycling capacity and support from local authorities to ensure sustainability [2]. New challenges arise related to the quality of the collected raw materials and the need for preliminary sorting. Therefore, one of the answers to this challenge is the involvement of different participants in the recycling process, including both humans and non-humans, which is key to understanding and optimizing the recycling process. Involving both humans and non-humans in the analysis of recycling processes can reveal hidden dynamics and increase overall efficiency [13].

According to the experts interviewed, now in Kharkiv there are practically no conditions for processing and recycling. As a counterargument (or an exception that proves the rule?), we point out that there are separate eco-hubs and initiatives that deal with this (for example, ZeroWaste Kharkiv), which organize waste recycling and reuse points in the city and suburbs), so the vast majority of sorted waste is simply taken away out of town or to landfills or to other cities for recycling. That is, the local Kharkiv network is not self-sufficient and is tied to external centers of calculation in other regions; this situation would be normal under the condition of sufficient

acceleration of these connections (that is, if the export of recyclable material to other regions was stimulated from the outside – legislatively, financially, politically, etc.), but the bulk of waste ends up in black boxes – in landfills.

V. Waste storage. Waste storage plays an important role in the waste management system, especially in cases of temporary accumulation before transportation or recycling. However, even with specially equipped storage facilities, there are limitations related to the risk of environmental contamination and the need for regular monitoring of stored waste. Proper storage facilities are essential to prevent environmental contamination and ensure safe handling of hazardous waste [13]. Studies also highlight the importance of interactions among all participants in the storage process, including the use of technological solutions for monitoring and managing waste. Advanced monitoring systems and strict regulations are crucial for effective waste storage management (ibid).

The Kharkiv case is extremely unpleasant in this context. According to experts, by February 2024, the construction of the modern Derhachi solid waste landfill was 95% complete, however, the well-known events not only stopped this progress but also threw it back; the status of this project at the time of publication of this article is not known for certain, we have contradictory data: from the zeroing of the construction process to the fact that it was practically not damaged. And since this landfill is located several kilometres from the contact line, normal work there is impossible, as well as there is no data about it in open sources and no opportunity for private visit. Therefore, this section of the network was planned as a centre of calculation, but now both terminologically and metaphorically can be designated as a black box.

Conclusions and prospects

The conclusions of the study are quite prosaic. If we talk about the applicability of ANT to this problem, then here we can state their complete compatibility: the ANT was as if created for the study of waste policy. It really allows us to notice specific gaps and disconnects in the network of human and non-human interactions of waste management. By identifying the main actors and processes in the network, it is possible to epistemologically localize the main shortcomings and blind spots, which in the case of the Kharkiv waste management network are:

- lack of recycling collection points (and/or information about them),
- lack of waste sorting bins at the places of residence of the population,
- complete lack of equipment for the removal of sorted raw materials.

Further, the network goes beyond the city limits, due to the lack of sufficiently large waste processing and recycling enterprises in Kharkiv, as well as difficulties with storage. Focusing specifically on material and logistical issues, nevertheless, we can state that in this case *thinking is ahead of being*: a survey of citizens shows that attitudes about the need to sort waste have been formed in a larger number of the population than the waste management network is able to handle. And further popularization of the relevant attitudes and values is not a priority; perhaps only in the form that the population consciously demands that local authorities improve the infrastructure, including, for example, developing information and digital tools that will allow the residents to find the nearest and most convenient recycling collection points.

If we talk about the limitations of this study, there are quite a lot of them: empirical – the validity of quantitative data leaves much to be desired (due to the conditions of the survey, the state of the object of study, the weak representativeness of the sample design chosen as the only possible one, etc.); methodological – the escapist nature of the ANT, which does not allow emphasizing the complexity of the conditions, reducing well-known events to the network configuration, not to mention the weak possibility of problematizing cognitive-discursive and almost zero possibility of differentiating the hierarchical aspects of interactions. Of the obvious continuations – differentiation of actors from among the city residents, in particular, the allocation of "professional recyclers" (who do this for financial reasons) and "ideological recyclers" (respectively, from non-financial ones), but this requires scaling the sample and / or additional qualitative intelligence. Also, a quantitative and qualitative analysis of the work of obligatory passage points – representatives of public utilities and recycling points seems extremely promising. Another question is: is the game worth the candle?

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РОЗПЛУТУЮЧИ ПАВУТИННЯ ЕКОПОЛІТИКИ: ЗАСТОСУВАННЯ АМТ ДЛЯ ДОСЛІДЖЕННЯ УПРАВЛІННЯ ВІДХОДАМИ У ПРИФРОНТОВОМУ ХАРКОВІ

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У статті аналізуються можливості застосування акторно-мережевої теорії до практик та технік управління харчовими відходами та політики утилізації відходів у Харкові. Наводяться результати реалізації грантового проєкту Fusilli «Сприяння трансформації міської системи харчування через впровадження інноваційних лабораторій життя», здійсненого за допомоги таких методів емпіричного соціологічного дослідження, як експертні інтерв'ю, кабінетне дослідження та анкетне опитування харків'ян. Особлива увага акцентується на складності і викликах політики поводження з відходами в екстремальних ситуаціях, зокрема в умовах війни, коли взаємодія людей та речей відбувається надзвичайно динамічно. Стверджується, що воєнний стан

створює унікальні перешкоди для практики сортування та переробки відходів, впливаючи на поведінку громадян і матеріально-технічну інфраструктуру, необхідну для ефективного поводження з відходами. Виходячи з головних положень акторно-мережевої теорії як теоретико-методологічної бази статті, здійснюється аналіз різних актантів, задіяних у мережі утилізації відходів прифронтового Харкова, включаючи мешканців міста, бізнес та сміттєпереробні підприємства, а також такі необхідні для збору та вивозу відходів речі, як сміттєві баки чи вантажівки. Демонструється, як ці елементи міської системи формують мережу взаємозалежних відносин, що впливає як на ефективність процесу сортування відходів, так і на екологічну політику в Харкові в цілому. Зазначається, що здійснене дослідження виявило досить суттєвий розрив між екологічною свідомістю та практичною поведінкою харків'ян при сортування сміття. Підкреслюється, що в цілому громадяни визнають важливість правильного поводження з відходами, проте інфраструктура, необхідна для підтримки таких практик (спеціалізовані контейнери та пункти переробки), є недостатньо розвинутою. Визначається вплив війни на загострення проблеми з матеріально-технічним забезпеченням міської системи утилізації відходів. Формулюється висновок про те, що акторно-мережева теорія надає адекватний інструментарій для аналізу взаємозв'язку між суб'єктами та об'єктами управління відходами. Підкреслюється необхідність покращення інфраструктури, правової бази та обізнаності громадськості щодо зазначеної проблеми з метою формування та підтримки сталої політики утилізації відходів, зокрема у таких постраждалих від війни містах, як Харків.

Ключові слова: політика щодо відходів, управління відходами, практики сортування відходів, переробка відходів, акторно-мережева теорія, проект Fusilli, Харків.

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