

# 10

## THE ESSENCE OF COMMUNICATION PROCESS IN WASTE MANAGEMENT SYSTEM

### 10.1 INTRODUCTION

National Waste Management Plan 2014 (NWMP 2014) with the prospect for years 2015-2022, describes the creation an integrated waste management system based on the principle of sustainable development. Basic activity aimed to integrate waste management system is mainly to point the waste hierarchy, and then determine the long-term goals which would allow to full integration. As part of these activities is planned among others creation of a database with waste, intensification of educational measures in the field of environmental protection and waste segregation, strengthening control of the companies in waste management sector, as well as many other solutions in the area of development of existing utilities and investment in advanced technology. NWMP 2014 also points out the problems associated with the system of collecting and storing information, monitoring and controlling of the entities participating in the system of waste management and insufficient environmental awareness of society [6]. The source of these problems can be traced in wrong conducted communication process and information exchange in the waste management system, because it forms the basis of this system and is largely responsible for its effectiveness.

Information plays an important role in any system and organization, whether it is a manufacturing company or government entity – each of them bases its work on specific information. It is important not only how to gather and process information, but also how to distribute them, within and outside of the organization. Information allows organizations to exist and function in their environment, the effectiveness of multiple systems depends precisely on accurate and factual information. The communication process is based on the exchange of messages between participants, the more these participants, the more complicated becomes an exchange of information between them.

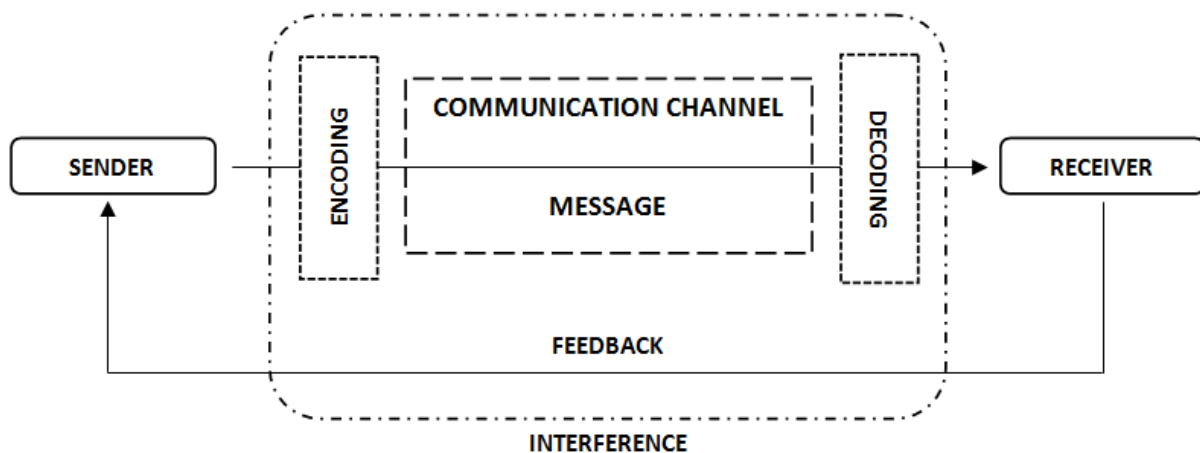
### 10.2 COMMUNICATION PROCESS

In the process of communication we can point out some stable components, which include: receiver, sender and message; these are elements without which we cannot make the communication process. In addition to the three basic elements in the communication process occur or may occur also other parts, such as a communication channel, interference distorting the process, feedback and the process of encoding and

decoding of broadcasted message. One should remember that feedback occurs only in two-way communication process in which the receiver becomes the new sender – the response to the broadcast message [7]. The following diagram illustrates a two-way communication process (Fig. 10.1).

The presented two-way communication process should proceed as follows [7]:

- 1 The sender creates a message – he should take into account the type of information and the characteristics of the receiver. Also the nature of the sender, his competence and personality has significant impact on created message.
- 2 When the message is ready, the sender must encode it – a message in the communication process takes the form of symbols, e.g. in writing, image, gesture, etc.
- 3 The sender, after encoding a message in the manner he chooses, he selects the appropriate communication channel – medium. The simplest partition of communication channels divides them into written and spoken; Communication channels also use storage media – traditional and modern media like internet.
- 4 The next stage is decoding – the receiver, upon receipt of the message, should interpret it. Decoding, as well as encoding process, is affected by the characteristics of the recipient's personality characteristics, experience, knowledge or convictions.
- 5 The final stage of the communication process is feedback – response given by the receiver to the sender of the message. At this stage, the receiver becomes the sender and forms, and then encodes the return message addressed to the earlier sender. This message goes through all the stages, up to the point where there is no need to send another feedback to the sender.



**Fig. 10.1 Diagram of two-way communication process**

Source: Own elaboration based on: [7]

It must be remembered that the communication process is also a subject of various disturbances and distortions, the so-called noises. They appear both in the form of internal and external disturbance, when the message is distorted by treating it with factors present in the environment. These disturbances also apply to the receipt of the message; receiver can make a mistake while decoding the message given by the sender [7].

Misunderstood message distorts the process of communication, context of transmitted information is changed sufficiently that the decisions taken in pursuance thereof may be wrong. On effectiveness of the communication process in the organization or between organization and the environment, depends also other processes in organization, which are accompanied by constant exchange of information. Therefore, it is important, in communication, to select of appropriate communication channels or encoding information with regard to the characteristics of the receiver of a message.

### 10.3 COMMUNICATION MODEL IN WASTE MANAGEMENT SYSTEM

The waste management system involve many various entities, which through the exchange of information relevant to each other, provides an effective process of collecting, sorting, manufacturing, disposal and storage of waste. A place in the system of waste management have also other entities, not directly connected with the system, but interested in feedback information about the course and effectiveness of it. The communication process in waste management system is best to considered at community level, because they are largely responsible for its effectiveness, and they take a number of actions aimed at ensuring its successful course.

Responsibilities of communities in waste management are detailed in the Act of 13 September 1996 on maintaining cleanliness and order in municipalities (Dz. U. of 2013 item 1399, as amended). To other legislative documents indicating entities and scope of the exchange of information in the waste management system are:

- Act of 14 December 2012 on waste (Dz. U. of 2013 item 21, as amended),
- Act of 27 April 2001 Environmental Protection Law (Dz. U. of 2013 item 1232, as amended),
- Act of 20 July 1991 Environmental Protection Inspectorate (Dz. U. of 2013 item, as amended),

and a number of other Acts and Regulations of the Minister of Environment, also in cooperation with other ministries. Due to the local government units participating in the communication process in the waste management system, we can also distinguish Acts relating directly to their actions, i.e. among others: Act of 8 March 1990 Local Government (Dz. U. of 2013 item 594, as amended), Act of 5 June 1998 Province Self-Government (Dz. U. of 2013 item 596, as amended) and other laws relating to public administration. It should be also important to remember about Acts related to the activities of other entities and companies producing and processing waste, which have to report back their activities.

When analysing the communication process in waste management system we should also mention its various character; communication occurs both inside the public administration units and between different units at many levels, as well as outside of them – when these units communicate with citizens and other entities in waste management. In most cases, it is a two-way communication, but not always self-government units are focused on feedback or they just underestimate them; particularly in the process of external communications [9].

The first step in the analysis of the communication process is to identify all the senders and receivers, and the information exchanged between them. It is important not only what information is transmitted, but also that they reach consumers by media. Conducting a reliable analysis becomes essential to ensure the effective operation of the communication process in the waste management system and hence increase the efficiency of the system itself.

### 10.3.1 Entities involved in the communication process

Entities participating in the exchange of information in the waste management system can be divided into several important groups:

- public administration units,
- residents and property owners,
- companies of waste management sector,
- other sectors companies,
- other interested entities.

Public administration units mainly include municipal government, who as part of their duties designates the entity responsible for municipal waste management system in the community. Most often it is one of community's department or in the case of smaller communities – an independent position. Apart from municipal entities we can also identify: Marshal's Office, Chief Inspectorate of Environmental Protection (CIEP) with Voivodeship Inspectorate of Environment Protection (VIEP), State District Sanitary Inspectorate, and also Ministry of Environment and other ministries involved in formulating Acts in area of waste management. Amongst property owners residents we can distinguish private owners and housing cooperatives and associations that on behalf of their tenants, deposit the declarations concerning the number of inhabitants, the way of collecting waste, etc. The owners are becoming intermediaries in the exchange of information between the tenants and the community. Another entity in the communication process are companies from the waste management sector; they collect, segregate, recycle, utilize and store different types of waste. Also the companies that produce the appropriate municipal equipment, and their offer is addressed to other companies in the waste management sector and public administration units, controlling them. To indicate an important role of municipal installations and companies collecting waste in the waste management system, it is worth to ring-fence them from the above group of municipal enterprises and considered them as a separate entity participating in the communication process. The specific entities belonging to the group of companies of the waste management sector, consist of: National Chamber of Waste Management (KIGO) and Polish Chamber of Waste Management (PIGO), associating hundreds of companies and other entities participating in waste management. KIGO and PIGO on behalf of members companies conduct a dialogue with the authorities and local governments, and other interested in system stakeholders, they provide training courses and discussion panels, and fighting for the rights of its members. These Chambers have open character and into their association may also join communities unions [5], [8].

Amongst entities involved in the communication process in waste management system, there can be distinguished the companies that produce waste; companies from different sectors and various nature of the activity. This refers to the manufacturing and service enterprises that conduct their business in community area. This specific group of companies also includes companies from the mining sector, where wastes are covered by separate laws.

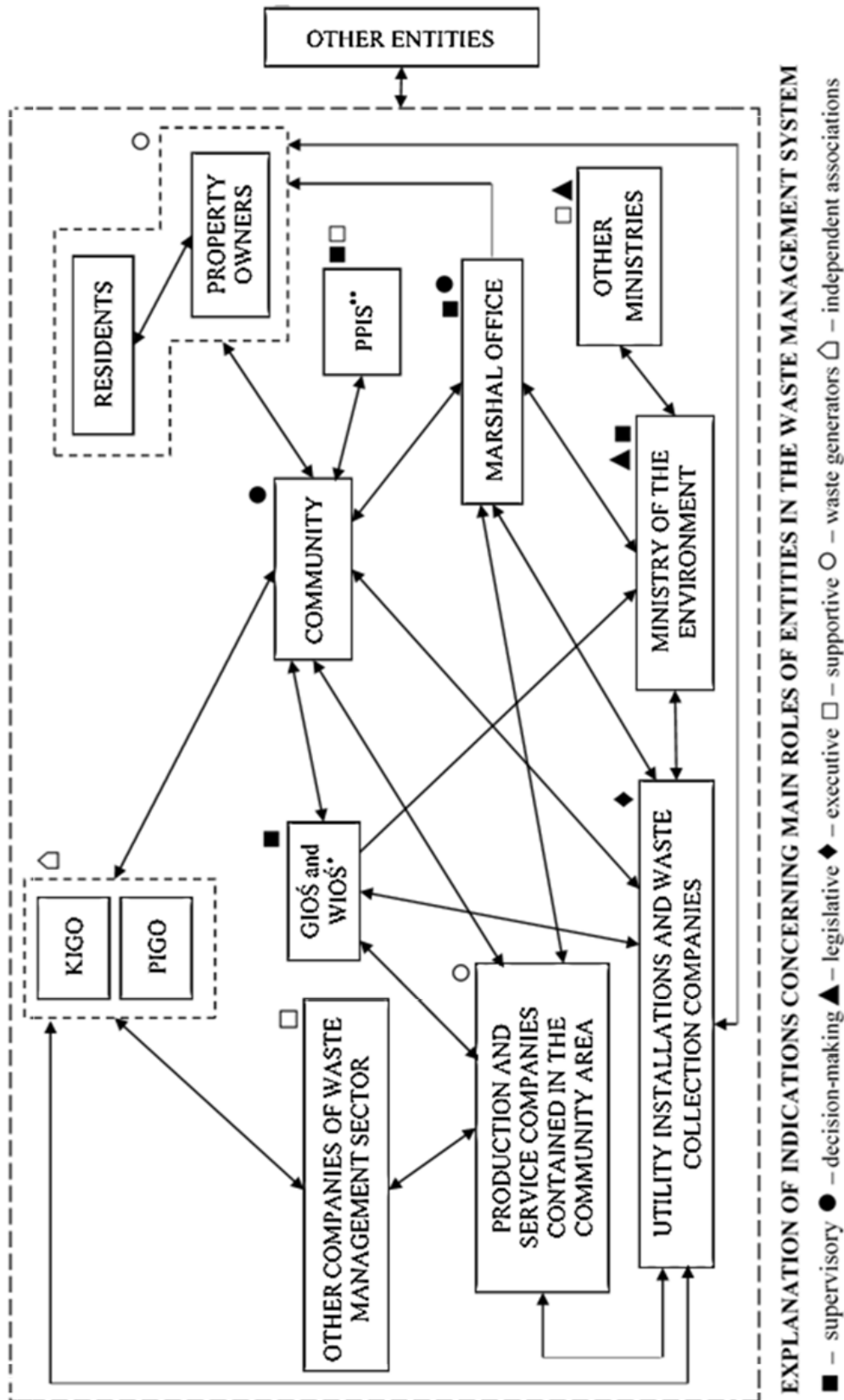
The last group of entities include all entities that do not take part directly in the waste management system, but they are looking for information that its relate. We classified here all types of research and development units, other research institutions, experts and other private individuals. The diagram below (Fig. 10.2) presents entities taking part in the communication process in waste management system, from the point of view of the community as the unit of public administration, which largely deals with ensuring the efficiency of the system. The diagram also contains the designations (explanation below the figure) which relate to the functions performed by the participants in the waste management system. They were divided into several functions: supervisory, decision-making, legislative, executive, supportive, independent associations and the waste producers.

### 10.3.2 Basic information exchanged in waste management system

Information exchanged in the process of communication between entities of waste management system relate among others: the amount of waste received and processed in community, efficiency of each utility lines, the number of inhabitants residing in the property or undertaken in the system actions. This information is provided in the form of reports, complaints, contracts and orders or informative and educational leaflets. Public administration units are obliged to pursue activities informative and educational residents activities, which use different advertising media such as billboards, newsletters, public bulletins, and even social networks and their own websites. There are also published reports on the implementation of the waste management plan and important contact details. Entities responsible for municipal installations and enterprises engaged in waste collection are required to submit on a regular basis reports about their actions and weights of received and processed waste. Thanks to feedback information, companies are able to dispose of collected waste between various utility installations that have the ability to process them.

The following matrix (Tab. 10.1) contains only an example of information exchanged between the main entities in the waste management system. The main entities are the ones that have the biggest impact on the waste management system in community area:

- community or department designated by it,
- residents and property owners,
- entities responsible for utility installations and waste collection companies,
- production and service companies located in the community,
- Marshal's Office.



**Fig. 10.2 Diagram of the exchange information in waste management system**

\* CIEP and VIEP – Chief Inspectorate of Environmental Protection and Voivodship Inspectorate of Environmental Protection.

\*\* SDSI – State District Sanitary Inspectorate.

Source: Own elaboration based on: [1], [2], [3], [4], [10]

Between them it flows the biggest amount of information that ensure the effectiveness and efficiency of the waste management system. Other entities, such as the Ministry of Environment, SDSI or CIEP and VIEP appear here mostly as supervisory, control or ancillary entities. With the exception that the Ministry of Environment first and foremost establishes laws concerning waste management system at the national level. However, the communities in acts of local law apply to regional conditions of existence of the system. The Ministry of Environment also collects the reports provided by the Marshal's Office and CIEP, and holds control over them. While the SDSI together with community unit determined Rules of Maintaining Cleanliness and Order in the community.

The above matrix (Fig. 10.2) shows how many different pieces of information are exchanged between the entities in the waste management and these are only the major participants and just some of the transmitted information. Wider analysis of the transmitted information should be primarily municipal entities, residents and property owners, companies dealing with waste collecting, service and manufacturing companies producing waste and owners of utility installations located on the community territory. Between these entities there flows biggest amount of information that is valuable from the perspective of efficiency and effectiveness of the waste management system. Information is also exchanged within appointed previously appointed groups of entities; for instance, between utility installations and companies collecting waste. As we can see the exchange of information in the waste management system is very broad, and the process is quite complicated because of the number of entities which participate in it.

Finally, it is also worth to mention the types of information channels and media used to exchange information between participants in the communication process. Communities as units supervising and ensuring the efficiency of municipal waste management system are also committed to educational and informational activities aimed at all residents and property owners.

They use such forms as public consultation, advertising in public spaces, websites, other advertising media such as local TV or radio station, as well as information leaflets and social media. A part of the communication process in waste management system it also applies to the exchange of classified information between public authorities and various companies which exchange with each other information about fees, recommendations, reports, complaints, technical specifications, etc. It is used not only the traditional way of transmission of information, when a report or complaint is sent in paper form to the postal address of institution or company, but also, for example specialized programs for creating reports in the form of digital documents, which allows submission of them electronically. Some information between participants is sent via e-mail as attachments. There are many basic file formats and programs through which it is possible to create a digital version of transmitted information. But it has its drawbacks – the number of different programs that are used to create and transmit information, significantly extends the communication process, and introduces a problems with its receiving. Not every participant of the process have the same software, so reading submitted information becomes difficult.

Tab. 10.1 Example of information exchanged between the main entities in the waste management system

	Marshal's Office	Production and service companies	Utility installations and waste collection companies	Property owners	Residents	Community
Community	Completeness of reports	A list of contracts for waste collection and evidence of payment	Types and amount of waste, complaints, comments on the waste collection	Complaints, declarations, fees	Complaints	-
Residents	Plans	-	Segregation of waste, schedule	Segregation of waste	-	Segregation of waste, schedule, environmental education
Property owners	Plans	-	Segregation of waste, schedule	-	Number of people residing property, fees	Deadlines and fees, declarations, segregation of waste
Utility installations and waste collection companies	Integrated permits	Waste collection request, complaints	-	Complaints, number of containers needed	Complaints	Property covered by receiving of waste, tenders
Production and service companies	Permits	-	Amount received and handled waste, fees	-	-	Waste collection – if the community so decides
Marshal's Office	-	Mass produced and exported packaging, batteries	Types and weights received and processed waste	-	-	Realization of tasks related to municipal waste management

Source: Own elaboration based on: [1], [2], [3], [4], [10]



Another concern is security of information transmitted electronically, the information transmitted and stored in this way are at risk of hacker attacks, especially when used for this poorly secured e-mail. Also the use of traditional media is burdened with some negatives, e.g. low durability. Therefore, it is important to select the appropriate communication channels, taking into account the nature of outgoing information and their receivers, but also the media durability, safety and their usefulness in the information exchange process.

## CONCLUSIONS

The waste management system is such a complicated system, that the process of communication between all the entities identified in it, becomes significantly complex. There are here different levels of communication, we are dealing with internal and external communication, and both are equally important from the point of view of the system. The selection of appropriate communication channels and media, is also relevant, which is not easy with such a large number of receivers and senders, and the information exchanged between them. There is a lack of comprehensive tools that would facilitate this process; merge used by participants software for creating digital documents and allow for their rapid transfer to selected target groups. So, to high-quality information only getting in interested in its entities.

It should be remembered that the information exchanged in the waste management system have a significant impact on the functioning of the whole system, as well as of each entities located there. Also the decisions taken in the framework of the activities of those entities – of companies and public administration units are based largely on information coming from the system. At the foundations of the waste management system it is the exchange of accurate and factual information – it's how residents approach to separate waste, and to what extent it agrees with the model proposed by the community, based on information received in a variety of campaigns and informational and educational folders. The rest of the system is based on how the waste are segregated "at source", methods of their collecting, sorting and possibilities of their recycling or eventually, their utilization.

Due to analyzing the communication process between entities of the waste management system, it has become possible to define several significant areas and issues that should be subjected to more extensive research, they include among others:

- assessment of the effectiveness of communication channels used in process, which will allow in the future to their streamlining and adjusting to the specificities of participants;
- identification of all entities in the communication process, as well as their analysis in terms of role performing in the waste management system and the degree of impact on system efficiency;
- the quality of the information transmitted in the system, their influence on decision-making and the ability to implement integrated decision support systems in this field;

- the possibility of using advanced IT tools in the process of communication that would be adapted to the requirements of all its participants and would combine the functions needed to ensure the effectiveness of the waste management system;
- security of information in the communication process – protection of classified information exchanged between entities in the waste management system, as well as an analysis of information available to a wider audience (e.g. residents);
- manoeuvrability of transmitted information in the system and the degree of user satisfaction in the communication process.

These issues are among the areas in which there are some loopholes, essentially affecting the functioning of the waste management system. The high quality of the information transmitted between the entities involved in the communication process is the basis for an effective and efficient system. However, this is often not enough, so we should undertake to carry out a broader research on the communication process in waste management system, taking into account the above-mentioned critical areas of the process.

## REFERENCES

- 1 Act of 13 September 1996 on maintaining cleanliness and order in municipalities (Dz. U. of 2013 item 1399, as amended).
- 2 Act of 14 December 2012 on waste (Dz. U. of 2013 item 21, as amended).
- 3 Act of 20 July 1991 Environmental Protection Inspectorate (Dz. U. of 2013 item 165, as amended)
- 4 Act of 27 April 2001 Environmental Protection Law (Dz. U. of 2013 item 1232, as amended).
- 5 Krajowa Izba Gospodarki Odpadami. *Akty prawne*. Available: <http://www.kigo.pl/> [Accessed: Apr. 20, 2015].
- 6 National Waste Management Plan 2014, Warsaw: The Council of Ministers, 2010.
- 7 J. Ober. „Funkcja i rola efektywnej komunikacji w zarządzaniu”. *Zeszyty Naukowe Politechniki Śląskiej, seria: Organizacja i Zarządzanie* z. 65, 2013.
- 8 Polska Izba Gospodarki Odpadami. *Publikacje*. Available: <http://www.pigo.org.pl/> [Accessed: Apr. 20, 2015].
- 9 K. Serafin. „Skuteczna komunikacja w podmiotach administracji publicznej”. *Governance – korporacje, instytucje publiczne, sieci. Studia Ekonomiczne, Uniwersytet Ekonomiczny w Katowicach*, no. 141, 2013.
- 10 Summary of reporting obligations on waste management in the first half of 2015. Available: [https://www.mos.gov.pl/g2/big/2015\\_02/42f503e260d8a3bfe9df471a6a43baf4.pdf](https://www.mos.gov.pl/g2/big/2015_02/42f503e260d8a3bfe9df471a6a43baf4.pdf). [Accessed: Apr. 20, 2015].

## THE ESSENCE OF COMMUNICATION PROCESS IN WASTE MANAGEMENT SYSTEM

**Abstract:** *The purpose of the article was to identify some trends and directions of changes in the process of communication between all entities in waste management system. Streamlining of the process should be followed by identifying the participants and information exchanged between them. It is important to recognize all the communication channels and media used in the process, as well as distortions occurred. Identification of gaps and potential barriers in the communication process of waste management system will designate areas for further analysis and extended research.*

**Key words:** *waste management system, communication process, the act of maintaining cleanliness and order in municipalities, the act of waste*

## ISTOTA PROCESU KOMUNIKACJI W SYSTEMIE GOSPODARKI ODPADAMI

**Streszczenie:** *Celem niniejszego artykułu było wskazanie kierunków rozwoju i zmian w procesie komunikacji pomiędzy wszystkimi podmiotami systemu gospodarki odpadami. Usprawnienie tego procesu należy zacząć od identyfikacji jego uczestników oraz wymienianych pomiędzy nimi informacji. Istotne staje się również rozpoznanie kanałów komunikacyjnych i wykorzystywanych nośników, jak i występujących w procesie zniekształceń. Identyfikacja luk i potencjalnych barier w procesie komunikacji w systemie gospodarki odpadami pozwoli wyznaczyć obszary wymagające dalszej analizy i pogłębionych badań.*

**Słowa kluczowe:** *system gospodarki odpadami, proces komunikacji, ustawa o utrzymaniu czystości i porządku w gminach, ustawa o odpadach*

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