



IT SYSTEMS SUPPORTING WASTE MANAGEMENT IN COMMUNITIES – AN OVERVIEW OF INNOVATIVE FUNCTIONS

Monika STĘPIEŃ, Krzysztof KURUS, Barbara BIAŁECKA
Silesian University of Technology

Abstract:

The aim of this article was to review the most used systems supporting waste management in communities of the provinces of Silesia regarding to innovativeness of the functions offered within them. On the market there can be distinguished many systems dedicated to communities, which more or less are able to meet the demands of their users. Many of them only, in a small area, supports the management process of the waste system, offering only functions related to the accounting and finance service, or only creating reports. It is difficult to find software that would allow communities a comprehensive way for efficient and effective management, and would improve communication between all entities involved in the system. To meet market realities and requirements of users, software producers need to continuously improve innovation of their products.

Key words: waste management system, IT systems, supporting systems, waste

INTRODUCTION

On the market there are many systems, which are used by communities as systems supporting waste management process. Many of them fulfill only singular functions related to servicing finances, billing and bookkeeping or generating reports, collecting declarations from inhabitants and legal services. Whereas, others are intended only for a database or allowing communities to monitor the work of collecting vehicles (most software is made to be available by a company engaged in the collection and treatment of waste in the community). Amongst IT tools used by communities, were also systems for public administration, but not directly dedicated to units involved in the waste management in communities. These tools are usually used for registration purposes and allow for the electronic circulation of documents, making it easier for communities to carry out administrative processes.

Not much commercially available systems dedicated to communities allow for comprehensive support management process of waste management system. There are some stand out tools that willingly use communities in the province of Silesia, however, these tools do not always fully meet the expectations of their main users. This is not only because of the wrong review of functions offered by the applications themselves, but also with the specific needs of communities in this area. Waste management, due to its especial nature – a large number of entities involved in the system and many of the tasks that need to be taken and controlled is so complex that requires bigger comprehensive approach by the producers and developers of IT systems. A broad approach to the problem of waste management, which is required by its unique characteristics, causes that only few manufacturers are able to choose to build a system that in a synthetic way would meet their expectations.

It is worth verifying if the tools, according to their authors, in a comprehensive manner municipal support unit the implementation of tasks arising from the Act on maintaining cleanliness and the arrangement in municipalities and if they have proper functions necessary for this. The law imposes on communities carrying out the supervision over the receipt and processing of waste, conducting information and education activities and the analysis and reporting undertaken in within the system activities [1]. To the basic functions which these systems should pursue, can be included among:

- electronic collection of declarations,
- creation of analyzes and forecasts,
- creation reports and statements,
- managing owners, properties and complaints,
- scheduling of waste removal,
- monitoring waste collection (including monitoring the amount of waste collected at various points on the route of the vehicle),
- exchanging data with other entities,
- communication with residents and property owners,
- creation of databases for the purposes of registration.

If we consider the IT system, which shall make it considerably easier to communities management of waste system, attention should be drawn into other functional and additional services that should be taken into account by the producer in the design phase:

- help desk (assistance in real-time),
- built-in communicator for employees,
- alerting about important dates,
- trainings for employees before and after implementation of the system,
- technical service.

Table 1

Comparison of selected IT systems supporting process of waste management in communities in the province of Silesia

	Ratusz – Odpady Komunalne	GOMiG-Odpady	ecoSanit	EKOKOSZ
electronic collection of declarations	–	+	+	–
creation of analyzes	+	+	–	+
creation of qualitative and quantitative predictions on waste	–	+	n.d.	–
creation of reports stemming from the respective laws	+	+	+	+
creating reports for the user's own	+	+	+	+
complaint management	–	–	–	–
property management	+	+	+	+
owners management	+	+	+	+
scheduling of the waste collection	–	+	–	–
financial settlement and fees	+	+	+	WINDYKACJA (eng. vindication) module integration
monitoring of the waste collection	–	integration with external program	integration with external program	n.d.
management of containers for waste	–	+	+	+
database (registries declaration, real estate, etc.)	+	+	+	+
data exchange with other entities	–	+	+	+
information/educational actions (a separate web portal)	–	+	–	–
communication with property owners (eg. text messages)	SPK module integration	+	+	–
generating alerts	n.d.	+	+	n.d.
help desk	n.d.	+	–	use of additional program
application for mobile devices	–	–	+	–
work on multiple sites at once	+	+	+	n.d.
integration with external systems	+	+	+	n.d.
the ability to integrate additional modules/programs	+	+	+	+
support for different file formats (import/export)	n.d.	dbf, xml, csv	n.d.	xml, html, txt
access via a web browser (work on an external server)	–	only for companies receiving waste with module sprawozdawczość WWW (eng. reporting WWW)	+	–

Source: Own elaboration based on [2, 3, 4, 5].

Multi-dimensional tool for supporting the activities of communities should be characterized not only by intuitive, adaptable and transparent user interface and ease of operation, but also by the ability of importing and exporting files in different, and certainly in basic, formats like: doc, docx, odt, pdf, xls, xlsx and ods; a high level of security and ease of data entry is foundation. The complexity of this tool should manifest itself primarily in the multi-modularity and the possibility of adapting the modules to the needs of the user. Where there is no possibility of extending the system with additional modules – producer should allow the user to integrate tools from other IT systems, that allow it to fulfill the missing functions.

IT SYSTEMS COMMONLY USED IN COMMUNITIES

Amongst IT systems, which are mostly used by municipal units involved in the waste management system in the province of Silesia and which largely support their responsibilities towards duties under the Act on maintaining cleanliness and order in municipalities, we can point out:

- system Ratusz* (enterprise Rekord SI from Bielsko-Biała),
- system GOMiG-Odpady (enterprise ARISCO from Łódź),
- system ecoSanit (enterprise LogicSynergy from Kraków),
- system EKOKOSZ (enterprise GEOBID from Katowice).

*IT system Ratusz supports the management and is dedicated to public administration units; program related to waste management is located in package called OPŁATY LOKALNE (eng. LOCAL FEES).

The above table (Table 1) presents a comparison of selected functions and capabilities of four chosen IT systems taking into account basic functions and additional services, which to the large extent have been mentioned in the previous chapter of this article.

To make the prepared review more transparent, there were set out following designations:

- „+” means that the function exists,
- „-” means that the function does not exist,
- „n.d.” means an insufficient information to determine that function exists or not.

From IT systems, most commonly selected by municipal units in the province of Silesia, preferably in comparison falls out GOMiG-Odpady program ARISCO company from Łódź. This system provides the most comprehensive way of supporting the work of communities in the waste management. It does not only possess necessary functions such as property and owners management, reporting and ability of creating data bases, but also allows for scheduling of the waste collection, communication with the owners and residents, including the conduct information and education actions by using the web portal located at czystagmina.pl. Producers made it possible for users to implement modules, which are associated with electronic collection of declarations and access to the program via website for companies receiving waste and a broad integration capabilities with external systems, including system monitoring waste collection and Księgowość Zobowiązań (KSZOB) program's U.I. INFO-SYSTEM.

The large potential exists also in system called ecoSanit, which producer is LogicSynergy company from Kraków. The program also has the basic modules related to data base, billing and financial accounting or reporting. What distinguishes it from other systems is a mobile application iBOP (Internetowe Biuro Obsługi Płatnika) and the access to the system via a website. Producers also made it possible for users to integrate the system with external software, so they can take advantage in a wide range of functions required to manage municipal waste in communities.

SUMMARY

All applications and IT systems, which are designed for communities and allow them to effectively management of waste, should take into account its multifaceted nature. The combination of functions such as accounting services, electronic collection of statements, reporting, communication with residents and property owners or scheduling the reception facilities and creation of analyzes and forecasts, should not be something extraordinary. Besides the basic functions, which undoubtedly should offer comprehensive IT systems, there should be also considered the provision of

a high data security. These systems should have an intuitive and clear interface, provide regular updating of the data, which allows for simultaneous operation of multiple stations, or ensure ease of use and data entry. Focusing on the users point of view, it is important to also adjust the modules to their needs, or if that is not possible, to integrate the system with other, which previously has been used in communities IT systems.

It is worth noticing that the waste management system is created not only by municipal units; other entities identified in the system include residents and property owners, companies involved in collection and processing of waste, other local government units and all organizations or private individuals interested in the functioning of the system. Each of these entities to a greater or lesser extent, involve in the management process or have an impact on the whole system. Within the waste management system, every made decision has a great impact on interests of its participants and each one is important from the point of view of the efficient functioning of the whole system, as well as each of those entities individually. The priority is therefore to create an IT system that would allow to improve not only the communication between all entities, but also this one that in a complete way would be an assistance to the actions taken by each subject.

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mgr Monika Stępień, mgr inż. Krzysztof Kurus,
 prof. dr hab. inż. Barbara Białecką
 Silesian University of Technology, Faculty of Organization and Management
 Institute of Production Engineering
 ul. Roosevelta 26, 41-800 Zabrze, POLAND
 e-mail: monika.stepien@polsl.pl
 krzysztof.kurus@polsl.pl
 barbara.bialECKA@polsl.pl