The 3rd International Conference on Economics and Social Sciences
Innovative models to revive the global economy
October 15-16, 2020
Bucharest University of Economic Studies, Romania

Contemporary Business − Between Sustainability and Waste

Mustafa AL-MAFRACHI[1,]
Alexandru Valentin TEODOROV[2]*, Hanaa Najm ABED[3]

DOI: 10.2478/9788395815072-031

Abstract

The use of waste management in the context of sustainability has been increasingly important over the years. Despite this importance, it is noticed that this area is still little explored and there are many possibilities of academic research. The main goal of this report is to form a waste management plan, help implement a waste management plan, and encourage adopting new environmental technologies. This report discusses a short introduction about the sustainable process, waste management, and case study in Romania.

Keywords: Sustainability, Waste management, The Ministry of Environment, Romania, Contemporary Business.

JEL Classification: M11, Q01, Q53, Q56

1. Introduction

Nowadays, overpopulation and rapid development of industries and lifestyles lead to an increase in consumption and a depletion of natural resources. On the other hand, humans have always produced waste and disposed of it in a way, which influenced the environment. Therefore, the increase in waste that is generated by industrial factories and human activities needs to be managed. For this reason, scientists have been researching intensely in fields such as sustainable engineering and green engineering to reduce energy and natural resource consumptions. The idea of sustainability has a quantifiable unit, which refers to three pillars of social, environmental, and economic life. These pillars focus on environmental policies, which increasingly require the reduction, reuse, and recycling of waste. This type

[1] Bucharest University of Economic Studies, Bucharest, Romania, mustafa3.saad@gmail.com.
[2] Bucharest University of Economic Studies, Bucharest, Romania, valyteodorov@gmail.com.
[3] University of Agronomic Sciences and Veterinary Medicine, Bucharest, Romania, daniamo549@gmail.com.
* Corresponding author.

of action contributes to closing the loop of material use throughout the economy by providing waste-derived materials as inputs for production (Skumatz et al., 2008).

Sustainable manufacturing process and solid waste management are used for conserving valuable natural resources, preventing the unnecessary emission of gas and protecting public health. The main goals include reducing environmental impacts and offering economic opportunities. Solid-state recycling process becomes an effective and powerful methodology to achieve the green state forming from recyclable waste to useful parts. The developed process can be considered as a typical green movement or environmentally manufactured process. It has many benefits including simpleness, cost-effectiveness, and energy-saving and can be cleanly recycled as it does not harm the environment (Sachs et al., 2006).

The main goal of this report is to explain the main advantages of a sustainable manufacturing process and its effects in minimizing or eliminating production and processing wastes through eco-efficient practices, and it encourages the adoption of new environmental technologies. Therefore, this report discusses a brief introduction about the sustainable process, waste management, and the case study of Romania.

2. Literature Review

2.1 Problem statement

Given the wide range of issues inherent to the concept of sustainability, the increasing volume of information related to this subject and their complexity, the insertion of KM can provide many benefits to this area of research (Chang et al., 2018; Halati and He, 2018; Reijsen et al., 2015; Singh and El-Kassar, 2019; Yigitcanlar, 2011) and therefore needs to be further deepened. Currently, the use of the concept of sustainability is discussed and used in several types of research around the world, which led to the dissemination of several conceptual interpretations according to the purpose of each research, resulting in the considerable extension of its meaning and importance. A widely adopted definition of sustainability is that developed in the World Commission on Environment and Development WCED (Brundtland, 1987, p. 41): “Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs”.

As a consequence of transdisciplinary intrinsic to the concept of sustainability, standard definitions can hardly encompass its true dimensions. In this sense, Biswas et al. (2018) and Bhandari et al. (2018) highlight the importance of the Triple Bottom Line (TBL) for an adequate understanding of the dimensions of sustainability. Initially created by John Elkington, the TBL (“people, profit and planet”) played an important role in the search for an understanding of sustainability. According to this concept, the dimensions of sustainability are economic, social and environmental. That is, for a company to be considered sustainable, in addition to being profitable, it needs to take into account in its

decision-making the social and environmental impacts of its actions (Biswas et al., 2018; Depken and Zeman, 2018; Zhang et al., 2018).

The three Rs are commonly used terms in waste management; they stand for "reduce, reuse, and recycle". As waste generation rates have risen, processing costs increased, and available landfill space decreased, the three Rs have become a central tenet in sustainable waste management efforts (El-Haggar, 2007; Seadon, 2006; Suttibak & Nitivattananon, 2008; Tudor et al., 2011). The concept of waste reduction, or waste minimization, involves redesigning products or changing societal patterns of consumption, use, and waste generation to prevent the creation of waste and minimize the toxicity of waste that is produced (USEPA, 1995). Common examples of waste reduction include the use of reusable coffee mugs instead of disposable ones, reducing product packaging, and buying durable products which can be repaired rather than replaced. Reduction can also be achieved in many cases through reducing consumption of products, goods, and services. The most effective way to reduce waste is by not creating it in the first place. Therefore, it is obvious why reduction is placed at the top of waste hierarchies (USEPA, 2010).

As it was the case with the coffee cups, in many instances, reduction can be achieved through the reuse of products. Efforts to take action to reduce waste before it is actually produced can also be termed pre-cycling. It is sometimes possible to use a product more than once in its same form for the same purpose; this is known as reuse (USEPA, 1995). Examples include using single-sided paper for notes, reusing disposable shopping bags, or using boxes as storage containers (UC Davis, 2008). Reusing products displaces the need to buy other products thus preventing the generation of waste. Waste minimization through reduction and reuse offers several advantages, including: saving the use of natural resources to form new products and the wastes produced in the manufacturing processes; reducing waste generated from product disposal; and reducing costs associated with waste disposal (USEPA, 2010).

Not all waste products can be disposed and even reusable products will eventually need to be replaced. It is inevitable to convert that waste into a by-product of daily human living (Kim, 2002), but in many cases it is possible for this waste to be diverted and recycled into valuable new materials. Glass, plastic and paper products are commonly collected and reformed into new materials and products. Recycling products offer many of the benefits of waste reduction efforts: displacing new material usage, reducing waste generated and the costs associated with disposal. However, recycling requires energy and the input of some new materials. Therefore, this process is lengthier, placing recycling lower on the waste hierarchy than reduction and reuse (UC Davis, 2008; USEPA, 2010). Many waste management frameworks seek to incorporate the three Rs in some capacity. In the UK, North America, throughout Europe and in parts of Asia, waste hierarchies are being incorporated, thus promoting the adoption and use of "reduce, reuse and recycle" initiatives (Allwood et al., 2010). Waste management hierarchies place the

highest priority on waste prevention, reuse, and then waste recovery. Disposing materials in a landfill is the least desirable of the options (ECOTEC, 2000).

2.2 The Research Gap

This study aims to research the extent to which waste management can contribute to achieving sustainability in new urban projects in Romania. This will be done by taking advantage of the main indicators of organizations supporting sustainability. Afterwards, the study will propose a series of steps to be taken into consideration. These will lead in a direction that helps this urbanization rise and become sustainable.

3. Research Questions / Aims of the Research

3.1 Research questions

The main goal of this article is to study how Romania acts with regard to waste management and to give recommendations for good practices. As mentioned above, urban plans in Romania lack the application of the principles and goals of sustainability in their projects. The absence of these elements from its clear goal to achieve sustainability can be easily noticed as most of these projects aim to achieve investment purposes without considering the importance of the environment and sustainable urban systems.

In conclusion, this type of generalized behaviour in the Romanian system makes us ask three questions:

- What components are essential in a comprehensive waste management plan?
- What types of considerations should Romanian organizations contemplate in developing a waste management plan?
- What is the range of options that exists in forming a waste management plan?

3.2 Purpose of the study

This study aims to research the extent to which waste management can contribute to achieving sustainability in new urban projects in Romania by taking advantage of the indicators of organizations supporting sustainability, then reaching a direction that helps this urbanization to rise and become sustainable urbanization.

4. Research Methods

The research relied on the descriptive approach, through describing the phenomena related to the study, as well as on the analytical approach through the use of statistical methods in analysing the data of the questionnaire collected, with the aim of identifying the relationship between the integrated waste management and sustainable development process, in order to reach results and

recommendations based on which to make decisions that bring the best possible benefit for the society.

The research used a sample of workers in the Romanian Ministry of Environment, the number of individuals in the sample reaching 50 during the period November - December 2019.

5. Results

Questionnaire analysis, the first axis:

Table 1. The axis of the integrated waste management process

Phrase	Strongly agree (%)	Agree (%)	Neutral (%)	Disagree (%)	Strongly disagree (%)	Relative weight
There is a lot of interest in the integrated waste management process	48	30	12	6	4	0.824
There are capabilities that enhance the effectiveness of the integrated waste management process	42	28	14	10	6	0.780
The integrated waste management process starts from the collection areas	38	32	10	14	6	0.764
There are many effective methods used in the assembly process	32	34	14	12	8	0.740
Citizen behaviour affects the integrated waste management process	44	30	12	10	4	0.800
The prevailing energy policy of the country affects the integrated waste management process	40	34	14	6	6	0.792
Community economic factors influence the integrated waste management process	34	28	12	14	12	0.716
Advanced technology affects the efficiency of the integrated waste management process	38	32	14	10	6	0.772
The integrated waste management process improves the surrounding environment	40	34	12	6	8	0.784
The integrated waste management process reduces environmental pollution to the lowest possible level.	38	32	10	14	6	0.764
The integrated waste management process is subject to effective control from the competent authorities.	32	34	14	12	8	0.740

Source: Produced by the author, using the SPSS software.

When arranging the axis statements in terms of the degree of relative importance, the value of the greatest relative weight, from the point of view of the study sample, was "There is a lot of interest in the integrated waste management process" with a relative score of 0.824. The second variable in terms of relative importance was "Citizen behaviour affects the integrated waste management process" with a relative score reaching 0.800. The variable "The prevailing energy policy in the country affects the integrated waste management process" reached third place with a value of 0.792; and the following "Integrated waste management process improves the surrounding environment" with 0.784.

In what concerns the rest of variables, these are as follows: "There are all capabilities that help in the effectiveness of the integrated waste management process", 6th place in terms of relative importance with a score of 0.780; then "Advanced technology affects the efficiency of the integrated waste management process", 7th place with a value of 0.772; then "The integrated waste management process starts from the collection areas" and "The integrated waste management process reduces environmental pollution to the lowest possible level", both reaching a relative value of 0.764. The least important variables form the point of view of the study group were "There are many effective methods used in the assembly process"; "The integrated waste management process is subject to effective control from the competent authorities" – both scoring 0.740 and last "Community economic factors influence the integrated waste management process", with a relative weight of 0.716.

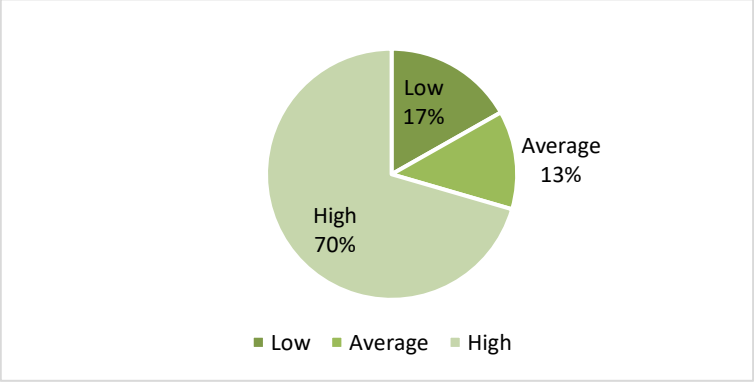

Figure 1. Axis levels of the integrated waste management process

It is clear that the axis has been divided into 3 levels (high - medium - low) and it was found that for 70.5% of the sample, the focus of the study is in the high level, while for 12.7% of the sample, the focus of the study is in the middle level, while the low level consists of 16.8% of the sample, which shows a high level of performance of the integrated waste management process from the point of view of the study sample individuals.

The second axis:

Table 2. The axis of sustainable development

Phrase	Strongly agree (%)	Agree (%)	Neutral (%)	Disagree (%)	Strongly disagree (%)	Relative weight
The integrated waste management process contributes to community development	44	30	12	10	4	0.800
The integrated waste management process increases the level of environmental awareness of citizens	40	34	14	6	6	0.792
The integrated waste management process contributes to achieving the environmental goals required to be achieved	40	34	12	6	8	0.784
The efficiency of the integrated waste management process increases as a result of the increase in the efficiency of the control management method	34	30	14	16	6	0.740
The Ministry of Environment aims to achieve sustainable development through many methods	42	26	12	10	10	0.760
The integrated waste management process meets the objectives of the Ministry of Environment in achieving sustainable development	32	30	18	14	6	0.736
There are many benefits to society through the integrated waste management process	38	32	14	12	4	0.776
The integrated waste management process is achieved in the development of the environmental sector	42	26	14	12	6	0.772
The integrated waste management process is in line with the development goals to be achieved	40	28	14	14	4	0.772
The country was able to achieve high levels of development as a result of using various methods of development	44	30	12	10	4	0.800

Source: Produced by the author, using the SPSS software.

When arranging the axis statements in terms of the degree of relative importance, from the point of view of the study sample, it was found that "The integrated waste management process contributes to community development" and "The country was able to achieve high levels of development as a result of using various methods of development" were considered to be the most relevant of the axis with a relative weight of 0.800. Following closely, the study group considered the variable "The integrated waste management process increases the level of environmental awareness of citizens" to be of importance to sustainable development with a score of 0.792.

When it comes to the values of the rest of the variables, these rank as follows: "The integrated waste management process contributes to achieving the environmental goals required to be achieved", ranked 4th in terms of importance to the focus group, with relative score of 0.784; then "There are many benefits to society through the integrated waste management process", with score 0.776; next, "The integrated waste management process is achieved in the development of the environmental sector" and "The integrated waste management process is in line with the development goals to be achieved" both reaching a relative score of 0.772. The last three were: "The Ministry of Environment aims to achieve sustainable development through many methods" with score 0.760, then "The efficiency of the integrated waste management process increases as a result of the increase in the efficiency of the control management method", with score 0.740, and lastly "The integrated waste management process meets the objectives of the Ministry of Environment in achieving sustainable development", reaching score 0.736.

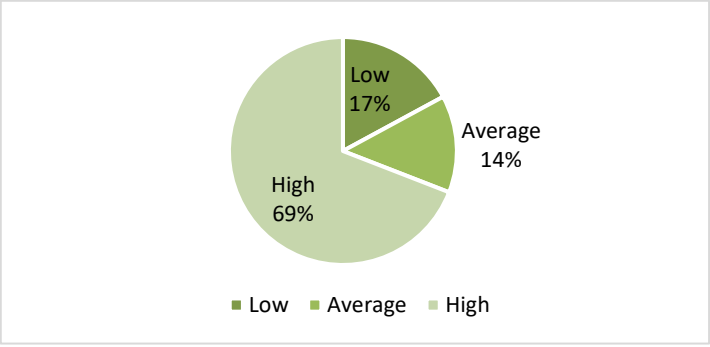

Figure 2. Axis levels of sustainable development

It is clear that the axis has been divided into 3 levels (high - medium - low) and it was found that for 69.1% of the sample, the focus of the study is in the high level, while 13.8% is in the middle level, while the low level consists of 17.1% of the sample, which shows the high level of the process of sustainable development from the point of view of the study sample individuals.

Study hypothesis test

"There is a positive relationship with statistical significance between the integrated waste management process and the level of sustainable development."

To ensure the validity of the study hypothesis, the study carried out the correlation coefficient test to study the correlation between the integrated waste management process and the level of sustainable development, and it was found that there was a significant direct correlation at the level of 0.01, which confirms the validity of the study hypothesis and that there is a direct impact of the integrated waste management process on the level of sustainable development, i.e. The higher the level of integrated waste management process, the greater the level of sustainable development achieved.

Table 3. Statistical significance at the level of significance 0.01

The variable	Integrated waste management process
Level of sustainable development	0.779

Source: Produced by the author, using the SPSS software.

6. Conclusions

The current article focused on the relationship between urban waste management as urbanization. What is more, the study also aimed at discovering how integrated waste management can help for a better development of a country per se. Thus, after releasing the survey, there were a series of variables that were taken into account, so as to prove the hypothesis. Therefore, in order to summarize some of the findings, these are:

- There is a great interest of officials in achieving high levels of integrated waste management process in the community;
- There is a high level of performance of the integrated waste management process from the point of view of the study sample group;
- There is a great interest of officials in achieving high levels of sustainable development in society;
- The high level of the sustainable development process from the point of view of the study sample individuals;
- There is a direct impact of the integrated waste management process on the sustainable development level.

All these variables come to aid the affirmation according to which "There is a positive relationship with statistical significance between the integrated waste management process and the level of sustainable development" thus, rendering, once more the hypothesis to be valid.

Acknowledgement

This work was co-financed from the European Social Fund through Operational Programme Human Capital 2014-2020, project number POCU/380/6/13/125015 "Development of entrepreneurial skills for doctoral students and postdoctoral researchers in the field of economic sciences".

References

[1] Allwood, J. M., Ashby, M. F., Gutowski, T. G., & Worrell, E. (2010). Material efficiency: A white paper. Resources, Conservation and Recycling, 55(3), pp. 362-381. Elsevier B.V. DOI: 10.1016/j.resconrec.2010.11.002.

[2] Bhandari, R., Saptalena, L. G., Kusch, W. (2018). Sustainability assessment of a micro hydropower plant in Nepal. Energy. Sustain. Soc. 8, 3. https://doi.org/10.1186/ s13705-018-0147-2.

[3] Biswas, I., Raj, A., Srivastava, S. K. (2018). Supply chain channel coordination with triple bottom line approach. Transport. Res. Part E Logist. Transp. Rev. 115, 213e226. https://doi.org/10.1016/j.tre.2018.05.007.

[4] Brundtland, G. H., Khalid, M., Agnelli, S., Al-Athel, S., & Chidzero, B. (1987). Our common future. New York, 8.

[5] Chang, D. L., Sabatini-Marques, J., da Costa, E. M., Selig, P. M., Yigitcanlar, T. (2018). Knowledge-based, smart and sustainable cities: a provocation for a conceptual framework. J. Open Innov. Technol. Mark. Complex. 4, 5. https://doi.org/10.1186/ s40852-018-0087-2.

[6] Depken, D., Zeman, C. (2018). Small business challenges and the triple bottom line, TBL: Needs assessment in a Midwest State, U.S.A. Technol. Forecast. Soc. Change 135, 44e50. https://doi.org/10.1016/j.techfore.2017.05.032.

[7] ECOTEC Research and Consulting Ltd. (2000). Beyond the bin: The economics of waste management options. Retrieved from www.foe.co.uk/resource/reports/ economics_waste_options.pdf.

[8] El-Haggar, S. M. (2007). Sustainable industrial design and waste management: Cradle-to-cradle for sustainable development (p. 424). Oxford: Elsevier/Academic Press.

[9] Halati, A., He, Y. (2018). Intersection of economic and environmental goals of sustainable development initiatives. J. Clean. Prod. https://doi.org/10.1016/j.jclepro. 2018.03.322.

[10] Kim, S.-J. (2002). Korean waste management and eco-efficient symbiosis − a case study of Kwangmyong City. Clean Technologies and Environmental Policy, 3(4), pp. 371-382. DOI: 10.1007/s10098-001-0124-9.

[11] Reijsen, J. van, Helms, R., Batenburg, R., Foorthuis, R. (2015). The impact of knowledge management and social capital on dynamic capability in organizations. Knowl. Manag. Res. Pract. 401e417.

[12] Sachs, N. (2006). Planning the funeral at the birth: Extended producer responsibility in the European Union and the United States. *Harvard Environmental Law Review*, 30(51).

[13] Seadon, J. K. (2006). Integrated waste management-looking beyond the solid waste horizon. Waste management, 26(12), pp.1327-36. DOI: 10.1016/j.wasman.2006.04.009.

[14] Singh, S. K. (2019). Territoriality, task performance, and workplace deviance: Empirical evidence on role of knowledge hiding. J. Bus. Res. 97, 10e19. https:// doi.org/10.1016/j.jbusres.2018.12.034.

[15] Singh, S. K., El-Kassar, A.-N. (2019). Role of big data analytics in developing sustainable capabilities. J. Clean. Prod. 213, 1264e1273. https://doi.org/10.1016/j. jclepro.2018.12.199.

[16] Skumatz, L. (2008). Pay as you throw in the US: implementation, impacts, and experience. Waste management, 28(12), 2778-85. Elsevier Ltd. DOI: 10.1016/j.wasman. 2008.03.033.

[17] Suttibak, S., & Nitivattananon, V. (2008). Resources, Conservation and Recycling Assessment of factors influencing the performance of solid waste recycling programs. *Conservation And Recycling*, 53, 45-56. doi: 10.1016/j.resconrec.2008.09.004.

[18] Tudor, T., Robinson, G., Riley, M., Guilbert, S., & Barr, S. (2011). Challenges facing the sustainable consumption and waste management agendas: perspectives on UK households. *Local Environment*, 16(1), 51-66. DOI: 10.1080/13549839.2010.548372.

[19] U.S. Environmental Protection Agency. (1995). Decision-makers' guide to solid waste management, volume II. Washington, D. C. Retrieved from http://www.epa.gov/ osw/nonhaz/municipal/dmg2/.

[20] U.S. Environmental Protection Agency. (2010). Reduce, Reuse, Recycle. Wastes - Resource Conservation. Retrieved January 5, 2011, from http://www.epa.gov/ wastes/conserve/rrr/.

[21] U.S. Environmental Protection Agency. (2010). Reduce, Reuse, Recycle. Wastes - Resource Conservation. Retrieved January 5, 2011, from http://www.epa.gov/ wastes/conserve/rrr/.

[22] UC Davis. (2008). The 4 R's of waste reduction.

[23] Yang, J., Yuan, M., Yigitcanlar, T., Newman, P., Schultmann, F. (2015). Managing knowledge to promote sustainability in Australian transport infrastructure projects. Sustain. Times 7, 8132e8150. https://doi.org/10.3390/su7078132. Yigitcanlar, T., 2011. Position paper: redefining knowledge-based urban development. Int. J. Knowl. Based Dev. 2, 340e356.

[24] Zhang, W., Padmanabhan, P., Huang, C.H. (2018). Firm level offshoring activities, pollution regulation, triple bottom line, and market structure: What do they have in common? J. Clean. Prod. 195, 618e624. https://doi.org/10.1016/j.jclepro. 2018.05.232.

[25] Zheng, X., Li, L., Zhang, F., Zhu, M. (2019). The Roles of Power Distance Orientation and Perceived Insider Status in the Subordinates' Moqi with Supervisors and Sustainable Knowledge-Sharing. *Sustainability*, 11, 1421. https://doi.org/10.3390/ su11051421.