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## Impact of Unskilled Labour on Waste Products Management in West 'B' Municipality of Zanzibar

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### **Abstract:**

*The study assessed the impact of unskilled labour on waste product management in the West 'B' municipality of Zanzibar. The sample size was 139 respondents, and a cross-sectional research design involving a quantitative approach was applied. The data were collected by using questionnaires. Multiple regressions were used to analyse the data. The findings show that in waste collection, unskilled labours do not have any impact on waste products management as it scored 0.542 higher than 0.05 alpha of probability value. Secondly, that waste transportation also has no impact on waste products management as it scored 0.808 alpha above a standard of 0.05. In contrast, unskilled labours have an impact on waste disposal as it scored 0.023 alpha less than 0.05 alpha. The study recommended that the government should provide modern equipment and improve the working environment to ensure unskilled labours put more effort into the management of waste products. Nevertheless, capacity building of unskilled labourers on waste disposal was recommended to increase proper waste disposal.*

**Keywords:** Unskilled labour, waste products management, municipality

### **1. Introduction**

In many developed countries, efforts to waste management have improved Agbefe et al., (2019). In developing countries, the situation of waste is not the same as there are obstacles to properly collecting waste, uncontrolled disposal, and even burning waste (Kimeu, 2015). Even among the 27 EU member nations, such as Sweden, Switzerland, Portugal, France, England, and Norway, the issue of unskilled labour in public and commercial organisations is universal and widespread. Sweden, Switzerland, Portugal, and Norway are the top countries to hire unskilled workers (Giannakitsidou et al., 2020). In Europe, the origins of unskilled labour can be traced back to the middle ages (Parajuly et al., 2020). Some are sourced from within their member countries, while others are sourced from outside the European Union (Silva et al., 2018). Canada accepts migrants as unskilled labour through a program known as Provincial Nomination Programs (PNP), which are intended to reduce labour market needs in their respective jurisdictions. Canada recognizes the value that unskilled and intermediate-skilled foreign workers bring to the country and welcomes them through the Canadian work permit program and various immigration programs (Akbulut & Boulatoff, 2021). Most people, who moved from one country to another in search of work, ended up working in waste management jobs such as waste collection, transportation, and composition (Silva et al., 2021). Malaysia's proportion of unskilled workers was 11.2 percent, demonstrating that unskilled workers employed in waste product management are higher than the number of semi-skilled workers in the country (Hoornweg, & Bhada, 2012).

Many Sub-Saharan African countries, such as Burundi, Central African Republic, Botswana, Burkina Faso, Cape Verde, Republic of the Congo, etc., are affected by the problem of unskilled labours in their workplaces. Youth unemployment, both skilled and unskilled, remains a severe and untreated issue in many Sub-Saharan African countries. The Government of the United Republic of Tanzania has indicated that 80% of Tanzania's workforce is unskilled, posing a barrier to the country's transition to a middle-income economy (Ntakamulenga, 2012). According to the Association of Tanzania Employers (2012), between 30 and 40 percent of advertised jobs require trained individuals, meaning that Tanzania still has a large number of unskilled people who work in various institutions such as waste management, agriculture, mining, and other industries.

Like other developing countries, waste products in Zanzibar vary from one region to another according to people's living standards, lifestyle, and available natural resources. Waste found in Zanzibar is mainly composed of organic material (85.6%) (Wolters, 2016). Statistics show that 800 metre cubic of waste is generated in Zanzibar town per day, and only 45% is collected and disposed of by the responsible municipal council. This is because of insufficient serving, lack of awareness among citizens on the role of dumping and dustbins, and lack of resources. Poor waste management in Zanzibar also resulted in burning waste in domestic areas, dumping illegally, and being eaten by animals. Some of these wastes are blown around the wind or swept into grainages by the rain, normally resulting in blockages, flooding, and stagnant water (Wolters, 2016). Further, Maione (2019) observes that, by now, there is no clear projection of waste

product generation in small islands, including Zanzibar. This left a hard question and increased tension of environmental degradation on the small islands. The failure of Zanzibar in solid waste management creates fear, anxiety, and frustration for Visitors, Health Officers, Administrators, waste management stakeholders, and the citizens living in West B Municipal Council.

### 1.1. Problem Statement

Waste management is a problem compounded by rapid population growth (Kihila et al., 2021). Expanding population and increased human activities have resulted in a significant output of waste from households (Abdul & Hafeez, 2018). Modern technology produces garbage, but there is little effort to apply the same technology to home waste management, posing a hazard to public health and the environment. The problem of poor waste management in Zanzibar stood as the most worrying issue hindering the role of city cleanness and attraction in Zanzibar today. Prior data show that it has been a decade now that unskilled labours in waste management in West 'B' municipality have not been able to meet the desired cleanness level in waste collection, transportation, and waste disposal. For instance, in 2017, West 'B' Municipality generated 87,984 tons of solid waste, but only 39,593 tons were collected, transported, and disposed off. In 2018 the waste generated was 91,584 tons, but only 41,854 tons were collected, transported, and disposed off. Also, in 2019, it generated 95,040 tons, but only 43,718 tons were collected, transported, and disposed off. In addition, in 2020, it generated 98,496 tons, but only 44,816 tons were collected, transported, and disposed off. In 2021, the West 'B' Municipal generated 101,952 tons, but surprisingly enough, only 45,869 tons were collected and disposed off (HoD, West 'B' Urban Planning, 2021). Generally, literature shows that unskilled labours worked in numerous Municipalities and have produced major waste management issues in the cities of developing countries and sub-urban areas (Liyala, 2011). This points to the fact that poor waste management is still a huge problem in Zanzibar. However, several strategies have been taken to combat this problem in Zanzibar. For example, training was offered in 2019/2020 to build the capacity of unskilled labours in waste management in Zanzibar. However, unskilled labours in West 'B' Municipal fail to meet the desired goal, and the problem of poor waste management is escalating. Several academic studies in solid waste management have been conducted, such as those of Mbido (2013) and Liyala (2011), who debated whether appropriate training courses to build the capacity of unskilled labours could help in the better running of waste management projects to address waste management problems. Despite these studies, little is known about the effects of unskilled labours on waste product management. Therefore, this study was designed to address the impacts of unskilled labour on waste product management in the West 'B' Municipality of Zanzibar.

### 1.2. Specific Objectives

The objectives of the study were:

- To examine the impact of unskilled labour in waste collection of waste product management in the West 'B' Municipality of Zanzibar.
- To evaluate the impact of unskilled labour in waste transportation of waste product management in West 'B' Municipality of Zanzibar.
- To measure the impact of unskilled labour on the waste composition of waste product management in West 'B' Municipality of Zanzibar.

### 1.3. Hypotheses

- H<sub>1</sub>O: There is no impact of unskilled labour in waste collection in the West 'B' Municipality of Zanzibar.
- H<sub>2</sub>O: There is no impact of unskilled labour in waste transportation in West 'B' Municipality of Zanzibar.
- H<sub>3</sub>O: There is no impact of unskilled labour in waste disposal in West 'B' Municipality of Zanzibar.

## 2. Theoretical Literature Review

The study was underpinned by the Stakeholders' Theory and the Resource Dependence Theory. The Stakeholders' Theory by Freeman 1984 defined a Stakeholder theory of an organisation as a collection of stakeholders to manage the many stakeholders' interests, needs, and perspectives. The management of these organisations is responsible for managing them to benefit all stakeholders to secure stakeholders' rights and involvement in decision-making that impacts efficient waste product management (Kimeu, 2015). The municipality must identify the demands of its stakeholders and seek to exceed their highest expectations (Mnyone & Mafuru, 2017). As a result, the success of any organisation is determined by how well management manages stakeholder relationships. There is no reason for a company to exist without the backing of stakeholders (e.g., unskilled labour) (Luthra, 2020). According to Joseph (2006), stakeholders are the people and organisations who are vital to a company's survival and success. Waste management issues are viewed as part of a company's total social responsibility addressed using the stakeholders' theory (Céspedes et al., 2003). Stakeholders monitor and enforce legislative, economic, and social license requirements to gain power by using a range of license terms, the regulatory, social, and economic licenses issued, which also impact an organisation's waste management performance. The stakeholder theory in this study implies that organisations should emphasize waste management and organisational performance when analyzing stakeholders' interests because these interests are nurtured through interactive symmetrical two-way communication with the stakeholders. The municipality must maintain ongoing communication with all stakeholders about implementing waste management measures to maintain a conducive work organisational operation environment.

The Resource Dependence Theory was developed by Pfeffer & Salancik in 1978, which concerned with how external resources used by the organisation, such as raw materials, affect organisational behavior. The hypothesis is critical to this research since the ability of any organisation to collaborate, adapt, and explore resources faster than the competitors determines its success. The resource dependence theory believes that organisations' resources are critical to their performance and that control over resources is a source of power. In order to ensure free access to resources, organisational tactics must be carefully studied (Pfeffer & Salancik, 1978). The implications of the resource dependence theory in this study are that organisations should ensure that all resources needed for waste product management, including enough labours, both skilled and unskilled, are available, trained, and motivated, and emphasize waste management to improve organisational performance. The municipality must provide stakeholders with all required resources to implement waste management and maintain a conducive work organisational operation environment.

### 2.1. Empirical Review

Kimeu (2015) conducted a study in Mombasa on the influence of waste management strategies on hotel operational performance. The research took place in Kenya. In his study, a census survey research design was used. Data were collected using a questionnaire from 200 respondents and then analysed using descriptive statistics to discover that labour availability, materials such as dustbins and plastic, and reliable technology impact waste product management performance. The study contributes enough to the discussion of this study. However, the weaknesses are in the unclear explanation of variables.

Aryampa et al. (2019) investigated the status of waste management in East African Cities. The study used recorded waste collection efficiencies and paper review as a research method to find out whether the availability of higher-skilled labour impacts the collection of waste products. Despite using a very complex method in data collection and design, this study is too useful because their argument help in the discussion and analysis of this study. However, this current study analysed the impact of unskilled labour on waste management.

Shabani (2015) investigated the factors affecting community participation in solid waste management in municipal councils in Tanzania. The study used interviews and questionnaires to collect data from 135 household members. This study revealed that most of the members were willing to pay as long as satisfactory services were given by the municipal regarding waste collection. Based on payment factors in waste product management, the study falls short of connecting unskilled labour and waste management.

Khamis (2016) investigated the effectiveness of solid waste management systems on local government authority in Tanzania at Moshi Municipal council. In his study, he uses a qualitative approach whereby data were collected by using focus groups to find out that the availability of resources for collection, transportation, and disposals like bins, berries, wheels, etc., and timely payment of unskilled labour have an impact on the effectiveness of solid waste management.

Nzeadibe (2015) investigated how waste moves up the hierarchy involving the informal sector to increase recycling rates in Nigerian cities. The study used a correlation research design. In their study, they found out that well-organised labour (skilled, employed, or by contract) has an impact on the performance of waste product management in Nigeria. The contribution given from this study is that the method used is appropriate to inform that this study also helped to discuss current study findings. The only weakness is that the setting and the time when the study was designed are quite different from Zanzibar.

Wolters (2016) conducted a study on Environmental Health in Zanzibar using a case study of domestic solid waste management in the Urban West (North Zone). In his study, a multi-case study method was applied whereby different cases were explored to discover serious health risks in the streets of Kilimahewa, Muembe Makumbi, Masumbani, KwaWazee, which were caused by poor waste disposal in these areas. The study concentrated on environmental health, unlike the current study that specifically focused on unskilled labours and waste management in Zanzibar.

### 2.2. Conceptual Framework

The conceptual framework is shown in figure 1.

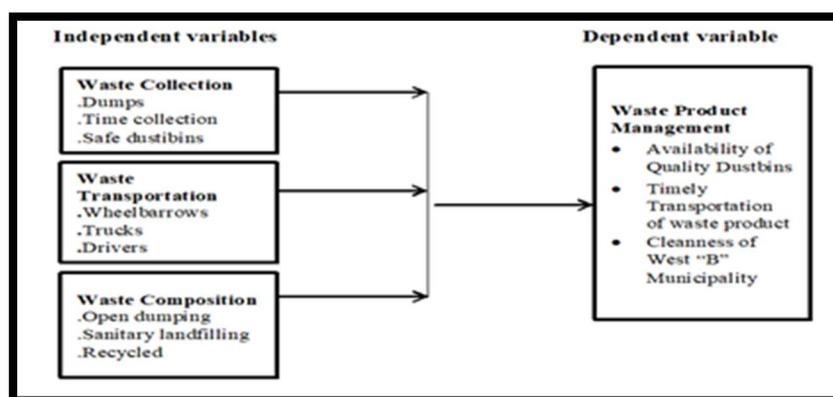


Figure 1: Conceptual Framework

Source: Researcher, (2022)

### 3. Methodology

#### 3.1. Research Design

The study applied a cross-sectional research design because it allows an in-depth look at a particular situation and time instead of a broader spectrum allowing new insights from it (Kothari, 2004).

#### 3.2. Research Approach

The research approach is a plan and procedure consisting of broad assumptions to detailed methods of data collection, analysis, and interpretation (Orodho & Kombo, 2002). It is based on the nature of the research problem being addressed (Orodho, 2003). In this study, a quantitative approach was used since it tends to collect numerical data, whereby the process of measurement was central to the success of this work as it allows the researcher to:

- Reach a higher sample size,
- Study a larger sample size for any hypothesis,
- Quickly and more straightforwardly reach an accurate and generalized conclusion of the results (Kombo & Tromp, 2006).

#### 3.3. Area of the Study

The study was conducted in West 'B' Municipality of Unguja, which is located in the Urban West Region in Zanzibar. The West B Municipality was chosen following easy accessibility.

#### 3.4. Population of the Study

The population for this study was 214 people involving operational staff and outsourced staff from West 'B' Municipality. Table 1 shows the distribution.

Category of Employee	Frequency	Percentage (%)
Out Sourced Staff - WPM	180	84%
Operational Staff - WPM	34	16%
Total	214	100%

Table 1: Distribution of the Population of the Study by Category of Labour

WPM=Waste Product Management.

Source: Researcher, 2022

#### 3.5. Sampling Technique

The researcher used a simple random technique to select the study sample because each respondent had an equal chance of being selected (Sekaran, 2003).

#### 3.6. Sample Size

The study sample of 139 respondents was collected using the Yamane (1967) determining sample size, as shown in table 2.

Category	Frequency	Sample Size	Percentage (%)
Out Source Staff - WPM	180	117	84.%
Operational Staff - WPM	34	22	16.%
Total	214	139	100%

Table 2: Sample Size

WPM=Waste Product Management

Source: Researcher, (2022)

#### 3.7. Data Collection Tool

The study used a questionnaire to collect data. Kothari (2004) defines a questionnaire as a research instrument containing a list of questions that people are asked to answer to collect information relevant to the study. The questionnaire was in five (5) likert scale format.

#### 3.8. Data Analysis

The data were analysed using multiple regressions technique through the help of Statistical Package for the Social Science (SPSS Version 23). According to Neuman (2014), multiple regressions is the statistical technique that is used to measure the impact or effects between two or more predicted variables in the case of this study (waste collection, waste transportation, and waste disposition) against one dependent variable (waste products management).

## 4. Findings of the Study

### 4.1. Response Rate

The study expects 139 respondents. Due to several reasons, including job rotation, annual leave, and retirement, the researcher successfully got 133 respondents who returned their questionnaires, equal to 95.68% of all respondents. This percentage was deemed satisfactory.

### 4.2. Characteristics of the Respondents

The characteristics analysed were:

- Age,
- Gender, and
- Education level

#### 4.2.1. Age

Variables	Frequency	Percentage (%)
Below 18 Years	13	9.8%
18-30 Years	65	48.9%
31-40 Years	33	24.8%
41-50 Years	7	5.3%
51-60 Years	15	11.3%
Total	133	100.0%

Table 3: Respondents' Age  
Source: Researcher (2022)

Results in table 3 show that:

- 48.9% of the respondents (65) were aged between 18 and 30 years,
- 9.8% of respondents (13) were aged below 18 years,
- 24.8% of respondents (33) were aged between 31 and 40 years,
- 5.3% of respondents (7) were aged between 41 and 50 years
- 11.3% of the respondents (15) were aged between 51 and 60 years

These results also imply that both groups of people (youth and adults) were incorporated into the waste management issue.

#### 4.2.2. Gender

The gender of the respondents was analysed to check the composition of the respondents based on their age. This was necessary to check if both types of respondents were given equal chances.

Variables	Frequency	Percentage (%)
Males	68	51.1%
Females	65	48.9%
Total	133	100.0%

Table 4: Respondents' Gender  
Source: Researcher (2022)

The findings indicated that:

- 68 (51.1%) of respondents were male, and
- 65 (48.9%) were female respondents

These results of the findings show that both males and females were given equal chances to express their views on waste management.

#### 4.2.3. Education

The education level of the respondents was also analysed to check the distribution of the respondents based on their education level. Table 5 below summarises the results of the findings.

Variables	Frequency	Percentage (%)
Primary education up to form II	52	39.1%
Secondary education Olevel	33	24.8%
Advance sec education Alevel	48	36.1%
Certificate level	0	0%
Diploma level	0	0%
Degree	0	0%
Total	133	100.0%

Table 5: Respondents' Education Level

Source: Researcher (2022)

The findings indicate that:

- 39.1% of the respondents (52) had primary education up to form II level, 24.8% of the respondents (33) completed secondary education,
- 36.1% of the respondents (48) completed the advanced level

These findings revealed that most of the respondents had a low level of education, as, in Zanzibar, most of the people with low education have cleaning companies.

#### 4.3. Impact of Unskilled Labour in Waste Collection, Transport, and Disposal in the West 'B' Municipality of Zanzibar

Model	B	Bootstrap <sup>a</sup>					
		Bias	Std. Error	Sig. (2-tailed)	95% Confidence Interval		
					Lower	Upper	
1	(Constant)	1.684	.021	.294	.001	1.162	2.305
	Waste collection	.080	-.005	.131	.542	-.172	.326
	Transportation	-.027	-.007	.104	.808	-.232	.165
	Disposal	.199	.001	.089	.023	.034	.370

a. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

Table 6: Coefficients

Source: Researcher (2022)

The results in table 6 show that the general model scored at 0.001 significance value while the results of waste collection towards waste products management were 0.542 value. The results proved that the impact of unskilled labour in waste collection to waste products management was 0.542 value. 0.542 value is larger than 0.05 alpha, and the null hypothesis was accepted. The results were similar to those of Kimeu (2015), who found that unskilled labours impact waste product management performance. According to Aryampa et al. (2019), skilled labours are more powerful in waste collection than unskilled people.

Secondly, the results proved that the impact of unskilled labour in waste transportation was 0.808 value which is larger than 0.05 alpha, and the null hypothesis was accepted. The findings are in line with the findings of Khamis (2016), who found that waste transportation has an impact on waste product management.

Thirdly, the value for the impact of unskilled labour in waste disposal was 0.023 value. The null hypothesis is rejected if this value is less than 0.05 alpha. The results were different from the findings of Nzeadibe (2015), where unskilled labour had no impact on waste disposal.

## 5. Conclusion

The study concluded that there was no impact between the role of unskilled labour in waste collection and waste transportation on waste product management in the West 'B' Municipality of Zanzibar. Lastly, the study concluded that unskilled labour has a significant impact on waste disposal on waste product management in West 'B' Municipality of Zanzibar.

## 6. Recommendations

The study recommended that government continue to initiate capacity-building programmes for unskilled labours as it impacts waste disposal. Since unskilled labours have no impact on waste collection, transportation should instead equip the unskilled labours with modern equipment such as Trucks, E-tricycles, narrow vehicles, etc. Also, the working environment for waste collectors should be improved in terms of payments, safety, and security.

## 7. References

- Abdul, F. H., & Hafeez, R. O. (2018). The Methods Used by Non-Governmental Organisations in Solid Waste Management: Are They Effective in Combating Waste in Zanzibar? *Journal of Environmental Economics and Management*, 80-96, 102404.

- ii. Agbefe, L. E., Lawson, E. T., & Yirenya-Tawiah, D. (2019). Awareness on waste segregation at source and willingness to pay for collection service in selected markets in Ga West Municipality, Accra, Ghana. *Journal of Material Cycles and Waste Management*, 21(4), 905-914.
- iii. Akbulut-Yuksel, M., & Boulatoff, C. (2021). The effects of a green nudge on municipal solid waste: Evidence from a clear bag policy. *Journal of Environmental Economics and Management*, 106, 102404.
- iv. Aryampa, S., Maheshwari, B., Sabiiti, E., Bateganya, N. L., & Bukenya, B. (2019). Status of waste management in the East African Cities: Understanding the drivers of waste generation, collection and disposal and their impacts on Kampala City's sustainability. *Sustainability*, 11(19), 5523.
- v. Céspedes-Lorente, J., De Burgos-Jiménez, J., & Álvarez-Gil, M. J. (2003). Stakeholders' environmental influence. An empirical analysis in the Spanish hotel industry. *Scandinavian journal of management*, 19(3), 333-358.
- vi. Giannakitsidou, O., Giannikos, I., & Chondrou, A. (2020). Ranking European countries on the basis of their environmental and circular economy performance: A DEA application in MSW. *Waste management*, 109, 181-191. Guidelines for managing municipal solid waste through segregation, reuse, and recycling in Zanzibar. Centre for Science and Environment, New Delhi.
- vii. HoD, Urban Planning, (2021). Taarifa fupi ya usimamizi na udhibitiwa taka ngumu katika Manispaaya MaGHARIB 'B' un published report.
- viii. Hoorweg, D. & Bhada-Tata, P. (2012). What a Waste A Global Review of Solid Waste. [http://www.europarl.europa.eu/RegData/etudes/STUD/2017/581913/EPRS\\_STU\(2017\)58193\\_EN.pdf](http://www.europarl.europa.eu/RegData/etudes/STUD/2017/581913/EPRS_STU(2017)58193_EN.pdf) institute of open learning.
- ix. Joseph, K. (2006). Stakeholder participation for sustainable waste management. *Habitat International*, 30(4), 863-871.
- x. Khamis, A. A. (2016). Effectiveness of solid waste management systems in local government authorities in Tanzania: The case of Moshi municipal council (Doctoral dissertation, Mzumbe University).
- xi. Kihila, J. M., Wernsted, K., & Kaseva, M. (2021). Waste segregation and potential for recycling- A case study in Dar es Salaam City, Tanzania. *Sustainable Environment*, 7(1), 1935532.
- xii. Kimeu, D. M. (2015). Effect of waste management practices on the operational performance of hotels in Mombasa County, Kenya (Doctoral dissertation, University of Nairobi).
- xiii. Kombo, D. K., & Tromp, D. L. (2006). Proposal and thesis writing: An introduction. Nairobi: Paulines Publications Africa, 5(1), 814-30.
- xiv. Kothari, C.R. (2004). *Research Methodology: Methods and Techniques*: NEW Delhi, New Age International (P) Ltd, Publishers.
- xv. Liyala, C. (2011). Modernising solid waste management at municipal level: institutional arrangements in urban centres of East Africa (Doctoral dissertation). Wageningen: Wageningen University.
- xvi. Luthra, A. (2020). Efficiency in waste collection markets: Changing relationships between firms, informal workers, and the state in urban India. *Environment and Planning A: Economy and Space*, 52(7), 1375-1394.
- xvii. Maione, C. (2019). Emergence of plastic pollution on tourism beaches in Zanzibar, Tanzania. Master's Thesis School for Environment and Sustainability, University of Michigan.
- xviii. Mbido, K. (2013). Optimization of municipal solid waste transportation management with composting plant (Doctoral dissertation, University of Dar-es-Salaam).
- xix. Neuman W.L (2014). *Social Research Methods: Qualitative and Quantitative Approaches*, Seventh Edition, Pearson Education Limited, United Kingdom.
- xx. Ntakamulenga, R. (2012, September). The status of solid waste management in Tanzania. In *Coastal East Africa Solid Waste Workshop Flic en Flac, Mauritius* (Vol. 10).
- xxi. Nzeadibe, T. C. (2015). Moving up the hierarchy: involving the informal sector to increase recycling rates in Nigerian cities. *Future directions of municipal solid waste management in Africa*, 70-87.
- xxii. Orodho, A. J. (2003). *Essentials of educational and social science research methods*. Nairobi: masola publishers, 54, 71-82.
- xxiii. Orodho, A. J., & Kombo, D. K. (2002). *Research methods*. Nairobi: Kenyatta University, institute of open learning.
- xxiv. Parajuly, K., Fitzpatrick, C., Muldoon, O., & Kuehr, R. (2020). Behavioral change for the circular economy: A review with a focus on electronic waste management in the EU. *Resources, Conservation & Recycling*: X, 6, 100035.
- xxv. Pfeffer, J., & Salancik, G. R. (1978). *A resource dependence perspective* Cambridge University Press, UK 1(7).
- xxvi. Sekaran, U. (2003). Towards a guide for novice research on research methodology: Review and proposed methods. *Journal of Cases of Information Technology*, 8(4), 24-35.
- xxvii. Silva, S. C. E., Martinez, C. A., Petrescu, D. C., & Petrescu-Mag, R. M. (2019). Two perspectives, the same target-a sustainable municipal waste management. Evidence from Latin America and central and eastern Europe. *Quality-Access to Success*, 20.
- xxviii. Wolters, I. (2016). Environmental Health in Zanzibar-a case study on domestic solid waste management in the Urban West (North Zone) (Doctoral dissertation, Hochschule für angewandte Wissenschaften Hamburg).
- xxix. Yamane, Taro. (1967). *Statistics, an introductory analysis*, 2nd Ed., New York: Harper and Row. Cited from Israel, G.D. (1992). Determining sample size.