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Evaluation of Environmental Management System for Small and Medium Enterprises in Dar Es Salaam, Tanzania

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ABSTRACT

A system that manages environmental issues of Small and Medium Enterprises (SMEs) from the time of acquisition of raw materials up to disposal of the product is not well clear, especially in Tanzania. Most of the studies have been conducted in the field of environment management but few of them address the evaluation of the management of SMEs activities with respect to the environment. Although the nature of activities of SMEs has little noticeable environmental implications at the individual level but the impact is large due to diversification and labour intensity of these SMEs. SMEs employ about 20% of the total labour force in Tanzania. Thus, the consequences on the environment are therefore very high. In this study both quantitative and qualitative research methods have been used to evaluate the awareness on Environmental Management Systems (EMS), the extent of implementation of EMS, tools used in EMS and Factors that hinder effective EMS. Descriptive and Factor analysis have been used as techniques for analyzing data. The study found a low level of awareness, whereby about 59% of respondents were slightly aware, on EMS, tools used for EMS were found to be more reactive tools than proactive tools. Whereas about 60% of SMEs are inappropriately and inadequately implementing elements of EMS according to ISO 14001. The study found critical factors with high influence on hindering the implementation of EMS including inadequate environmental consciousness of top leaders. It is recommended that more efforts should be invested in creating awareness, impacting the knowledge and skills of implementing the EMS as per ISO 14001 requirements at all levels of SMEs.

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INTRODUCTION

Protection of the environment and economic growth are often seemed to be antagonistic. The interdependence between economic activity, ecosystems and natural resources presents not only opportunities but also environmental challenges. Development of industrial activities and projects result into high demand of resources for raw materials and utilities, encroachment of sensitive areas such as wetlands, increased amount of waste generated, air pollution, indiscriminate disposal of liquid and solid wastes which pose health risks (NEMC, 2017).

Economic reform programs implemented in Tanzania promote market economy philosophy s whereby the private sector takes the lead in creating incomes, employment and growth. On other hand, the government plays a regulatory role and create conducive environment for the private sector to take the lead in driving economic growth. The Small and Medium Enterprises (SMEs) account for a large share of the enterprise's activities in Tanzania. In fact, SMEs have become promising private sector and make the base for private sector growth. (URT, 2003).

SMEs still play a great role in absorbing the unemployed population and economic growth. The Small Industries Development Organization (SIDO) in 2008 reported that 92 % of the school leavers were potentially absorbed by SME sector. This shows that SMEs is a good option for absorption of unemployed individuals, school leavers, college and university graduates in the country. Furthermore, the SME sector was anticipated to occupy about 20 % of the total labour force in Tanzania (URT, 2012). This sector is also very important in generating income as well as contributing to GDP growth rate and foreign exchange earnings due to international trade (URT, 2010). By 2008, it was reported that 30 % of the GDP originated from SME sector. The contribution increased from 30 % to 35 % in 2011 (URT, 2003).

However, small and medium enterprises (SMEs), in particular, are often unaware of their impact on the environment and lack the knowledge and expertise needed to implement and manage EMS. The SMEs have exerted significant pressure on the environment, either individually or through a combination of sectors. This has heightened the need to implement systems for monitoring and promoting improvements in the environmental management performed by SMEs. (NEMC, 2017).

The literature is full of researches which have been conducted concerning environmental issues. However, few of those studies have been done to assess the EMS in SMEs particularly in Tanzania. Although the nature of activities of SMEs has little noticeable environment implications at individual level, the impact is large due to diversification and labour intensity which is about 20% of the total labour force in Tanzania employed in this sector; the consequences on environment are therefore very high (URT, 2003).

EMS for managing the activities of SMEs from the time of acquisition of raw material up to waste disposal is needed for various reasons. The EMS may in turn results in environmental conservation, could save cost which the government, institutions and individuals incur as post-reaction due to environmental degradation. For these reasons, it has attracted necessity to assess the EMS for SMEs. In this context EMS means strategic approach to continuous environmental improvement within SMEs. It includes set of tools and processes SMEs use to realize their environmental goals

Thus, the focus of this paper is to present results on assessment of awareness of EMS by small and medium enterprises, tools used to manage their environment, extent of implementation of EMS, factor affecting implementation of EMS as well as strategies for implementation of EMS.

METHODS AND MATERIALS

The study employed both quantitative and qualitative research approaches as well as survey techniques for data collection. The study was conducted in Dar es Salaam city. The selection of this study area was due to the fact that Dar es Salaam is a commercial city of Tanzania and most of SMEs are conducting their activities in this city. Table 1 shows the distribution of the target population.

Table 1: Distribution of the Target population (SMEs)

Target population		N (population size)
SMEs	Textiles and leather industries	60
	Pulp and paper industries	17
	Plastics and Packaging industries	25
	Chemical, Paints and Dyes industries	35
	Total (N)	**137**

Table 2: Distribution of the Target population (Group of experts and regulators)

S/No.	Target population
1.	NEMC and LGAs Officers
2.	Academicians

According to FSDT survey there are 405,902 SMEs in Dar es Salaam region (FSDT, 2012). In order to narrow the scope, SMEs with high rate of environmental pollution were considered for the study. It has been reported that among most polluting industries are Textiles and leather industries, Pulp and paper industries, Plastics and Packaging industries, Chemical, Paints and Dyes industries(Jangu, 2017). The data were also triangulated to other sources such as regulatory bodies and academic institutions. Academicians, Local Government Authorities (LGA's) and NEMC, officers were assumed have vast knowledge on environmental issues, thus were involved as respondents for the study. Data were collected using questionnaires and document review for primary and secondary data respectively. The questionnaire consisted of open and closed questions which allowed data to be collected in both qualitative and quantitative data. The questionnaire prepared in CSEntry CSPro version 7.2.1 was deployed in tablets and administered by interviewers in order to gather the required information. Data were measured using five-point likert scales. The respondents included 102 SMEs, 11 academicians and 20 regulators (NEMC and LGAs officers).

In this study, the total population was 137 which comprise SMEs of the sectors mention in Table 1. Yamane formula was used to get 102 sample size of SMEs. Simple random sampling was used in collecting data from SMEs.

$$\mathbf{n}= \frac{N}{1+N(e^2)} \quad (1)$$

$$\mathbf{n} = \frac{137}{1+137(0.05^2)} = \mathbf{102} \quad (2)$$

where:

n = Sample size,

N= Target population

1= Constant

e= the confidence level or margin error (0.05)

Table 3: Sample size

S/N	Target respondents	n*r/N	Sample size (Unit of analysis)
Random sampling			

a)	SMEs	Textiles and leather industries	102*60/137	45
		Pulp and paper industries	102*17/137	13
		Plastics and Packaging industries	102*25/137	19
		Chemical, Paints and Dyes industries	102*35/137	25
b)		**Total**		**102**
Purposive sampling unit of analysis				
c)	NEMC and LGAs Officers			20
d)	Academicians			11
e)	**Total**			**31**

r = number of type of SMEs in population N.

Validity and Reliability Analysis

(a)*Validity Test*

According to (Cornish, 2007),Validity explains how well the collected data covers the actual area of investigation. The concept of Validity basically means "measure what is intended to be measured. In this study validity was measured using Pearson Correlation by SPSS software. Validity was tested using SPSS software by doing the correlation analysis with Pearson Correlation. Correlation between each question in the questionnaire and its total value was found using the Pearson correlation. For the instrument to be valid, the following conditions were used.

- If Sig. < 0.05 the question/instrument is valid
- If Sig. > 0.05 the question/instrument in not valid
- The results showed that the instrument is valid.

(b) *Reliability test*

Reliability tells how consistently a method measures something when applying the same method to the sample under the same conditions and provides the same results (Manly and Alberto, 2017). To test the reliability of data collection instruments Cronbach's Alpha was used to measure the internal consistency by the use of SPSS. Cronbach's alpha ranges between 0 and 1, the closer the Cronbach's alpha coefficient is to 1.0 the greater the internal consistency of the items in the scale.

Table 4: Reliability Analysis

Variables	Cronbach's Alpha	No. of Items
Level of awareness	0.977	18
Extent of Implementation of EMS	0.976	17
Factors hinder implementation of EMS	0.975	15
General	**0.976**	

Table 4 illustrates the results of reliability test using Cronbach's alpha approach. Reliability coefficient of 0.7 or higher is considered acceptable. Cronbach's alpha greater than 0.9 means excellent consistency, greater than 0.8 means good consistence, 0.7 means acceptable, 0.6 means questionable, greater than 0.5 means poor and less that 0.5 is unacceptable. According to results in Table 4 our instruments are high reliable to measure and produce the same output repeatedly

Data Processing, Analysis and Presentation

(c) *Data processing*

Processing implies editing, coding, classification and tabulation of collected data so that they are pliable to analysis. The collected data was edited, compiled, classified, coded and summarized using Python and SPSS software in order to eliminate errors. Moreover, in order to draw conclusion data collected from the primary source using the structured questionnaire was summarized, edited and coded before analysis.

Data Analysis

All data collected were treated and analyzed using SPSS (Statistical Package for Social Sciences) version 26 and Python. The analysis was according to the requirements of the data and achievement of the specific objectives. Descriptive statistics was used to present preliminary findings of population and the data collected and other inferential statistic tools such as Pearson Correlation and Factor analysis were employed.

Factor analysis is the one among of the statistics method used to describe the correlated variable in term of potentially lower number of unobserved variables called factors. In particular, factor analysis used to explore the data for patterns, confirm hypotheses, and reduction of many variables to a more manageable number. In this study Factor analysis used in assessing the factors which hinder implementation of EMS to SMEs.

RESULTS AND DISCUSSIONS

Table 5 provides demographic information of the respondents. The results show that, most of SMEs which were involved in the study are in the category of medium industries (78), followed with small industries (21) and lastly is micro industries (3).

Table 5: Respondents' demographic variables

Variable	N	%
Gender of the respondents (SMEs)		
Male	57	56
Female	45	44
Total	**102**	**100.0**
Gender of the respondents (NEMC, LGAs officers and Academicians)		
Male	22	70.97
Female	9	29.03
Total	**31**	**100.0**
Education level		
Secondary School	28	27.0
Diploma/Vocational Trainings	61	60.0
Degree	13	13.0
Total	**102**	**100.0**
SME Category		
Medium Enterprise	78	76.5
Small Enterprise	21	20.5
Micro Enterprise	3	3.0
Total	**102**	**100.0**
Level of value chain of SMEs		
Extraction level	6	5.8
Production level	4	4.0
Extraction & production	3	3.0
Production and Finished goods	89	87.2
Total	**102**	**100.0**

Awareness of EMS by SMEs

regarding awareness of EMS by SMEs, the results shows that 59% of respondents were slightly aware, 28% not aware at all, 3% somewhat aware, 9% moderate aware and only 1% extreme aware. Table 6 shows the frequency distribution of the awareness. The EMS awareness was measured by evaluating the components of EMS which are Policy making, Planning, Do, Check, Act and Review. As awareness is low to most of SMEs this demonstrates that, EMS implementation to SMEs is very low in Dar es Salaam 3).

Environmental Management tools used by SMEs

Study results reveal that environmental management tools used by SMEs; municipal solid waste collection leads with 30.3% of usage followed with land fill (19.7%), environmental labelling (9.9%), incinerators (9.9%), end of pipe technology (8.5%), on-site recycling (8.5%), dilute and disperse (7%) and life cycle assessment (6.3%) as shown in Figure 1. The study shows that most of the tools which are highly applicable by SMEs for

environmental management are more reactive than proactive.

Table 6: Total EMS awareness result

Mean total awareness rounded					
		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	extremely aware	1	1.0	1.0	1.0
	moderately aware	9	9.0	9.0	10.0
	somewhat aware	3	3.0	3.0	13.0
	slightly aware	60	59.0	59.0	72.0
	not at all aware	29	28.0	28.0	100.0
	Total	**102**	**100.0**	**100.0**	

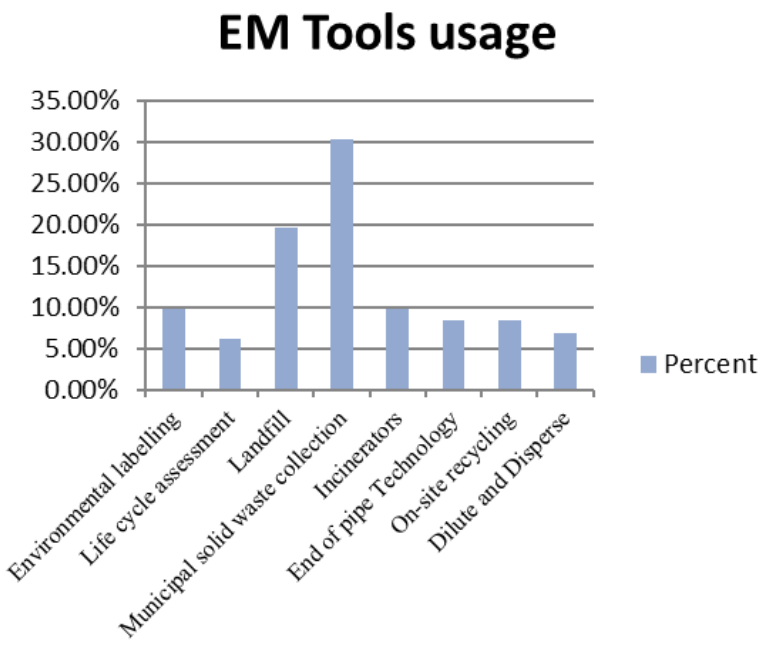

Figure 1: Environmental management tools used to SMEs

Extent of EMS Implementation

The extent of EMS implementation in SMEs shows that 60% are doing it inappropriate and 27% have not implemented at all or not exist, 3% insufficient, 9% Acceptable and only 1% outstanding. Table 7 shows the frequency distribution of the extent of implementation of EMS. The study results reveal that SMEs had EMS plans. However, these plans ewe found to have inappropriate and irrelevant contents compared to requirements of ISO14001standards. Table 7 shows the frequency distribution.

Factors that hinder implementation of EMS in SMEs

The tested factors were extracted from various literature sources. These factors were tested by using exploratory factor analysis (EFA) of which helped to figure out whether those factors have significant influence on hindering the implementation of EMS in SMEs in Tanzania. KMO and Bartlett's test of sphericity was significant at p –value .000, chi squire 2285.746 and the degree of freedom 105. According to KMO, the sampling adequacy was revealed to be 0.932 which shows the sample is

enough to proceed with the factor analysis. The variables were rotated using Varimax rotation and extraction technique with Kaiser Normalization. All tested factors were almost significant for effective implementation of EMS. Whereas two components were extracted. Results are as shown in Table 8 and Table 9.

Table 7: Extent of implementation for EMS

Mean total implementation					
		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	Outstanding	1	1.0	1.0	1.0
	Acceptable	9	9.0	9.0	10.0
	Insufficient	3	3.0	3.0	13.0
	Poor	61	60.0	60.0	73.0
	Not Applicable	28	27.0	27.0	100.0
	Total	**102**	**100.0**	**100.0**	

Table 8: KMO and Bartlett's Test

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.932
Bartlett's Test of Sphericity	Approx. Chi-Square	2285.746
	Df	105
	Sig.	0.000

Rotated Component Matrix[a]

Table 9: Rotated Component Matrixa

Rotated Component Matrix[a]		
	Component	
	1(internal factors)	**2(External factors)**
Environmental consciousness of top leaders	.882	.354
Incompatibility with organization corporate culture	.876	.318
Uncertainty in maintaining continuous improvement	.850	.350
Lack of Commitment of management	.845	.390
Difficult in dealing with Environmental issues	.843	.359
Improper Infrastructure and technology	.795	.434
Lack of Training on EM	.764	.395
Long time for EMS implementation	.696	.479
Implementation Cost	.322	.896
Professional expertise (Consultancy)	.408	.857
Legal enforcement	.415	.846
Lack of competitive advantage of EMS	.352	.843
Unclear policies	.401	.843
Limited communication and participation between stakeholder	.377	.840
Limited resources and support	.420	.814
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.		
a. Rotation converged in 3 iterations.		

Drivers and success factors for the implementation of EMS to SMEs in Tanzania

Prioritisation matrix was used to prioritise the drivers of EMS implementation for SMEs in Tanzania. The drivers were obtained through document review. In table 10 the drivers have been rated, Government encouragement and enforcement towards EMS implementation leads the ranking whereas thought of sustainability being the least ranked.

Table 10: Driver's prioritization matrix

Drivers	(D1)	(D2)	(D3)	(D4)	(D5)	**Total**	**Ranking**
Government encouragement and enforcement towards EMS implementation(D1)		10	1	10	5	**26**	**1**
The thought of sustainability (SD) (D2)	0.1		0.1	0.2	0.1	**0.5**	**5**
Due diligence and Compliance (D3)	0.2	10		10	1	**21.2**	**2**
Cost savings (Long term pay-off) (D4)	0.1	1	0.1		0.1	**2.3**	**4**
Market Expansion (D5)	0.2	10	1	5		**16.2**	**3**

1 Equally Important
5 Significantly More Important
10 Exceedingly More Important
1/5 Significantly Less Important
1/10 Exceedingly Less Important

Success factors for EMS implementation

The success factors for the implementation of EMS in SMEs were ranked by using prioritization matrix. The factors were ranked, and the first ranked factor was management commitment (40.9%) while the least one was environmental implementers (1.8%) as shown in Table 11.

Table 11: Prioritization matrix for success factors

Success factors	Management Commitment	Training	Communication	Resources	Approach	Competence	Environmental Coordinator	Total	Ranking
Management Commitment		10	10	10	5	1	10	**46 (40.9%)**	**1**
Training	0.2		1	5	0.1	5	5	**16.3 (14.5%)**	**3**
Communication	0.1	1		5	0.2	5	5	**16.3 (14.5%)**	**4**
Resources	0.1	0.2	0.2		5	1	1	**7.5 (6.7%)**	**5**
Approach	0.2	5	5	0.2		5	5	**20.4 (17.8%)**	**2**
Competence	0.2	0.2	0.2	0.2	0.2		5	**6.0 (5.3%)**	**6**
Environmental implementers	0.1	0.2	0.2	1	0.2	0.2		**1.9 (1.8%)**	**7**

1 Equally Important
5 Significantly More Important
10 Exceedingly More Important
1/5 Significantly Less Important
1/10 Exceedingly Less Important

From the above results, it is evident that the EMS is centered on the management's ability to demonstrate their commitment throughout the planning and implementation process. This implies the success of the EMS is largely dependent of the management. This is in support of the emphasis ISO 1400l places on management. This commitment starts from selecting the right drivers to start the implementation, through the setting of the right environmental policies with corresponding objectives and targets

CONCLUSION AND RECOMMENDATION

Conclusion

The purpose of this study was to assess the implementation of EMS to SMEs in Tanzania. The study has great significance to provide a road map towards conservation of environment from activities performed by SMEs sector. Implementation of EMS in return will reduce a lot of environmental degradation cases which have catastrophic effect to human and other living things. On other hand EMS leads to; improvement in production management, quality, customer retainment, compliance assurance and operational efficiency. Also EMS leads to greater cost savings, enhancement of public image of the organization, positive external relations, reduced risk. (Ahmed, Nusari and Zaroog, 2012).

The findings of the study aligned with the literature and the current studies, which support that the extent of implementation of EMS is not satisfactory in most of developing countries, and this is due to low level of awareness of the EMS and its importance. Therefore, responsible authorities (NEMC and LGAs) need to improve the awareness of EMS to SMEs. Also, the success of EMS is highly dependent on top management commitment and support. Commitment can be difficult to obtain when there is lack of understanding of the EMS standards and the benefits. In order to secure commitment, top management should be provided with training on EMS including highlight the benefits associated with an EMS, simplifying the steps associated with implementation, and the possibility of integrating EMS with other management systems. Furthermore, it is necessary to demonstrate the value of an EMS by bringing senior management attention to environmental risks and liabilities, supply chain pressure and market trends.

Recommendations

Based on the above conclusions the following recommendations are put forward:

The institutions responsible for enforcement of environmental management (i.e NEMC and LGAs) should consider emphasizing integration of EMS to SMEs as part of day to day of activities of the enterprises. This includes proper duration and timing of EMS implementation, having different programs to create awareness, impact the knowledge and skills and promoting the importance of implementing the EMS at a level of SMEs. EMS should be integral part of environmental certification requirement. However careful considerations should be made when integrating SMEs operations with EMS as due to nature of the operators of SMEs it may too artificial to implement full EMS as per ISO 14001 standards. For SMEs with little number of employees and financial resources, it might be difficult sometimes for them to implement full. Also, although all tested factors were observed to be significant for effective implementation of EMS, factors should be subjected to confirmatory factor analysis (CFA) using appropriate statistical tools. Furthermore, the following strategies for the implementation of EMS for SMEs should considered;

a) Training on the benefits of EMS should be provided to the top management in order to raise their commitment and support towards the implementation of EMS to their

organization.

b) There should be understandings of environmental standards by the core personnel in the organization.
c) There should be in place procedures for proper documentation of environmental issues in the organization.
d) Responsibilities and roles of each function and level should be well defined and communicated.
e) Employees should be encouraged to adopt environmental practices and understand the benefits.

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