

Occupational safety and environmental risks scenario of Small and Medium Enterprises (SMEs): An analysis of the situation in Harare chemical industries, Zimbabwe.

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ABSTRACT

Aims: To analyze the nature, peculiarities and ways of bridging the differences between Small and Medium Enterprises (SMEs) and Large Enterprises (LEs) in Zimbabwe chemical industry with reference to safety and environmental risks.

Study design: This study takes a survey approach.

Place and Duration of Study: Graniteside (GR), Willowvale (WV), Southerton (ST), Workington (WN) and Msasa (MS) industrial areas in Harare Zimbabwe between June 2011 and October 2012.

Methodology: We administered a survey-questionnaire to collect primary data from respondents coming from 49 SMEs using proportional sampling (7 GR, 10 ST, 12 WN, 11 WV and 9 MS); 6 LEs and 5 key informants from government and industry associations. Other data was obtained from document analysis from libraries and websites of industrial association and observations made on industrial visits.

Results: Results showed that 85.6%, 93.8%, 95.9% and 93.8% of SMEs did not have OSH policies, risk analysis strategy, staff welfare facilities and did not keep accident records respectively. Moreover, most premises were not appropriate for chemical handling, processing and storage due to the fact that they had shunned government designated areas. LEs had comprehensive approach to safety and environmental management, though most of them (66.7%) struggle mainly with risk analysis. Analysis showed that the current scenario was due to lack of national legislation on SMEs operation. This results in SME operations being informal, up to individual organization's discretion without regard to OSH and environmental management.

Conclusion: Though SMEs largely contribute to Zimbabwean economy and to output of chemical industry, their operations are out rightly OSH and environmentally irresponsible. A huge gap that exists between SMEs and LEs could be bridged by involvement of all stakeholders in policy formulation and support. Collaboration, information disclosure and benchmarking with LEs can enhance SMEs OHS and environmental management

Keywords:

SMEs, Occupational Health and Safety, Environmental risks, risk analysis

1. INTRODUCTION

Small and Medium Enterprises (SMEs) are a major source of innovation and development in all countries especially in many developing and fast growing transition economies [1;2]. The recent changes in the Zimbabwean economy has seen a shift from a mainly agriculture based economy to emergency of SMEs (especially during the hyperinflation period of 2007 – 2009 as a means of survival) formerly known as the informal sector, in all industries and particularly chemical industry [3]. This is greatly encouraged by the government's indigenization drive which saw the introduction of the Ministry of Small and Medium Enterprises and Cooperative Development (MSMECD). To date over 600 SMEs are registered with the SME Association of Zimbabwe's (SMEAZ) since its formation in 2011. SMEAZ splits SMEs into small enterprises and medium enterprises. They define small enterprises as those companies that have turnover less than US\$240 000 or assets less than US\$100 000 while medium enterprises assets are above that of small enterprises, but less than US\$1 million [4]. The main goal of SMEAZ is to ensure that SMEs develop a transformative mind-set that will see them grow to large corporations. SMEs range from 1 – 300 employees in most countries though their size is even smaller in developing countries. In this study a Large Enterprise (LE) is an organization that has more than 300 employees. In Zimbabwe, most LEs are operating at 40% capacity due to the economic meltdown affecting the country. This further reduces the turnover and sizes of most SMEs to even around 100 employees. However, this study maintains the definition of >300 employees for LEs. It is important to note that SMEs classification is merely for administrative purposes by industrial associations since they are not homogeneous but varies greatly in size, structure, complexity and activities [5].

Zimbabwe is an example of a developing or transition economy which has major similarities to eastern economies such as China. In China (a fast growing economy) SMEs are companies with turnover less than US\$48 million and assets less than US\$64million. This shows the potential of SMEs if they are developed. They comprise nearly 99% of all chemical companies in China [1]. They are known to contribute at least 50% of GDP in developing and developed economies [3,4] and produce most of the world's output [5]. SMEs contribute 99.5% in Portugal and 98.6% in Thailand of national business, generating about 74% of employment in both countries [2;6]. Regardless of the contributions of SMEs to the economy, their emergency in chemical industry should be accompanied with process safety and environmental management since handling of chemicals is risky.

Attempts to address OHS in SMEs have attracted much attention in recent years. However, most OSH initiatives in developing countries are mainly frustrated by lack of comprehensive policy and government support. According to [3] failure to create vibrant SMEs has arisen primarily from a government policy point of view, which is characterised by general lack of support regardless of value they attach to the sector. He argues that instead of SMEs working towards becoming part of the formal economy, they view their current status as advantageous to remain part of the unregulated market. Unregulated market has perceived advantages like not paying taxes and other statutory dues, such as taking short-cuts. It becomes clear that if it may be possible for organizations to evade taxes and registration, OSH and environmental management is not spared. What may seem advantageous creates serious developmental and trade barriers for SMEs on their interface with LEs [3]. The patchy/quick-fix approach to business locally known as the "kiya-kiya" approach has led businesses within the sector to be driven primarily by the desire to make money, and less by a passion to excel in the processing and delivery of a particular product or service.

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74 In 2011 MSMECD website announced that the Zimbabwean Government approved the
75 policy framework for infrastructure provision for the SMEs sector. The policy that was crafted
76 by the MSMECD was aimed at strengthening the collaboration of government ministries,
77 local authorities and other development partners in the provision of affordable and
78 appropriate infrastructure. This indicates that policy development for SMEs is still at the
79 infancy stage and a rigorous approach is required to achieve appropriate practices in the
80 industry. This leaves other aspects of industrial operations still to be addressed in policy.
81 The report of The Portfolio committee on Small and Medium Enterprise Cooperative
82 Development in 2010 on the enquiry to get an insight into the operations of SMEs in
83 Zimbabwe noted with concern that the sector was operating in an environment without any
84 supporting policy or Act peculiar to the sector [7] and to date they still do not have a
85 conducive legal framework in which to conduct their businesses.

86 The Ministry of Public Service, Labor and Social Welfare is responsible for OSH across
87 sectors in Zimbabwe through the Labor Act, Chapter 28:01 and National Social Security
88 Authority (NSSA) Accident Prevention and Workers Compensation Scheme Notice No. 68 of
89 1990. So to date there is no Zimbabwean Law or act that addresses process safety or OSH.
90 Environmental management is enforced by the Environmental Management Agency (EMA)
91 using the EMA Act environmental quality standards, Hazardous Substances, Pesticides and
92 Toxic Substances Regulations SI 12 of 2007 and the Air Pollution Control Regulations SI 72
93 of 2009 [8; 9].

94 Due to lack of policy, LEs in Zimbabwe implement various OSH practices through their own
95 innovation and experience. On the other hand SMEs, due to lack of skills and resources,
96 operations depends primarily on the knowledge of the director or owner. In small enterprises
97 the owner is often the manager, and he or she has to take care of all management issues
98 (production planning, sales, accounting, human resources, and procurement), and is
99 involved in practical work (working in the field during the day, and carrying out managerial
100 functions in the evening). The owners' management style is often informal, and problems are
101 dealt with as they arise rather than through written rules, regulations and agreements [10]
102 Their knowledge is usually derived from working or life experiences. This was also noted by
103 [11] who stated that owners of small firms are dominant actors, who handle all management
104 issues, often in a patriarchal style and might be guided more by personal beliefs and cultural
105 values rather than by state guidelines. This affects health and safety conditions of their
106 enterprises. However in most cases managers of many SMEs are not fully aware of the
107 advantages that can accrue to them by implementing environmental risks alongside their
108 business activities.
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110 While both larger and smaller companies operations may comprise the same type of
111 chemical hazards, research has shown that SMEs appear to be at increased risk [12;13] of
112 industrial accident involving hazardous chemicals. They also tend to lag behind their LE
113 counterparts in preventive OSH issues [1;11]. They are faced with challenges such as
114 excessive costs, survival pressure, lack of management motivation, and shortage of
115 monetary and human resources [5;15]. Despite the recognition of ethical values, the legal
116 argument and compliance pressure on them, the challenges faced by SMEs play an
117 important role in their knowledge attitudes and practices to OSH and environmental
118 management [14]. It has also been established that smaller enterprises have less perception
119 of risk [12]. This has led SMEs to be generally perceived as lacking a sense of commitment
120 to the extent of being out rightly safety or environmentally irresponsible. They are reported to
121 be the source of around 70% of the environmental pollution and are known to take
122 environmental measures only in response to threats of imposed penalties or closure by
123 government or regulatory authorities hence "end-of-pipe" pollution control [5,15]. SMEs are

also reported to contribute around 82% of all occupational injuries, and about 90% of fatal accidents [12;14]. Their significant presence in densely populated areas, and the fact that they scattered in commercial and residential areas [5,16], makes them have a severe environmental and health impact.

Generally LEs have played a great part on OSH implementation in developing countries due to their financial muscle, readiness to invest, presence of skilled people, more data and information systems, effective company structure and programs [14]. Traditionally, the public exerts substantially less pressure on SMEs than on large firms in the environmental health and safety issues [16], contrary to them producing most of the world output and negatively affecting employees and the environment. There is less pressure on them due to their geographical dispersal, lack of visibility, rare occurrence of accidents due to fewer employees and their short life spans. It is possible for a SME to start operating, then operate for a few months and close down before they develop OSH skills. This challenge was noted by [11] who argued that the relatively short life cycles of small businesses, creates an instability that thwarts OSH surveillance and interventions as efforts must be continually renewed as new firms emerge. In most cases many of them are new and are not familiar with relevant safety regulations and practices (Brelsin et al 2010). As a result they know very little about OSH such as keeping injury statistics, compliance to regulations and policy issues. Information of non-safety and occupational illnesses are still very much hidden and difficult to evaluate objectively in SMEs [14]. Focus is mainly on the activities of LEs. Concerns on OSH scenario arise when less pressure is put on these organizations that have huge stake in the economy, at the same time being accused lacking of sense a of process, occupational and environmental safety responsibility. Furthermore, small firms in developing countries have received very little attention from OSH researchers [22]. Lack of published references to research on safety in such countries makes SME compliance to OSH and associated environmental risks difficult to assess. The problems they face, shape their behaviour and compliance to regulations. Current efforts and respective tools in OSH development are best-suited for LEs, when in fact they are outnumbered by SMEs. It is evident that the later require more attention and further developmental effort [14].

The aim of this paper is to characterize the nature and peculiarities of the challenges faced by SMEs in the field of OSH. We also aim to find ways of at least bridge the gap between OSH and environmental practices of SMEs and LEs in Zimbabwe. This is done to initiate documentation of the OSH and environmental risks scenario in African countries and in particular that of Zimbabwean SMEs and to raise awareness across these organizations. We open up the areas of collaborations and synergies between SMEs and LEs. This paper generate information that can be used as basis policy for framework and for the evaluation of SME OSH practices in Zimbabwe. The paper discusses the issues threatening the much needed contribution of SMEs to developing and transition economies.

2. METHODOLOGY

This study took a questionnaire survey approach. A survey-questionnaire to collect primary data using face-to-face interviews was used. The questionnaire was pilot tested in a LE and SMEs from the study area five industrial sites. Figure 1 shows the industrial areas where the SMEs and LEs were sampled. The targeted respondents were from chemical industry SMEs and LEs. Key informant interviews from government and industry associations were used to complement this data. Other data was obtained from document analysis from libraries and websites of industrial association and observations made on industrial visits.

The MSMECD, Zimbabwe Congress of Trade Unions (ZCTU) and NSSA, SMEAZ databases of affiliates and training workshops attendees were used to generate a sample frame of 100

176 chemical SMEs in the five major industrial sites of Harare : Graniteside (GR), Willowvale
177 (WV), Southerton (ST), Workington (WN) and Msasa (MS).

178 Physical visits to the companies were made instead of the traditional phone calls to notify
179 targeted respondents. SME location is problematic due to their occasional changes in
180 address. During physical visits and using a random walk routine, more SMEs were
181 discovered which were used as substitute interviews. Each interviewer had a card indicating
182 the information of interviewer details, our organization details, and an introductory letter on
183 study objectives and interview guide. Some interviews were done on first visit but most were
184 made by scheduling an appointment which required 3 or more visits in most cases.

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186 Interviews within SMEs were conducted with the director or owner of the company, due to
187 the absence of health and safety personnel. In LEs senior OSH managers were interviewed.
188 Key informant interviews were done with Research and Development Officers and training
189 personnel in industrial organisations. Data was obtained from respondents coming from 49
190 SMEs by proportional sampling (7 GR, 10 ST, 12 WN, 11 WV and 9 MS); 6 LEs and 5 key
191 informants from government and industry associations. Other data was obtained from
192 document analysis from libraries and websites of industrial association and observations
193 made on industrial visits. Table 1 shows the numbers of different types of companies
194 interviewed

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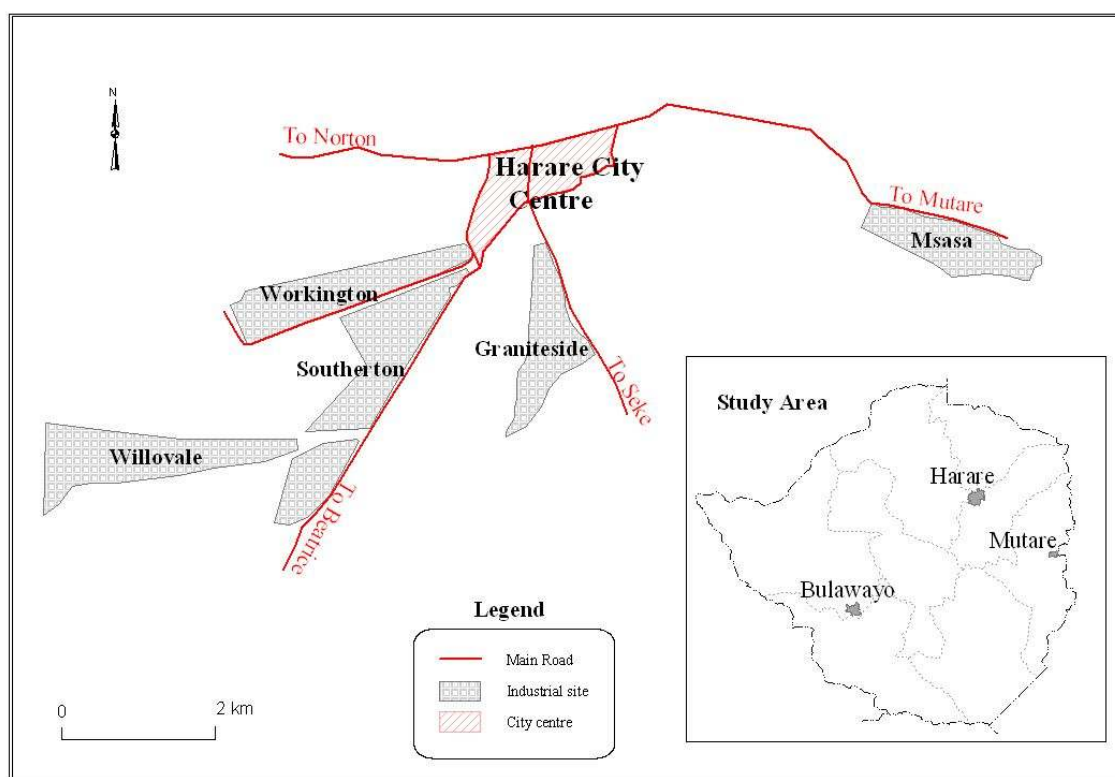


Figure 1 Study area: showing the industrial areas where the SMEs and LEs were sampled.

Table 1. Types of interviewed companies

Type of Chemical SME	Number interviewed
Supply of Industrial Chemical (importers and Stores)	17
Manufacturing	5
Petrochemical	9
Supply of Household / office chemicals	16
Pharmacy	2

On receipt questionnaires had to be validated. Validation of questionnaires involved the following criteria

- The company was supposed to be SME in Chemical industry
- Operated for at least 1 year
- owner, Director, general or operations manager interviewed
- all questions appropriately answered

Table 2 summarizes the validation process

222 **Table 2. Summary of the validation process**

Validation activity	Number
Number of companies from the sample frame	100
Number of substitutes identified	42
Number of pilot questionnaires	4 (SMEs + 1 LE)
Total targeted	142
Number interviewed	49 SMEs + 6 LEs
Owner, manager or safety personnel interviewed	49 SMEs + 6 LEs
Senior manager could not be interviewed, located or refused	93 (71 sample frame + 22 substitute)
Substitute interviews carried out	20
Questionnaires answered and completed well first time	42
Reworked questionnaires (missing information)	7
Total number of validated questionnaires	49 SMEs + 6 LEs

Data from the questionnaires were coded and analyzed mostly for frequency percentages and means.

3. RESULTS AND DISCUSSION

3.1 Demographic information on the enterprises assessed.

Of the 142 sampled SMEs, (100 originally targeted from sample frame and 42 substitute SMEs), the questionnaires and pilot study yielded 49 respondents. This composed of 29 from the original sample frame. Out of the original sample frame of 100, 71% of the companies could not be located or refused to take part in the study. Twenty (48%) of the 42 substitute SMEs were interviewed. This yielded a response rate of 34.5% which is comparable to slightly lower rates by [6;14;17]. It is far higher than postal surveys reported by [18]. The interviews with SMEs comprised 37 Directors or owners and 12 with senior managers. All 6 interviews with LEs they were carried out with OSH personnel.

3.2 Occupational Safety and health Scenario in SMEs

It can be noted from Table 3 that most (85.6%) SMEs do not have OSH policy. Nobody in the firms was responsible for OSH hence preventive measures were inactive. As a consequence of lack of OSH policy in most companies, it was found that no SME had a functional risk analysis strategy. It could also be seen that the 6.2% SMEs that has OSH policy are the ones that have a risk analysis strategy which was not functional. This puts people working in these organizations at high risk [13]. This confirms the notion that most SMEs have a low risk perception or they are more focused at production and survival of organization than OSH [3;12]. Chemical safety cannot be guaranteed without a policy. Policy is a core element of safety management. Since most SMEs had no OSH policy, chemical safety and environmental management can be viewed as nonexistent. It is difficult to apply any systematic approach to health and safety without a policy [19]. This confirms [3]'s notion of SMEs operating with a patchy/quick-fix approach to business and being accountable to no-one. This was also supported by the fact that only 21.4% were licenced or registered. The majority (39.8%) of them were not operating without a licence or they were using a licence for a different type of business (38.8%) other than chemical industry. These results

show foundational aspects of OSH in Zimbabwean SMEs that need serious attention to make the sector responsible and sustainable.

The results showed a different scenario in environmental management practices of SMEs. Higher compliance rates of 44.9% could be attributed to EMA, the environmental management agency which had recently embarked on a vigilant, serious surveillance programme nationwide. As a result 44.9% had an environmental management programme. However 14.2% had a management programme but due to lack of appropriate structure to support it in the chemical organizations, it is not enforced. As established in literature SMEs comply in response to threats of imposed penalties or closure by government or regulatory authorities [5, 15].

It was found that most SMEs (87.8 %) had fire prevention equipment. Fire poses the most devastating effects and loss risk in industry. Fire prevention is a concern of NSSA and EMA who have strict inspectorate program and hence a high compliance. However, only 38.8% of the SMEs had up to date service records for their equipment (including the fire equipment). This shows a low consciousness to OSH issues and maintenance.

Quite a number (46.9%) of organizations had first aid facilities. Though slightly high compared to other concern areas, this is still considered too low bearing in mind that first aid is one of the most adopted cultures in Zimbabwean industry. First aid is the oldest and one of the most established OSH practice. A higher compliance rate is required for it to be considered as adequate.

Table 3. Percentage of OSH and EMS attribute or documentation of SMEs

OSH attribute or documentation	Have it and using it/ No (% SME)	Have it not using it/ No (% SME)	Do not have/ No(% SME)
OSH policy statement	3 (6.2%)	5 (10.2%)	42 (85.6%)
Environmental management system	22 (44.9%)	7 (14.2)	20 (40.9)
Risk assessment policy	0	3 (6.2%)	46 (93.8%)
Certification or licensing by regulatory authority	11 (21.4%)	-	38 (78.6%)
First Aid facility and documentation	23 (46.9%)	3 (6.2%)	23 (46.9%)
Accident statistics records	2 (4.1 %)	1(2.1%)	46 (93.8%)
Fire prevention equipment	44 (87.8%)	0	5 (12.2%)
Safety equipment service records	19 (38.8%)	-	30 (61.2%)
Compensation policy	3 (6.2%)	-	46 (93.8%)
OSH Training records	17 (34.7%)	-	32 (65.3%)
Welfare facilities	2* (4.1%)	-	47 (95.9%)
Control strategies for hazardous environment	32 (65.3%)	5 (10.2%)	12 (24.5%)

Table 3 show that there was high number of organizations (65.3%) that had control strategies for hazardous environment. This is a Labor Act concern. Issues such as protective equipment, exposure to chemicals and working hours is a concern of labor movements and is part of work contracts. Lack of compliance by other organizations can be explained by the use of cheap labor and unskilled workers who cannot demand better working conditions in

most SMEs. This was alluded by [20] who stated that, small firms are more likely to employ “vulnerable” workers such as young and/or low education workers compared to large firms.

The keeping of accident records was found to be very low (4.1%). This could have been due to the rare occurrence of accidents in SMEs at one company. There are fewer accidents at each small company due to less complex process systems, size of organization production output and number of employees as compared to LEs. This agrees with [11] who stated that statistics show that accidents do happen regularly in the SMEs sector but they might not be obvious to employers as accidents are relatively rare in any one site. Due to numerous numbers of SMEs the cumulative effect results in large numbers of accidents when statistics are collected from a cluster of industries. There is less shift work in SMEs due to decreased work load. Literature has often cited shift work as a major contributor of accidents in industry especially when combined with night work and overtime [21].

The presence of welfare facilities was found to be appalling, very few (4.1%) organizations were found to have eating places or cafeteria and clinic or treatment rooms. The lack of appropriate facilities could be attributed to the fact that most SMEs shunned designated working areas provided by government, citing reasons such as that the areas allocated were not strategically located to attract business [23]. As a result most SMEs use substandard cheap infrastructure closer to main roads, shopping centres and town. Such places may not be suitable for industrial use.

3.3 Occupational safety and health scenario in LEs.

It was found that most LEs had OSH policy statement, OSH training records, environmental management strategy, certification or licensing by regulatory authority, First Aid facility and documentation, accident statistics records, fire prevention equipment and safety equipment service records. This is attributed to the fact that most LEs have well established OSH and Environmental management structures which are well supported by adequate human and financial resources. Table 4 shows a few selected areas that are still a concern even to LEs.

Table 4. Percentage of OSH and EMS attribute or documentation of LEs concern areas

OSH attribute or documentation	Have it and using it (current)	Have it, using it (outdated)	Have it not referred to it for long time	Do not have documentation
OSH policy statement	3	2	1	0
Environmental management system	3	2	0	1
Risk assessment policy	1	1	0	4
Safety equipment service records	4	2	0	0
Control strategies for hazardous environment	4	2	0	0

It was found that risk assessment is also major concern even in LEs; about 66.7% indicated that they did not have a documented risk analysis strategy. Only 16.7% had updated current strategies while 16.7% were using outdated strategies. This is comparable to the results obtained by [6] in his study of the OSH situation in Thailand SMEs, they reported that 20% of the companies were using outdated risk analysis strategies. In this study, an outdated policy or strategy is one that has not gone through the necessary and recommended review in at

least the past 2 years. Not all LEs had an OSH policy, safety equipment service records and control strategies for hazardous environment. However 33.3% had outdated OSH policy safety, equipment service records, environmental management system and control strategies for hazardous environment. This indicates a general laxity even among LEs developing countries in OSH. Only 50% had a current environmental management system which also indicated low compliance levels, bearing in mind the expertise LEs have. Sixteen percent do not have an environmental management system and 33.3% are using an outdated one. This is a similar trend to OSH policy prevalence hence showing the dependence nature between the two. The varied compliance status with regard to environmental management shows that environmental management in companies has not reached a unified approach. Different organizations have various approaches to environmental management mainly due to the traditional polluter pays principle.

3.4 Bridging the gap between LEs and SMEs

NSSA, EMA, ZCTU and MSMECD should spearhead policy formulation for OSH and EMS in Zimbabwe so that all chemical enterprises are similarly regulated, rather than the current scenario where different organization choose and use various laws and regulations in enforcing occupational health.

A 50% compliance rate in EMS for LEs as compared to 44.9% in SMEs indicates that LEs are more likely to participate in EMS certification scheme than smaller organizations. Results from both questionnaires and key informant interviews show that SMEs view OSH policing and EMS certification as costly and that cost of adoption do not outweigh benefits. This agrees with results of work done in Europe by [18] and [14] hence the reasons given by local organisations match international views for non-compliance among SMEs to EMS certification. Initiatives in Europe such as clustering, collaboration and disclosure of safety information needs to be explored locally since similarities occur. Government and civic organisation need to invest more in chemical OSH and EMS in order to make the sector less risky by improving working environment of their employees and the environment of surrounding communities.

Results also show that unlike LEs, the corporate image of SMEs is very low, 80% key informants indicated that most qualified personnel prefers working in LEs for reasons such as low risk and principles-governed working environment. They are convinced that safety culture in LEs is formalised and systematic to deal with all their OSH concerns. They indicated that due to lack of professionalism, the SMEs sector, as it is dubbed informal sector, the atmosphere there could be described as 'anything can happen'. The remainder (20%) indicated that motivation of professionals to work in SMEs could be driven mainly by desire to make money under less stringent regulations using unskilled-risk-taking -but-lowly-paid work force. [6] described the SMEs workforce as younger, less educated and less experienced. This agrees with Zimbabwean SMEs literature [3; etc.] and can only be averted by training, investment, motivational programmes and incentivised schemes by government (e.g. MSMECD), the civic societies and industrial associations. The results suggest that chemical safety and environmental management need to be tackled urgently from the basics since very little has been done. Zimbabwe needs to adopt as a bridging mechanism recommendations by most researchers [e.g.7;14 etc.] that programming, regulations and approach, should cater for the differences between LEs and SMEs rather than bundling them. More should be done to improve SMEs, while the continual improvement approach should drive LEs to maintain momentum in the field. Prescription of initiatives from LEs is not only inappropriate but will most likely suffer 'tissue rejection' in SMEs.

Training and provision of data would extinguish and alter the risk perception, approach to risk control and management priorities. It will expose the realities of not taking OSH and environmental management seriously and that it undo all SME endeavours.

4. CONCLUSION

Though SMEs largely contribute to Zimbabwean economy and to output of chemical industry, their operations are out rightly OSH and environmentally irresponsible. Zimbabwean SMEs OSH and chemical safety is nonexistent hence unsystematic. A gap that exists between operations of SMEs and LEs can be bridged by involvement of all stakeholders in SME support and policy formulation. Collaboration, information disclosure and benchmarking with LEs can enhance SMEs OHS and environmental management.

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AUTHORS' CONTRIBUTIONS

Author NM and PD designed the study, provided literature and analysis, while Authors CM and SM provided methodology and supervised field work. All authors read and approved the final manuscript.

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