

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.

The LEs interviewed had comprehensive approach to safety and environmental management, though most of them struggle mainly with risk analysis. Analysis showed that the current **SME OHS** scenario was due to lack of national legislation on their 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.

The OSH scenario of SMEs could be improved by involvement of all stakeholders in policy formulation and support. Collaboration, information disclosure and benchmarking **with long established large enterprises** 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 have seen the emergency of SMEs in all sectors and particularly chemical industry [3]. In Zimbabwe small enterprises are 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]. Zimbabwean Government and private sector aim to transform SMEs into large corporations. SMEs range from 1 – 300 employees in most countries though their size is even smaller in developing countries while a Large Enterprise (LE) is an organization that has more than 300 employees. It is important to note that SMEs classification is merely for administrative purposes by industrial associations. SMEs are not homogeneous but vary greatly in size, structure, complexity and activities [5].

Compared to Zimbabwe, SMEs in China have turnover and assets around US\$40million [1]. This shows the potential of SMEs if they are developed. World over, they are known to contribute at least 50% of GDP [3,4] and produce most of the world's output [5,6]. Regardless of the contributions of SMEs to the economy, their emergency in chemical industry has not been accompanied with process safety and environmental management. 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. On the other hand, instead of SMEs working towards becoming part of the formal economy, they prefer to remain part of the unregulated market with perceived advantages like not paying taxes and other statutory dues [3]. The patchy /quick-fix approach to business locally known as "kiya-kiya" has led businesses within the sector to be driven primarily by the desire to make money, hence evade taxes, registration, OSH and environmental management obligations. Regulations and policy development for SMEs is still at the infancy stage and a rigorous approach is required to achieve appropriate practices in the industry.. The report of The Portfolio committee on Small and Medium Enterprise Cooperative Development in 2010 on the enquiry to get an insight into the operations of SMEs in Zimbabwe noted with concern that the sector was operating in an environment without any supporting policy or Act peculiar to the sector [7]. To date SMEs still do not have a conducive legal framework in which to conduct their businesses.

Also due to lack of skills and resources, operations in the sector depends primarily on the knowledge of the director or owner rather than through written rules, regulations and agreements [8,9] and they are not fully aware of the advantages that can accrue to them by implementing OSH and environmental management alongside their business activities. Research has shown that SMEs appear to be at increased risk of chemical hazards [10;11;12]. This is worsened with challenges they face such as excessive costs, survival pressure, lack of management motivation, and shortage of monetary and human resources [5;13]. These challenges faced by SMEs play an important role in their knowledge attitudes and practices to OSH and environmental management [12]. It has also been established that smaller enterprises have less perception of risk [10]. This has led SMEs to be generally perceived as lacking a sense of commitment to the extent of being out rightly safety or environmentally irresponsible. They are known to take environmental measures only in

response to threats of imposed penalties or closure by government or regulatory authorities [5,13]. Their significant presence in densely populated areas, and the fact that they scattered in commercial and residential areas [5,14], makes them have a severe environmental and health impact. SMEs are also known to have short life spans. Short life cycles 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 [12].

Small firms in developing countries have received very little attention from OSH researchers. Lack of publications on SME in Zimbabwe makes compliance to OSH and associated environmental risks difficult to assess. Furthermore, current efforts and respective tools in OSH development are best-suited for LEs, when in fact they are outnumbered by SMEs [12].

The aim of this paper is to characterize the nature and peculiarities of the challenges faced by SMEs in the field of OSH in Zimbabwe. This would give baseline data for improvement for OSH and environmental practices of SMEs 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. 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

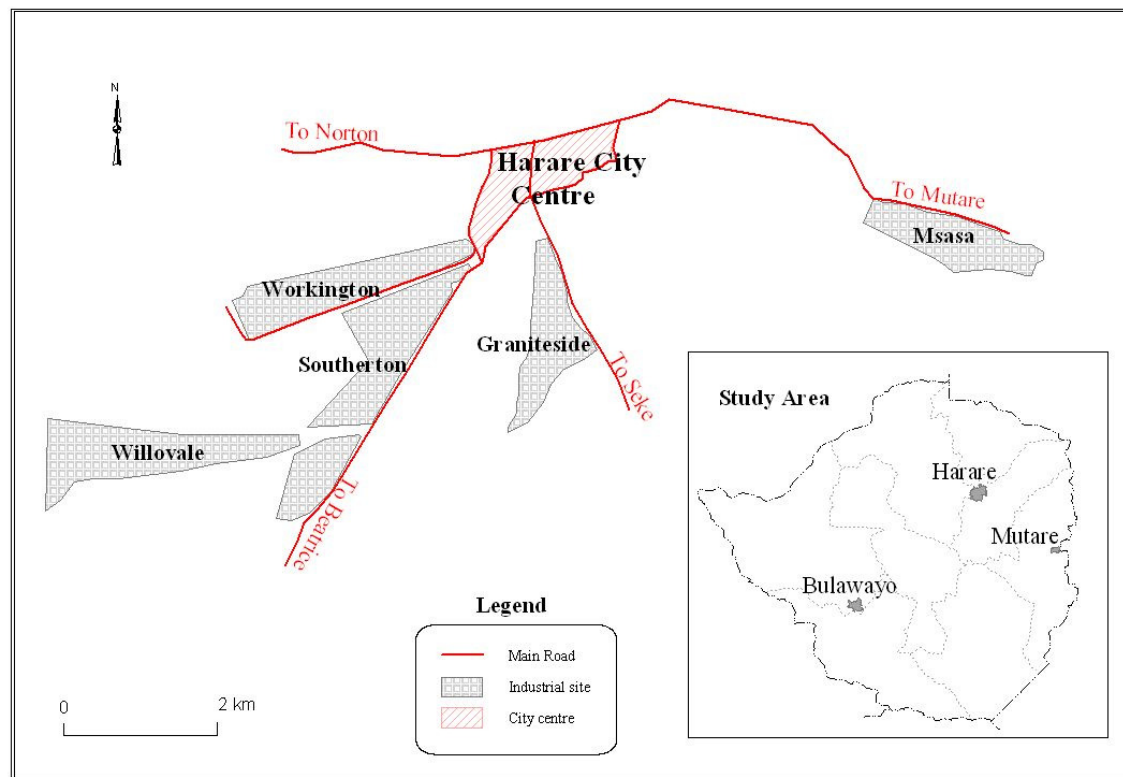
This study took a questionnaire survey approach. A survey-questionnaire to collect primary data using face-to-face interviews was used. The questionnaire was pilot tested in a LE and SMEs from the study area five industrial sites. Figure 1 shows the industrial areas where the SMEs and LEs were sampled. 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 chemical SMEs in the five major industrial sites of Harare : Graniteside (GR), Willowvale (WV), Southerton (ST), Workington (WN) and Msasa (MS).

Physical visits to the companies were made instead of the traditional phone calls to notify targeted respondents. SME location is problematic due to their occasional changes in address. During physical visits and using a random walk routine, more SMEs were discovered which were used as substitute interviews. The term substitute describes an SMEs not originally on the sample frame which can be interviewed in case one on original sample frame cannot participate or be found. The substitute SMEs had similar characteristics as the ones on sample from, though they were not derived from sample frame but discovered in the industrial areas as the research was being carried out. Substitute companies were subjected to the same validation process. The validation process is described below. Each interviewer had a card indicating the information of interviewer details, our organization details, and an introductory letter on study objectives and interview guide. Some interviews were done on first visit but most were made by scheduling an appointment which required 3 or more visits in most cases.

Interviews within SMEs were conducted with the director or owner of the company, due to the absence of health and safety personnel. In LEs senior OSH managers were interviewed.

123
 124 Key informant interviews were done with Research and Development Officers and training
 125 personnel in industrial organisations. Data was obtained from respondents coming from 49
 126 SMEs by proportional sampling (7 GR, 10 ST, 12 WN, 11 WV and 9 MS); 6 LEs and 5 key
 127 informants from government and industry associations. Other data was obtained from
 128 document analysis from libraries and websites of industrial association and observations
 129 made on industrial visits. Table 1 shows the numbers of different types of companies
 130 interviewed
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 133
 134 Figure 1 Study area: showing the industrial areas where the SMEs and LEs were sampled.
 135

136 **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

137
 138 On receipt questionnaires had to be validated. Validation of companies and questionnaires
 139 involved the following criteria
 140 • The company was supposed to be SME in Chemical industry
 141 • Operated for at least 1 year
 142 • Owner, director, general or operations manager interviewed

- 143 • All questions appropriately answered
 144 Table 2 summarizes the validation process

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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

148
 149
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Questionnaire items for SMEs

- 151 • Do you have OSH policy statement?
 152 Yes (Using it) Yes(not seen it / not using it) No
 153 • Do you have an Environmental management system?
 154 Yes (Using it) Yes(not seen it / not using it) No
 155 • Do you have a Risk assessment policy?
 156 Yes (Using it) Yes(not seen it / not using it) No
 157 • Do you have a Certification or licensing by regulatory authority?
 158 Yes (Using it) Yes(not seen it / not using it) No
 159 • Do you have a First Aid facility and documentation?
 160 Yes (Using it) Yes(not seen it / not using it) No
 161 • Do you have Accident statistics records?
 162 Yes (Using it) Yes(not seen it / not using it) No
 163 • Do you have Fire prevention equipment?
 164 Yes (Using it) Yes(not seen it / not using it) No
 165 • Do you have Safety equipment service records?
 166 Yes (Using it) Yes(not seen it / not using it) No
 167 • Do you have a Compensation policy?
 168 Yes (Using it) Yes(not seen it / not using it) No
 169 • Do you have an OSH Training records?
 170 Yes (Using it) Yes(not seen it / not using it) No
 171 • Do you have Welfare facilities?
 172 Yes (Using it) Yes(not seen it / not using it) No
 173 • Do you have Control strategies for hazardous environment?
 174 Yes (Using it) Yes(not seen it / not using it) No
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For SMEs companies not having an OSH and EMS attribute or documentation indicates lack or ignorance of that specific attribute. Having it not using it indicates complacency or relaxation in that specific area. For LEs the same questionnaire items were used but extra categories “current” and “outdated” were introduced. These catered for the difference between companies who are active in updating OSH attributes and those who recognise the importance of the attribute but has not given it necessary it requires to function well hence not updating / revising it. For this study “current” means that the attributes has gone through the scheduled revisions and reviews while “outdated” means the attribute has not gone through the scheduled revisions in the past 2 years. 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 targeted SMEs, (100 from industrial associations sample frame and 42 substitute SMEs), the questionnaires and pilot study yielded only 49 respondents. Out of the original sample frame of 100 SMEs, 71% of them could not be located or refused to take part in the study. They could not be located because they had stopped operating or information of their physical address was not upto date and efforts to locate them failed. 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;12;15]. It is far higher than postal surveys reported by [18].The interviews with SMEs comprised of 37 Directors or owners and 12 with senior managers. Of the 38 LEs in the five industrial areas only 6 were interviewed. This yielded a response rate of 15,8%. The response rate is too low for statistically viable analysis. All the 6 interviews with LEs they were carried out with OSH personnel. Selected information on the analysis of LEs is given in Table 4.

3.2 Occupational Safety and health Scenario in SMEs

Table 3 shows percentage of OSH and EMS attribute or documentation of SMEs. The responses were classified into three: ‘have it and using it’; ‘have it not using it’ and ‘do not have’. These classes indicate a varied degree of commitment to OSH from committed, indifferent or relaxed and not committed respectively. 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 [11]. 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;10]. One leader of an industrial association indicated that

Most SMEs came as a result of difficult times in 2008 – 2009, those that are still operating are the ones who have done well, and to maintain their performance, more focus is on production than anything...

Chemical safety cannot be guaranteed without a policy. Policy is a core element of safety management [19]. 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 [17].This confirms [3]’s notion of SMEs operating with a

229 patchy/quick-fix approach to business and being accountable to no-one. This was also
 230 eluded by a government official
 231
 232 the so called informal sector now called SMEs is still characterised by high
 233 degree of the informal operating approach, this coupled with the slow pace with
 234 which regulations and policies are being formulated by government, issues such as
 235 OSH are a luxury that can only be achieved by well-established organisations...it will
 236 take time to have policy frameworks for SMEs..
 237
 238 Another key informant supported the same notion when he referred to the informal way
 239 which SMEs operates as a
 240 deep culture which dates back from the bad days, where nobody knows exactly
 241 what the next person is doing, the more unregulated his business is the more the
 242 profit margin....
 243
 244 The use of the phrase 'deep culture' in the statement above indicates that the lack of
 245 formalised sustainable practices in most SMEs is a 'generally acceptable way of doing
 246 business' as put by one SME owner who said
 247 no one has really been forced to close for not having an environmental
 248 management policy, but if you cannot make money you will be forced to close...
 249
 250 The focus of most SMEs is just to make money. With high rates of unemployment, an
 251 employee is most likely to complain less income than unsafe employment conditions. This
 252 survival insistent culture makes most workers blind to other requirements and employer
 253 obligations such as creation of a safe and hygienic work place.
 254
 255 From this notion anything that does not directly support production contradicts the reason
 256 why the SME was established i.e. the quest for survival. This makes OSH and environmental
 257 management to be secondary issues.
 258
 259 This lowers the corporate image of SMEs, 4 of the five key informants, when asked where
 260 qualified personnel would prefer working they indicated that they would want to work in LEs.
 261 Reasons for that preference were low risk and principles-governed working environment.
 262 One key informant from a social security organization indicated that
 263 given the choice any sound person would prefer working at a bigger organization where
 264 the company has a clinic and contributes to welfare schemes like medical aid....
 265 Most (3 out 4) key informants view safety culture in LEs is formalised and systematic to deal
 266 with all their OSH concerns. They indicated that due to lack of professionalism, the SMEs
 267 sector, as it is dubbed informal sector, the atmosphere there could be described as 'anything
 268 can happen'.
 269 Most SMEs hardly have injury compensation schemes, even if they would have
 270 most of them cannot afford huge medical compensation bill arising from the
 271 workplace without having negative effect on the company operations....(Social
 272 Security officer)
 273 It was established from interviews also that motivation of professionals to work in SMEs
 274 could be driven mainly by desire to make money under less stringent regulations using
 275 unskilled-risk -taking -but-lowly-paid work force. Kongtip [6] described the SMEs workforce
 276 as younger, less educated and less experienced. This agrees with Zimbabwean SMEs
 277 literature [3; etc.) and can only be averted by training, investment, motivational programmes
 278 and incentivised schemes by government (e.g. MSMECD), the civic societies and industrial
 279 associations. A key informant from industrial association eluded that
 280

.....besides having national policy, what may greatly enhance SMEs OSH practises is training and education.....

The results suggest that chemical safety and environmental management need to be tackled urgently from the basics since very little has been done. More should be done to improve SMEs, while the continual improvement approach should drive LEs to maintain momentum in the field.

Prescriptions of initiatives from LEs is not only inappropriate but will most likely suffer 'tissue rejection' in SMEs.

This was also supported by the fact that only 21.4% were licenced or registered. The majority (39.8%) of them were not operating with 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 [18] 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 [9] 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 [19].

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 not were not strategically located to attract business [21]. 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.

For all OSH attributes companies falling into ‘having but not using’ range from 2% -14% (1 – 7) which is generally low considering the difference it would make if added to corresponding ‘have it using it’ category. Additions of these two would give the total of those that have the attribute.

3.3 Indications on the occupational safety and health scenario in LEs.

It was found that most LEs interviewed 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 interviewed 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 these LEs. It is important to note that due to low figures generalizations cannot be made about 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; four of the six LEs indicated that they did not have a documented risk analysis strategy. Only 1 company had updated current risk analysis strategies and also 1 was using outdated strategies while 4 did not have. This indicates a negative trend on risk analysis in these LEs. 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 2 companies had outdated OSH policy safety, equipment service records, environmental management system and control strategies for hazardous environment. This indicates a general laxity among the LEs in OSH. This may be attributed to lack of national policy to govern OSH, individual corporations decide on their own the level OSH implementation. Only half of the interviewed had a current environmental management system which also indicated low compliance levels, bearing in mind the expertise LEs have. One company did not have an environmental management system and 2 were using an outdated one. This is a similar trend to companies having OSH policy hence showing the dependence nature between the two aspects. The varied compliance status with regard to environmental management shows that environmental management in the companies has not reached a unified approach and is company specific. Different organizations have various approaches to environmental management mainly due to the traditional polluter pays principle.

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

4. CONCLUSION

Though SMEs largely contribute to Zimbabwean economy and to output of chemical industry, their operations have been shown to be OSH and environmentally inadequate. This implies that in a policy free or relaxed regulations atmosphere companies may flout any concerns which seem not to be directly linked to production such as safety. It can be concluded from these findings that most SME operations are not sustainable. Zimbabwean SMEs OSH and environmental safety is ranges from unsystematic to non-existent. This paper contributes baseline data for stakeholders wanting to initiate OHS and environmental management programming in SMEs. Results show policy as a starting point for OHS concerns in Zimbabwe. As the nation and hence most companies do not have policies governing the sectors' operations, it can be concluded that workers in these organizations are at various degrees of risk. Though statistical analysis could not be done to compare SMEs to LEs, even among the interviewed large corporations policing is very inadequate.

They have also relaxed to 'suit' the less demanding environment they are operating in. it is also shown here that national standards mirror all efforts by individual corporations. Collaboration, information disclosure and benchmarking with LEs remain possible channels to enhance SMEs OHS and environmental management. It is recommended to do a comparative study when a larger statistically viable sample of LEs is achievable in Zimbabwe.

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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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