

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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Authors' contributions

This work was carried out in collaboration between all authors. Authors 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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ABSTRACT

Aims: To analyze the nature and peculiarities of Small and Medium Enterprises (SMEs) in Zimbabwe chemical industry with reference to safety and environmental risks.

Study Design: This study took 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 Large Enterprises (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 Occupational Safety and Health (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 the

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enterprises 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 governing their operation. This results in SME operations being informal, up to individual organization's discretion and 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; policy.

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 those 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. 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 US40million [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 Mutambanengwe [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 the 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 [3,7]. 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 an appropriate 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]. The risk 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 OSH and environmental management knowledge, attitudes and practices [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, at any time 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 also discusses the issues threatening the much needed contribution of SMEs to developing and transition economies.

2. METHODOLOGY

This study took a questionnaire survey approach in which primary data was collected using face-to-face interviews. The questionnaire was pilot tested in a LE and SMEs from the study area's five industrial sites. Fig. 1 shows the industrial areas where the respondents 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 Ministry of Small and Medium Enterprises and Cooperative Development (MSMECD), Zimbabwe Congress of Trade Unions (ZCTU) and National Social Security Authority (NSSA), Small and Medium Enterprises Association of Zimbabwe (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 SMEs not originally on the sample frame which could be interviewed in case one on the original sample frame could not participate or be found. The substitutes SMEs had similar characteristics as those on the sample frame, but were 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 and summarised in Table 2. Each interviewer had a card indicating interviewer details, our organization details, and an introductory letter on study objectives and an interview guide. Some interviews were done on first visit but most were done after scheduling an appointment which required 3 or more visits.

SMEs interviews were conducted mostly with the director or owner of the company, due to the absence of health and safety personnel. In LEs senior OSH managers were interviewed. Key informant interviews were done with departmental heads, research and development officers and training personnel in industrial organisations and government. Data was obtained from respondents coming from 49 SMEs by proportional sampling (7 GR, 10 ST, 12 WN, 11 WV and 9 MS); 6 LEs and 5 key informants from government and industry associations. Table 1 shows the numbers of different types of companies interviewed

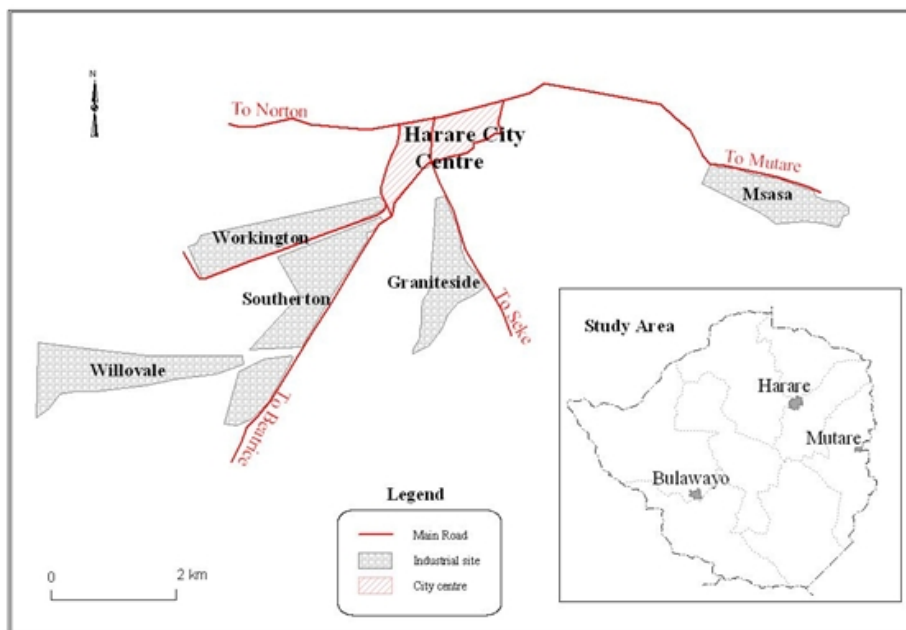


Fig. 1. Study area: showing the industrial areas where the SMEs and LEs were sampled

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 were be validated. The validation of the companies and 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 was interviewed.
- All questions were appropriately answered.

Table 2 summarizes the validation process.

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 (3 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

Table 3 shows the questionnaire items for SMEs. For SMEs, companies not having an OSH and EMS attribute or documentation indicated 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 namely "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 the necessary attention it requires to function well hence not updating or 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.

Table 3. Questionnaire items for SMEs

Item	Possible responses	
Do you have OSH policy statement?	Yes (using it) ___ it)___ No___	Yes(not seen it / not using
Do you have an environmental management system?	Yes (using it) ___ it)___ No___	Yes(not seen it / not using
Do you have a risk assessment policy?	Yes (using it) ___ it)___ No___	Yes(not seen it / not using
Do you have a certification or licensing by regulatory authority?	Yes (using it) ___ it)___ No___	Yes(not seen it / not using
Do you have a first aid facility and documentation?	Yes (using it) ___ it)___ No___	Yes(not seen it / not using
Do you have accident statistics records?	Yes (using it) ___ it)___ No___	Yes(not seen it / not using
Do you have fire prevention equipment?	Yes (using it) ___ it)___ No___	Yes(not seen it / not using
Do you have safety equipment service records?	Yes (using it) ___ it)___ No___	Yes(not seen it / not using
Do you have a compensation policy?	Yes (using it) ___ it)___ No___	Yes(not seen it / not using
Do you have an OSH training records?	Yes (using it) ___ it)___ No___	Yes(not seen it / not using
Do you have welfare facilities?	Yes (using it) ___ it)___ No___	Yes(not seen it / not using
Do you have control strategies for hazardous environment?	Yes (using it) ___ it)___ No___	Yes(not seen it / not using

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 up to 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]. The response was far higher than those in postal surveys reported by Breslin [18]. The interviews with SMEs comprised of 37 Directors or owners and 12 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 information obtained from LEs is given in Table 4.

3.2 Occupational Safety and Health Scenario in SMEs

Table 4 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” as indicated in Table 3. These classes indicate a varied degree of commitment to OSH ranging from committed, indifferent or relaxed and not committed respectively. It can be noted from Table 4 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. Analysis showed that the 6.2% SMEs that has OSH policy are the ones that have a risk analysis strategy which was not functional. As a result people working in these organizations are at higher 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 Mutambanengwe’s [3] notion that most SMEs are operating with a patchy/quick-fix approach to business and being accountable to no-one. This was also eluded by a government official who indicated that:

...the so called informal sector now called SMEs is still characterised by high degree of the informal operating approach, this coupled with the slow pace with which regulations and policies are being formulated by government, issues such as OSH are a luxury that can only be achieved by well-established organisations...it will take time to have policy frameworks for SMEs..

Another key informant supported the same notion when he referred to the informal way which SMEs operate as a:

....deep culture which dates back from the bad days, where nobody knows exactly what the next person is doing. The more unregulated his business is the more the profit margin....

The use of the phrase ‘deep culture’ in the statement above indicates that the lack of formalised and sustainable practices in most SMEs is a ‘generally’ acceptable way of doing business as put by one SME owner who said:

.....no one has really been forced to close down for not having an environmental management policy, but if you cannot make money you will be forced to close...

The focus of most SMEs is to make money. Due to high rates of unemployment in Zimbabwe, an employee is most likely to complain of lower income than unsafe employment conditions. This survival insistent culture makes most workers blind to other requirements and employer obligations such as creation of a safe and hygienic work place.

From this notion anything that does not directly support production contradicts the reason why the SME was established i.e. the quest for survival. This makes OSH and environmental management to be secondary issues. This approach lowers the corporate image of SMEs. Responses of 4 of the five key informants, when asked where qualified personnel would prefer working, indicated that they would prefer working in LEs. Reasons for that preference

were; perceived low risk and the principles-governed working environment. One key informant from a social security organization indicated that:

....given the choice, any sound person would prefer working at a bigger organization where the company has a clinic and contributes to welfare schemes like medical aid....

Most (3 out of 5) key informants view safety culture in LEs as formalised and systematic to deal with OSH concerns. They indicated that due to lack of professionalism, the SMEs sector, as it is dubbed the “informal sector” has a prevailing atmosphere that could be described as ‘anything can happen’. A Social Security officer for a parastatal indicated that:

....Most SMEs hardly have injury compensation schemes, even if they would have, most of them cannot afford huge medical compensation bill arising from the workplace without having negative effect on the company operations...

It was also established from interviews that motivation of professionals to work in SMEs is driven mainly by desire to make money under less stringent regulations using unskilled-risk -taking -but-lowly-paid work force. Kongtip [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. One key informant from an industrial association eluded that

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

These 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 OSH standards, while the continual improvement approach should drive LEs to maintain momentum in the field. One key informant supported this notion when he indicated that transfer of standards from LEs to SMEs would not work when he said:

..Prescribing initiatives from LEs is not only inappropriate but will most likely suffer ‘tissue rejection’ in SMEs....

Results also show that only 21.4% of the SMEs were licensed or registered. The majority (39.8%) of them were operating without a licence, while 38.8% were using a licence for a different type of business other than chemical industry. These results show foundational aspects of OSH that Zimbabwean SMEs need to address to make the sector responsible, answerable and hence operate sustainable.

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

It was found that most (87.8 %) SMEs 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 appreciation to maintenance and its contribution to OSH.

Quite a number (46.9%) of organizations had first aid facilities. Though this may be 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 practices. A higher compliance rate is required for it to be considered as adequate.

Table 4. 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 4 also shows 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 an individual 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 MacEachen et. al. [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. However, 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 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, because the areas allocated were not strategically located to attract business [20]. 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 and provision of welfare facilities.

For all OSH attributes, the number of 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 number of those that have the attribute.

3.3 Indications on the Occupational Safety and Health Scenario in LEs

It was found that most of the 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 5 shows a few selected areas that are still a concern even to these LEs. It is important to note that due to small sample size generalizations cannot be made about LEs.

Table 5. 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 in LEs; four of the six LEs indicated that they did not have a documented risk analysis strategy. Only 1 company had an updated and current risk analysis strategy and 1 was using outdated one. This indicates a negative trend on risk analysis in these LEs. 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 their level of OSH implementation. Only half (3) of the interviewed organizations 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.

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 risks 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.

Training and provision of data would extinguish and alter the risk perception, approach to risk control and management priorities by both SMEs and LEs. It will also expose the realities of not taking OSH and environmental management seriously and that will scaffold SMEs' appreciation to OSH and environmental management. 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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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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