Effects of occupational health and safety management systems implementation in accident prevention at a Harare beverage company

Tatenda Musungwa\(^1\) and Pedzisai Kowe\(^{1,2*}\)

**Abstract:** Occupational health and safety management (OHSMS) systems are recognised internationally as highly flexible and can be tailored to all sizes and types of businesses to manage accidents, injuries, fatalities and health risks at workplaces. This study evaluated the effectiveness of OHSMS audits to occupational accidents mitigation in food and beverage industries at Delta Sparkling Beverages, Harare, Zimbabwe. The study was based on an analytical research using a combination of qualitative and quantitative techniques. In particular in-depth interviews, non-participatory observations and documentary records data search were utilised. 84 questionnaires were self-administered to Delta Sparkling Beverages, employees from different departments using a stratified random technique in 2020. The effectiveness of OHS audits were analysed in which purposive interviews were employed to solicit vital information from key experts in the field of study. The study also sought to highlight challenges faced in the operationalisation of OHSMS audits and the implementation of safety systems. Statistical Package for Social Sciences (SPSS) was used for quantitative data analysis. The results of chi-square (p > 0.05) indicated that there was no association between occurrence of accidents at Delta Sparkling Beverages to OHSMS audits. The research findings further revealed that non-adherence to safe operating procedures (unsafe acts) by employees is the major cause of accidents at the company. The study recommended intervention towards employee behaviour, safety procedures and ways to improve safety culture within the company.

**Subjects:** Musculoskeletal Disorders - Ergonomics; Health and Safety; Public Health Policy and Practice; Occupational Health and Safety

**Keywords:** Occupational health; safety management systems audits; accident rates and prevention; Beverage industry

1. Introduction

The global population is expected to reach to 9.3 billion people by 2050, with a corresponding 60% increase in food and beverage (such as beers, wines, and spirits and soft drinks) demand (Energy and Industrial Strategy [BEIS], 2017). Despite the worldwide and recent economic declines, in most developed and developing countries, the food and beverage industry is both socially and economically important. The food and beverage industry is very important in its contribution to incomes, gross domestic product (GDP) and employment creation. The food and
The food and beverage sector remains the largest industrial manufacturing sector in most European Union countries contributing to more than €1.109 trillion in annual turnover and employing more than 4.57 million people (Europe, 2018).

The food and beverage sector, as the largest manufacturing sector in the European Union (EU), represents 15.2% of the total manufacturing turnover, 15% of the employment in the EU manufacturing industry, and 13.8% of EU household consumption expenditure (Food Drink Europe, 2018). In the United Kingdom, the food processing industry is the largest single manufacturing sector (Ladha-Sabur et al., 2019). Also, in the United Kingdom, the food chain involves about 300,000 enterprises, employs 3.3 million people and generates 15 million tons of food each year (Tassou et al., 2014). Although substantial improvement has been achieved in occupational safety at workplaces, however, the rate of the occupational injuries, risks and accidents is still challenging to manage and control (Sousa et al., 2014). Work-related diseases and deaths worldwide are estimated at 4% of the loss of GDP (Takala et al., 2014). According to the ILO statistics, (2022) 2.3 million women and men around the world succumb to work-related accidents or diseases every year; this tallies to over 6000 deaths every single day. Globally, there are around 340 million work-related accidents and 160 million victims of work-related illnesses annually. In 2014, at least 5,491 workers suffered from work-related injuries and 34 fatalities were experienced in Zimbabwe (National Social Security Authority 2014). NSSA., 2014).

The food and beverage industry also has a significant impact on the health and safety of the workers. The workplace accidents often have severe consequences on the workers, their families and the public as they cause high social health costs and have a significant impact on the sustainability of a society (Alli, 2008). It is recognised that any accident or illness at workplace can affect the operations and sustainability of employees and companies (Lay et al., 2016). Attention to occupational health and safety (OHS) issues at workplaces is very low in developing countries as most tasks are performed manually. Furthermore, occupational exposure to hazards is very high, and record keeping is of poor quality when measured by international standards (Kalatpour & Khavaji, 2016; Roudsari & Ghodsí, 2005; Tam et al., 2004).

Recent trends in the increase of mechanisation in most of the food and beverage sector have often had the effect of increasing the work volumes, resulting in higher stress levels of workers, as well as increasing the number of monotonous or repetitive tasks often associated with higher incidence of musculoskeletal disorders (MSDs) (e.g. upper limb disorders and back injuries). Even recent trends and increased automation in the food and beverage sector have also been associated by higher noise levels, which have led to several workers exposed and suffering from hearing impediments. Other common OHS problems in the food and beverage industry arise out of handling sharp cutting tools, increasing use of hazardous chemicals and higher exposure to dusts in the air that can cause occupational asthma. Governments authorities, employers and employees in the food and beverage industry have started to pay much attention to issues of OHS due to recent food-related outbreaks around the world that can significantly and potentially increase morbidity and mortality rates. OHS issues are vital for organisations as they ensure continuous work, productivity and efficiency (Leitao and Greiner, 2016; Yilmaz & Alp, 2016).

Most organisations are increasingly committed to improving the health and safety of workers, which is attained by controlling the hazards and accidents at a workplace and by complying with strict legal requirements (Lay et al., 2016). As a result, most organisations have implemented workplace safety management systems through documentation and certification to minimise accidents (International Labour Organisation (ILO) statistics (2013)). OHS management systems (OHSMS) are highly flexible and are viewed as an effective means and overall management system to reduce injuries, illnesses, accidents and fatalities, hazard and OHS risk for businesses of all types and sizes in providing a safe work environment (Autenrieth et al., 2016; Occupational Safety and Health Administration, 2009; Zimmerman, 2005).
An OHSMS is a series of interrelated policies, plans and procedures that specify how an organisation manages OHS issues (Autenrieth et al., 2016). This includes the organisational structure, planning activities, responsibilities, practices, procedures, processes and resources for developing, implementing, achieving, reviewing and maintaining the organisation’s OHS policy (Yoon et al., 2013). These strategies are continuously measured to effect the performance through OHSMS audits. OSHA compliance officers often use OHSMS as evidence of employers’ good faith in providing a safe work environment (Occupational Safety and Health Administration, 2009). Reducing the number of incidents will portray the good reputation of the organisation, as companies prefer to deal with organisations with sound OSH management systems.

However, research on the effect of OHSMS systems audits on health and safety performance in organisations has shown contrasting viewpoints and results (Foley et al., 2012; Friedman & Forst, 2007; Levine et al., 2012). To date, most reviews and studies have shown positive changes resulting from OHSMS interventions despite insufficient data in the published literature (Madsen et al., 2020; Robson et al., 2010). However, other studies indicate that certification has slight or no effect on OHS performance as occupational incidents remain a worldwide concern despite various industries using OHSMS systems and having safety performance evaluations (Boiral et al., 2018; International Labour Organisation (ILO) statistics, 2013). Maliha et al. (2021) noted that fewer OHSMS violations could indicate a decreased risk of injuries and illnesses.

In Zimbabwe, all workers are entitled to safety and health privileges in accordance with the National Labour Act of Zimbabwe (Chapter 28.01), National Social Security Authority (NSSA) Act (Chapter 17.04) and Factories and Works Act (Chapter 17.04). A study on the workplace safety management system audits will help manufacturing industries to evaluate and adopt strategies that have been implemented in other sectors to minimise accidents and educate where intervention is needed. Within the food and beverage industry, machinery-related hazards, workplace accidents and injury risks are generally well recognised and understood because of manual handling and repetitive motion tasks that can cause slips, trips and falls.

OSH problems in the food and beverage industry have not been generally perceived as a serious issue in the same way as other industries and sectors such as agriculture, healthcare, road and transportation, mining, building and construction sectors. In light of growing industrial accidents in workplaces, the food and beverage manufacturing sector in Zimbabwe have not escaped these occupational accidents, including the Delta Sparkling Beverages. The company holds high standards of OHS systems. These are National Occupational Safety Association certification, Coca Cola franchise safety requirements and Standards Association of Zimbabwe certifications. Despite the company having the required safety standards and being into continuous safety audits, accidents and near misses (unsafe conditions) are occurring and recurring at a noticeable rate. There were two fatal accidents involving contractors for the year 2016 and 2017, a serious amputation in the year 2019 and also a number of recorded and unrecorded minor injuries.

Hence, the main objective of the study was to assess the effect of OHSMS audits in accident prevention at Delta Sparkling Beverages in Harare, Zimbabwe. In order to achieve this undertaking, the following objectives of this study were as follows: (1) to identify the causes of accidents at Delta Sparkling Beverages (2) to examine the challenges associated with OHSMS audits operationalisation. Based on the aforementioned objectives, the research questions of the study were (1) what are the trends and causes of accidents and types of hazards and risks associated with different departments in the food and beverage industry? (2) What are the challenges and barriers associated with OHSMS implementation in food and beverage industry? (3) What are the levels of opinions of the workers and experts related to challenges and factors constraining effective OHS systems implementation in the food and beverage industry?. Overall, the study will be useful to the management and employees of the company, in identifying the gaps in the knowledge of the OHS systems at work concerning the ongoing safety audits being undertaken.
2. Materials and methods

2.1. Description of the study area
Delta Sparkling Beverages is a large company and conglomerate involved in the production, manufacturing, sales and distribution of beverages and non-alcoholic, carbonated soft drinks, bottled water, energy and sports drinks, milk and dairy, ready to drinks in Zimbabwe under license from The Coca-Cola Company. Delta Beverages Coca-Cola Plant is located at corner Seke and Cripps Roads in Graniteside industrial area, Harare metropolitan city (Figure 1). It is situated 3 km in the south from the main Harare Central Business District (CBD) in the hub of most industries ranging from heavy, light and tertiary. Harare, the administrative and commercial capital of Zimbabwe is located on a high plateau forming the North-East parts of the country. Harare has a flatter surface in most of the southern parts whilst developing undulated areas in the northern part of the city.

2.2. Research design
In this study, both qualitative and quantitative approaches were used to collect information on the effectiveness of OHS audits in preventing accidents at Delta Beverages. Qualitative methods have the potential to provide reflection and organisational learning, thereby expanding understanding and allowing for the identification of hazards, risks and accidents and unique ways of expressing them (Kongsvik et al., 2010). The use of quantitative approaches based on the questionnaire ensured respondents confidentiality and made it easier to obtain information.

2.3. Target population
The target population for this study were Delta Beverages employees. It consisted of 280 employees, including Bottling hall, Contractors, Supervisors, Safety, Health and Environmental Management (SHE) Manager and Clinic staff. These departments participate in the implementation of OHS systems and execution of safety audits. The SHE manager and plant departmental managers are responsible for implementing OHS systems, and they are familiar with various safety statutory instruments and requirements.

Figure 1. The geographical location of Delta Beverages Coca-Cola Plant in Harare, Zimbabwe.
2.4. Sample size determination
The research participants were 84 Delta employees (Table 1). In this case, the sample size (N = 30) represented workers of different sections from the total target population of 280 as shown in Table 1. A sample size of 30% (N = 30) was chosen because a sample size can be significant if it is greater than 30%. This makes it large enough to represent the target audience in an unbiased way (Tabandeh et al., 2022; Vasileiou et al., 2018). Small sample size can cause high error margins, while very large samples are expensive and difficult to convince the target audience (Lakens, 2022). Since Delta Beverages employees represent different sections of the industry, a stratified random sampling method to represent Delta employees and contractors were employed. A stratified random sampling allows the choosing of a smaller subset of a larger population; there is an equal chance that any of the samples in the subset will be chosen. This sampling technique reduces chances of bias (Zaman, 2021). Participants from all the departments had the equal chance to air out their views.

2.5. Data collection methods
In undertaking data collection, questionnaires, interviews, observations and document review were the tools utilised in this study.

2.5.1. Questionnaires
The questionnaire used in our study comprised a series of questions to gather relevant information that could be converted to variable measures under research. The questionnaire was divided into three parts: social-economic background information on respondent, safety and health concerns, and system implementation and OHS audit. Most of the questions were open-ended with the aim of determining and exploring the level of OHS performance at the operational stage of the organisation. Some of the closed questions in the questionnaire consisted of Likert-type questions to capture the levels and trends of accidents and risks related to OHS in food and beverage industry. Using a Likert scale, the respondents were asked and required to score whether they were in the agreement or disagreement with each statement in the questionnaire. The questionnaires were randomly distributed to Delta Beverages staff from the Packaging, Warehouse, Engineering, Human Resources and Quality Assurance departments and Contractor employees. Items in the questionnaire were explained when necessary. In our study, the participants were informed about the purpose of the study and the importance of the reliability of their answers to guarantee the anonymity of responses. The questionnaires were distributed in English as all the respondents are native English speakers.

2.5.2. Cronbach alpha on response rate on questionnaires
The main objective of the questionnaire in any research is to obtain relevant information in the most reliable and valid manner. The data gathered from the questionnaires were measured using Cronbach alpha to check the validity of the scale and to measure the reliability of the

| Table 1. Target population and the determination of sample size for the study |
|---------------------------------|-----------------|-----------------|
| Department                      | Target Population (N) | Sample Size at 30% of target population (n) |
| Packaging                       | 101              | 30              |
| Quality Assurance               | 15               | 5               |
| Engineering                     | 51               | 15              |
| Human Resources                 | 12               | 4               |
| Warehouse                       | 81               | 24              |
| Contractor employees            | 18               | 5               |
| Canteen and Laundry             | 2                | 1               |
| **Total**                       | **280**          | **84**          |
data and its consistency. Cronbach’s Alpha as indicator of scale reliability and internal consistency is often used in evaluating and assessing the reliability of tests for knowledge on OHS. It is widely used for questions that have more than two possible response behaviour, attitudes or outcomes in questionnaires. Cronbach’s alpha ranges from $r = 0$ to 1, with $r = 0.7$ or greater considered as sufficiently reliable. The general consensus for the lower limit of Cronbach’s alpha is 0.6 in an exploratory study (Hair et al., 2010). To test the validity and reliability of our questionnaire on the respondent’s knowledge on OHS, 15 participants were selected in the pilot study. The results of the pilot study were not included in the reporting of the final research findings.

2.5.3. Interviews
Interviews were conducted for the employees of the bottling hall, SHE representatives, NSSA Inspectors and the supervisors that are actively involved in maintaining and practicing OSH management at Delta Sparkling Beverages.

2.5.4. Field observations
Field observations of workers in the bottling hall were made to understand all necessary actions and the actual behaviour of a person, which can lead to accidents in the industry. This allowed us to gather existing situations and to identify the unsafe practices and conditions exhibited by workers while they were working. Field observations provide more precise information because people will not feel the need to act or act differently because they will not know what you are observing.

2.5.5. Secondary data
The main sources of secondary data included text books, OHS national standards obtained from Standards Association of Zimbabwe (SAZ), National Occupational Safety Association (NOSA) guides, Coca-Cola Global Audit Organisation requirements and Delta SHE department reports which were used to support with primary sources. Secondary sources of data were critically examined in order to extract complex information about how reliable and valid OHS systems audits are towards accident prevention.

2.6. Data analysis and presentation
All statistical analyses including the computation of the chi-square test were performed within SPSS software v25 to establish the association between OHS implementation and occurrence of hazards and accidents in Delta Sparkling Beverages. A two-sided $p < 0.05$ was considered to be statistically significant. The chi-square is computed as follows:

$$
\chi^2 = \sum \frac{(O_i - E_i)^2}{E_i}
$$

where:

- $\chi^2$ = Chi-square observed
- $\Sigma$ = The sum of
- $O$ = Observed frequencies
- $E$ = Expected frequencies
- $c$ = Degrees of freedom
3. Results and discussion

3.1. The validity and reliability of questionnaires
Cronbach’s alpha for the entire questionnaires of the scale was 0.912 indicating that it was highly reliable. During the pilot study to test the reliability and validity of the questionnaire, all the participants confirmed that the questions were well understood and thus the feasibility of the instrument was established. Higher Cronbach’s alpha of 0.9583 was found in a study that examined the extent to which the OHSA was implemented at an academic hospital in Johannesburg (Foromo et al., 2016).

3.2. Socio-demographic information of respondents
Most respondents were aged between 31 and 40 (48.9%), with 41–50 at 32.2%. Results from the study highlight that most employees in the food and beverage industry are the economically aged groups. Approximately 63.3% of the participants were holders of National Certificates/Diploma relevant to the specialised field of work. The group comprised of qualified artisans who are knowledgeable to their area of specialisation and operations at the plant. Around 32.7% were degreeed personnel and usually these were the top management and a minority of 4% personnel who occupied the general hand duty section. In regard to the number of years employees being involved in the food and beverage industry, over half of the employees had more than four years with the company. Thus, an individual at optimal age with high level of education and long experience was often recognised and assigned in implementing the system.

Results of the questionnaire survey also indicated that the majority (79%) of the surveyed people were males and 21% being females. This commensurate with employee ratios at Delta where there are more males than females. Dominance of the males may have been as a result of the nature of tasks in the food and beverage processing industry that are physically demanding for females. This result concurs with Taderera H., (2012), who postulated that manufacturing industries are a laborious environment; hence, males dominate as with the case of Delta Beverages food manufacturing industry.

3.3. Types of hazards at delta sparkling beverages
Physical exposures related to job tasks, workplace environment, use of tools and materials, machinery operations affect workers in different occupations and employment sectors (Chau et al., 2009; Vandergrift et al., 2012). Based on the administered questionnaires, the results indicated the most prominent types of hazards which result in accidents are physical hazards which constituted 61.4%, chemical hazards represented 14.3%, environmental hazards were 1.4% and ergonomic hazards constituted 22.9% as illustrated in Figure 2. This suggests, unlike the physical hazards, the biological and environmental hazards pose risks for the small fraction of workforce as indicated in Figure 2. Exposure and risk to biological hazards may be associated with inhalation and ingestion of dust during food and beverage processing as well as working in high levels of humidity which may cause skin irritations. Overall, the questionnaire survey showed that the larger proportion of Delta employees are more prone to occupational risks associated with physical hazards.

Many jobs and tasks in the manufacturing industries of developing countries continue to require manual labour in operating machinery. Ionising and nonionising radiations, heat and cold, rotating machinery, stressors such as vibrations, noise and falling objects are examples of physical hazards. Frequent machinery movement in the bottling hall section produces high noise levels above required standard 83 decibels (dB), which increases risk and accident proneness. These correspond to Lay et al.’s (2016) findings that exposure to hazards increases the chances of employees to OHS risks and that can be everyday or every week. Consistent evidence and previous researches have shown that workers in precarious or vulnerable work arrangements experience more health and safety hazards and poorer health and safety outcomes than do other workers (Abdalla et al., 2017).
However, exposure of workers to the physical hazards at workplace is not only limited to developing countries but also in the developed countries. A European Working Conditions Survey Results in 2010 revealed that 33% of European workers handle heavy loads for at least 25% of their working time and 23% are exposed to workplace vibration (Eurofound, 2010). In the USA, approximately 27% of working adults are exposed continually to repetitive motion (Tak & Calvert, 2011). At least 25% of workers in USA spend more than half of their time at workplace either bending or twisting. It is also estimated that approximately 10% of workers are exposed to cramped workspaces every day and 2.7% are exposed to whole-body vibration (Tak & Calvert, 2011).

### 3.4. Hazard exposure found at different departments

Table 2 indicates that some hazards were more prone to certain departments. Packaging department was most prone to physical hazards including bottle bursts, high noise levels above 90 db, and rotating machinery mostly due to machinery used. The study further identified physical hazards in the engineering department that included dust from the coal bunker. Coal dust pose pneumonic diseases (respiratory diseases). Wet floors and sharp objects were the hazards uniquely identified at the Canteen, Human Resource and Laundry section/department. These pose serious danger and may cause people to slip and fall. During interview sessions, the employees pointed out that packaging department was very busy that requires much attention and most employees tend to compromise safety with daily production. These findings are similar to those reported by Kim and Park (2021), who suggested that the greater number of employees serve to keep the rate of regulatory violations stable while improving the overall occupational health and safe environment.

Chemical hazards were also a threat to employees who works in the packaging department. Caustic chemical causes severe skin burns. The warehouse department was exposed to the ergonomics hazards arising from the use of chairs that are unsuitable to the nature of work conducted. It was observed during the period of administering the questionnaires and conducting the interviews that the warehouse department was a busy workplace due to constant use of lift truck operations. These pose a threat of collision to workers.
Table 2. Common hazards found at different departments

| Department of employees | Physical hazards | Chemical hazards | Biological hazards | Environmental hazards | Ergonomic hazards | Total |
|-------------------------|------------------|------------------|--------------------|-----------------------|------------------|-------|
| Quality Assurance       | 4                | 0                | 0                  | 1                     | 0                | 5     |
| Engineering             | 14               | 0                | 0                  | 0                     | 0                | 14    |
| Packaging               | 17               | 7                | 2                  | 0                     | 2                | 28    |
| Warehouse               | 6                | 0                | 0                  | 0                     | 14               | 20    |
| Human Resource          | 2                | 1                | 0                  | 0                     | 0                | 3     |
| **Total**               | **43**           | **8**            | **2**              | **1**                 | **16**           | **70** |
Figure 3. Frequency occurrence of accidents.

![Figure 3: Frequency occurrence of accidents](image)

|                     | Value     | df  | Asymp. Sig. (2-sided) |
|---------------------|-----------|-----|-----------------------|
| Pearson Chi-Square  | 61.417ths | 12  | .000                  |
| Likelihood Ratio    | 49.633    | 12  | .000                  |
| Linear-by-Linear Association | 3.688 | 1    | .055                  |

Table 3. Chi-square test results between department and accidents frequency

*DF-Degrees of Freedom, **Asymp. Sig. Asymptotic Significance (2-sided).

3.5. Frequency occurrence and prevalence of accidents

The findings from questionnaire surveys and accident reports books of SHE department of Delta Sparkling Beverages revealed that 61% of the accidents are being experienced quarterly and 27% occur biannually as illustrated in Figure 3. The warehouse and packaging departments experience most of the accidents and physical hazards which results from packaging of soft drinks. Bottle bursts are most common within the packaging department.

The chi-square test further revealed an association between department employee’s work and number of regularity of accidents taking place (Table 3).

3.6. Trends and prevalence of near miss incidents

Figure 4 shows that 57% of near miss incidents are experienced on a quarterly basis and 30% are experienced weekly. Based on accident reports of SHE department of Delta Beverages, there has been a constant occurrence of near-miss incidents before and after implementation of OHS systems at the organisation. The results from questionnaire respondents and findings from the SHE report record books further indicate that near-misses are mostly in the bottling hall and warehouse department as compared to other departments. Interviewed SHE representatives revealed that records of all reported near-misses are investigated, analysed and stored in the SHE near-miss record books as per NOSA standards (guides). During interview sessions, the employees pointed out that packaging department is section that is very busy thus most employees tend to compromise safety with daily production. Shop floor employees also had to point out that the working environment requires much attention as the department is more prone to physical hazards.
Figure 4. Trends of near miss incidents at delta sparkling beverages.

Figure 5. Causes of accidents at delta sparkling beverages.

3.7. Causes of accidents at delta sparkling beverages

The study further identified possible root causes of workplace accidents at Delta Sparkling Beverages (Figure 5). The major causes of accidents are non-adherence to safe operating procedures ranking to 40%; non-top-management participation to safety performance of the company was highlighted as the second cause of accidents with 26%. This is mainly related to unsafe acts, ignorance to safety standards, culture and regulations by workers and exposing themselves to a great risk contributes to high accidents rates in the manufacturing industry. The research findings from the questionnaire survey and field observations showed that many employees are not observing safety before commencing work.

The study indicated that pre-task risk assessments are not being done thoroughly. Due to such circumstances, the employees fail to identify possible hazards and thereby leading to the occurrence of accidents. This research finding was revealed throughout an interview with the Line 4
Manager; most incidents arise from improper handling of hazardous substances and cullet in the bottling hall. The engineering manager mentioned about non-adherence to proper lock out and tag out of hazardous machinery especially during maintenance.

Factors such as substance abuse, language barriers and low level of education are some of the most relevant employee culture-related aspects (Hallowell, 2008). Arrogances towards safety may result in occupational fatalities (Gordon, 2008). Due to such circumstances, the employees fail to identify possible hazards, improperly handle hazardous substance, non-adherence to proper lock out and tag out of hazardous machinery especially during maintenance thereby leading to the occurrence of accidents.

3.8. Effectiveness of delta sparkling beverages’s OHS management systems and OHS systems audits

An occupational health system functionality is measured particularly by the number of workplace-related accidents in terms of the injuries and damages recorded. An analysis was conducted in order to come up with an association between the causes of accidents at a workplace to OHS systems audits. Chi-square test showed no association between OHS audit protocols to the occurrence of accidents at the industry (p > 0.05). Table 4

The research findings showed that OHS Systems for Delta Company are viable and reliable since required and expected documentation are in place. Research results showed evidence of worker consultation and participation, hazard identification, evaluation and control. Results from the study highlight that audit non-conformity reports were in place, and corrective action plans were thoroughly done. The study unveils Global Coca-Cola surveillance audit reports and revealed that 70% of its non-conformities dwell much to employee unsafe acts. The research findings showed that the auditing system is effective as some employees responded that they must learn from them and they bring closure to some unattended non-conformities within the plant. Siwach (2022) purported that safety audits pinpoint and ascertain the extents of potential hazards to avoid risks and adversity occurrences.

The study revealed that external audits are consistently done in order to measure non-conformities that could have arisen within the plant. To concur this, auditor bias exists if an auditor or audit team has conflict of interest due to different auditors professional background and training (Robson and Bigelow, 2010).

3.9. Challenges encountered in OHS systems operationalisation

Various challenges are faced at Delta Sparkling Beverages in implementing the OHSMS and operationalisation of the auditing systems. Figure 6 illustrates the total number of respondents towards challenges encountered in OHS operationalisation. Amongst these include shortage of health and safety personnel, constrained budgeting and financing, behavioural, negligence and ignorance tendencies of workers on OHS responsibility (Figure 6).

| Table 4. Chi-square test results between OHS audits and occurrence of accidents |
|-------------------------------|-------|---|-----------------|
| Chi-Square test               | Value | DF | Asymp. Sig. (2-sided) |
| Pearson Chi-Square            | 8.786*| 5  | .118             |
| Likelihood Ratio              | 5.878 | 5  | .318             |
| Linear-by-Linear Association  | .071  | 1  | .790             |

*DF-Degrees of Freedom, *Asymp. Sig. Asymptotic Significance (2-sided).
3.9.1. Staff shortage
The research findings indicated that 19 respondents mentioned SHE staff shortage as a factor hindering the smooth performance of safety systems at Delta Sparkling Beverages. This factor was also concurred by the SHE Manager who highlighted the challenges that she face in the execution of her duties as a result of SHE staff shortage. Over the years, Delta Sparkling Beverages had no permanent SHE officer. An interview with the SHE Manager revealed the need for additional SHE staff to cater for the needs of health and safety at Delta Sparkling Beverages. Amongst these responsibilities include budgeting for OHS activities, initiating training and development which are health and safety related at Delta. Staff turnover is most of the key constraint and challenge related to effective food safety standards implementation (Karaman et al., 2012; Macheka et al., 2013). There is also extra need to attend to the requirements of workers who would have been involved in workplace accidents, maintaining a health register for all employees and carrying out frequent inspections on the maintenance of OHS standards.

3.9.2. Inadequate OHS training
Table 5 shows the training schedule frequency at Delta Sparkling Beverages. Based on the research findings obtained from the administered questionnaires, a larger proportion of respondents indicated that OHS trainings are not sufficient enough for employees to grasps the OHS concepts. Workers saw the need of being trained on some SHE audit protocols as most OHS training are done annually. The Packaging line 4 shift supervisors highlighted that there was a need of rescheduling OHS training as most are done annually. Inadequate trainings within a working environment ends up with workers losing their safety culture. This concurs well with some views of some employees who indicated that there are inadequate OSH trainings. As highlighted in an interview with one particular shop floor employee, most of the trainings are

| Challenges                        | Respondents |
|-----------------------------------|-------------|
| Non top management participation  | 8           |
| Lack of financial support         | 21          |
| Resistance and ignorance          | 17          |
| Inadequate trainings              | 39          |
| Understaffing                     | 15          |

Table 5. Training frequency of safety health and environment issues

| Frequency   | Percent | Valid Percent | Cumulative Percent |
|-------------|---------|---------------|--------------------|
| Everyday    | 1       | .8            | 1.4                |
| Weekly      | 1       | .8            | 1.4                |
| Quarterly   | 7       | 5.5           | 10.0               |
| Bi-annually | 11      | 8.7           | 15.7               |
| Annually    | 50      | 39.4          | 71.4               |
conducted by an internal person within the company than hiring an external trainer with a different mindset.

Kim and Park (2021) established that the size of the company, level of education of the trainers and training frequency are the most relevant factors that influence the rate of accidents. In the food manufacturing, an beverage industry, lack of education and training (Dora et al., 2013; Karaman et al., 2012; Macheka et al., 2013; Teixeira & Sampaio, 2013; Tomašević et al., 2013) and lack of skill and knowledge (Chen et al., 2015; Khalid, 2016) have been cited as some of the challenges preventing effective food safety standards implementation.

3.9.3. Awareness of workers towards safety and health issues
The research findings indicated that resistance and ignorance of employees is a challenge that hinders the effective operationalisation of OHS systems within the company. Employee behaviour and negative attitude towards safety (unsafe acts) due to non-adherence to safe operating procedures by employees lead to the causes of accidents within the plant. Workers with lower levels of education appear particularly vulnerable, possibly because of their greater exposure to physical demands or other hazards (Breslin et al., 2008). In the event of training being provided, language barriers and lack of awareness (Chen et al. 2015; Teixeira & Sampaio, 2013) may prevent workers from understanding basic safety procedures or knowing how or where to report safety or health concerns (Safa Abdalla et al., 2017).

3.9.4. Inadequate financial resources
Results showed that lack of adequate financial resources to enable the requisition of high-quality safety clothing results in safety clothing of low prices and low quality being procured for the workers which subsequently expose employees to work-related hazards and risks. An interview with the SHE manager indicated that the department however through this arrangement has little authority in deciding any other issues that may need urgent attention. Tomašević et al. (2013) and Macheka et al., (2013) indicated that the limited financial resources make it difficult for companies to recoup the costs related to the effective implementation or operation of the food safety management systems. This is because occupational health issues have the potential to both increase costs and decrease revenues for any organisation (Miller & Haslam, 2009).

3.9.5. Non-top-management participation
Based on the questionnaire survey, the respondents highlighted that non-attendance or lack of commitment at the top-level management is an obstacle to effective occupational, health and safety management systems implementation. Furthermore, interviews with shop floor employees reaffirmed and confirmed that the top management take long to react towards the safety needs of employees. They also attributed the challenge and delays in purchasing personal-protective equipment for employees. Top management leadership, commitment, and participation of all levels and functions of an organisation play a very crucial role for the success of the occupational, health and safety management systems implementation because they are the ones who disseminate key information towards the safety issues, health and well-being of employees (Siltori et al., 2021).

According to Al-Najjar and Jawad (2011), the barriers in the implementation of the quality management system in developing countries include lack of commitment at the top management. Research in Indonesia has shown that a lack of commitment at the top-level management and a general lack of personnel competency are the main obstacles to the proper implementation of quality management system (Amar & Zain, 2002). In developing countries, the top management executives may not fully comprehend the importance of meeting customer requirements and developing good relationships with suppliers in order to secure the supply of raw material. Furthermore, in developing countries, most companies involved in manufacturing industry are accused of producing and delivering substandard and poor-quality raw materials and equipment that are not constantly and adequately well maintained (Wilcock & Boys, 2017). Modern
automation of production processes is leading to decreasing exposure of workers to hazards (Kromhout and Vermeulen 2000).

4. Limitation of the study
There is considerable uncertainty in these results due the some few limitations. The collected OHS data may not be representative of all hazards, accidents, injuries and risks suffered by food and beverage workers (e.g., minor injuries that were not recordable would not likely be included), nor of the entire scope of OHS implementation in place at the organisation.

Our methods for considering the accidents, hazards and safety risks experienced by workers’ occupation may have masked some subtle differences related to particular job assignments within this specific industry group. Other potentially important aspects of the dynamics underlying the risks of long working hours are important to consider. For example, workers with rotating shifts may often experience sleep deficits and fatigue, which decrease their mental agility, reduce performance efficiency and increase error rates.

Compared with day workers, night workers have higher risk for injury, with successive night shifts further increasing the risk injuries (Folkard & Tucker, 2003). Increased risk for injury has also been associated with working overtime and long hour shifts (Dembe et al., 2008; Folkard & Lombardi, 2006). Shorter sleep duration and longer work hours are independently associated with the risk for work-related injury (Lombardi et al., 2010). This is mainly due to the fact that fatigue impairs cognitive functioning and slows response time (Lombardi et al., 2010). Furthermore, evidence on the ground suggests that shift work and night work interfere with circadian rhythms, decrease efficiency, and strain social and family relationships (Costa & Di Milia, 2010). However, workforce and environmental characteristics, including language barriers, shift length and times, work pacing, and geographical distribution of workers and workplace areas, present potential and various challenges for data collection, conducting interviews and observing workers to assess the management leadership component for the largest number of attributes on industry.

5. Conclusion and recommendations
The study evaluated the effects of OHS systems implementation in accident prevention at Delta Sparkling Beverages in Harare. This research established that Delta Sparkling Beverages adopt policies which supports OHS objectives and targets and systems are in place to help in accident prevention. Challenges hindering smooth OHS operationalisation at the workplace includes resistance and ignorance by workers to safety systems, short staffing and non-top management participation and lack of financial resources. Furthermore, the study revealed that accidents that are occurring at the workplace are due to non-adherence by employees to safety operating procedures (unsafe acts), low level of worker awareness of health and safety related rights and responsibilities.

However, substantial limitations in this study prohibit any inferential conclusions about the effectiveness of OHS systems implementation in accident prevention. In future studies, the present study could also be complemented with other potentially important aspects of the dynamics underlying the risks of long working hours, which are important to consider. Workplace physical hazards clearly persist in food and beverage manufacturing industries of the developing countries underscoring the importance of mitigating these hazards even as countries move towards becoming largely service-based economies and leaning towards automation production. New strategies needs to be developed that focus on the organisation of work processes and technology infrastructure to bring about a reduction in the work places accidents. It is expected that new technologies including modern automation, remote control and robotics in the food and beverage industry of production processes would lower accident frequencies and injuries by distancing the operator from hazards, injuries and accidents. Furthermore, new production technologies can potentially change management styles and safety management.
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Author details
Tatenda Musungwa1
Pedzisai Kowe1,2
1 Department of Geography, Environmental Sustainability and Resilience Building, Faculty of Social Sciences, Midlands State University, P BAG 9055, Sengwa Road, Gweru, Zimbabwe.
2 Discipline of Geography, School of Agricultural, Earth and Environmental Sciences, University of KwaZulu-Natal, Private Bag X01, Scottsville, Pietermaritzburg 3209, South Africa.

Disclosure statement
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