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*Corresponding author: Chioma S. Okoro, Department of Construction Management and Quantity Surveying, University of Johannesburg, Corner Siemert and Beit Street, Doornfontein 2028, Johannesburg, South Africa
E-mail: chiomasokoro@gmail.com

Reviewing editor:
Amir H. Alavi, University of Missouri
Columbia, USA

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Health and safety implementation motivators in the South African construction industry

Jacobus H.F. van Heerden¹, Innocent Musonda¹ and Chioma S. Okoro^{1*}

Abstract: The increased emphasis on health and safety (H&S) in the construction industry in recent years necessitates continuous research on strategies to improve H&S performance in the sector. However, the motives behind the implementation of H&S practices in the construction industry has been explored to a limited extent. The aim of the current study is to classify the drivers behind H&S implementation in the South African construction industry. A field survey was undertaken. Participants, selected through judgemental and snowball sampling techniques, included site engineers, site agents, contracts managers, construction managers and project managers. Mean item score and standard deviation were determined using EXCEL. *The need to manage hazards; organisations regard H&S as important; and compliance with the legislation* emerged as the most important drivers. The study provides evidence for construction organisations to develop effective strategies to mitigate the occurrence of fatalities and deaths in the construction industry. More robust data analysis techniques could be employed in further studies.

Subjects: Engineering Management; Built Environment; Health & Society

Keywords: construction industry; health and safety

ABOUT THE AUTHORS

Jacobus H.F. van Heerden, obtained his Bachelor of Technology in Quantity Surveying at the University of Johannesburg, South Africa in 2016. He is currently working as a quantity surveyor.

Prof Innocent Musonda, is an Associate Professor at the same University. He is a Registered Civil Engineer (REng - Zambia), Professional Construction Manager (PrCM - South Africa), and Chartered Member of the Institute of Building (MCIOB - UK). He holds a PhD in Engineering Management.

Chioma Okoro is a Doctoral Candidate in Engineering Management at the University of Johannesburg, South Africa.

The group's research interests are in health and safety, construction project management and sustainable infrastructure development. The current research touches on an important aspect of construction safety and is part of the group's project on Improving Health and Safety Performance in the Construction Industry.

PUBLIC INTEREST STATEMENT

Occupational health and safety (H&S) is a critical concern as it impacts on organizations, society and the economy as a whole. Poor H&S affects productivity, profitability, and organization's reputation, and results in human suffering. Therefore, ensuring H&S better performance may be driven by either one of the above factors or indeed by the need to comply with legislation. Consequently, the current research was birthed by the need to achieve a better H&S performance. Therefore, the current research sought to investigate the factors driving H&S implementation in construction organizations in order to establish the gaps and therefore provide sustainable solutions to improve their H&S performance. Data from a questionnaire survey among site agents, construction managers, contracts managers, site engineers and project managers were analyzed to determine what the motivating factors were. Findings were that most organizations ultimately want to implement H&S programs, procedures and practices because they regard H&S as important, need to manage hazards and to comply with legislation, in order to improve H&S performance.

1. Introduction

The construction industry is an important sector in terms of contribution to economic growth and gross domestic product (GDP) of an economy (Sánchez, Peláez, & Alís, 2017; Smallwood, Haupt, & Shakantu, 2009). Despite its important socio-economic role, there is high frequency of accidents in construction, which makes it an unsafe, highly dangerous and complex industry (Kheni, Dainty, & Gibb, 2008; Sánchez et al., 2017). Accident rates are unacceptably high in the construction industry. Poor health and safety has consequences for workers, organisations, society and countries (Sánchez et al., 2017). These consequences include direct and indirect costs. Direct costs are those directly related to an accident, treatment of an injury and any compensation offered to injured workers, including hospitalisation and medical costs, liability and property losses, sick leave administration, premiums for workers and temporary disability payments (Hinze, 2006; Hughes & Ferrett, 2016; Smallwood et al., 2009; Waehrer, Dong, Miller, Haile, & Men, 2007). On the other hand, indirect costs may result from a series of accidents and are not directly related to an accident (Griffin, 2006; Hughes & Ferrett, 2016; Waehrer et al., 2007). Typical indirect costs incurred by construction organisations include reduced productivity of injured worker/s; reduced productivity of workforce; costs resulting from delays; additional supervision costs; costs of clean-up after the accident; costs resulting from rescheduling of work to ensure timely completion, lost work days, and training of new workers (Hughes & Ferrett, 2016; Okorie & Smallwood, 2010; Smallwood et al., 2009). Therefore, H&S implementation is necessary to reduce the impact of the costs of accidents. Other reasons for implementing H&S as identified by Smallwood (2010) are legislation, financial issues, fines and penalties, quality, late completion and the reputation and image of the construction organisation. Further, investment in H&S increases profitability, productivity and employee confidence, and decreases attrition (Muiruri & Mulinge, 2014).

Further, H&S is a humanitarian and economic concern that needs to be implemented and managed orderly to achieve desirable results (Muiruri & Mulinge, 2014). When an organisation invests in their employees' H&S, it invests in success and continuity (British Safety Council, 2014). It is therefore important to continuously conduct research on ways to improve H&S performance in organisations, especially in the construction industry. Strategies to improve H&S performance include accident prevention through integrated programs and series of coordinated activities, directed to the management of unsafe personal performance and mechanical conditions that are based on attitudes, abilities and knowledge (Hosseinian & Torghabeh, 2012). Additionally, rewards, safety incentivisation programs, identification of hazards, risk control measures, increasing usage of information technology tools, integrating quality, documenting method statements, H&S induction and training have been advocated as H&S improvement tactics (Kheni et al., 2008; Olutase, 2014; Sánchez et al., 2017). However, identifying the root causes and reasons for non-implementation of H&S practices as well as implementing proactive measures rather than reactive measures, are critical in order to prevent the occurrence of accidents (Hosseinian & Torghabeh, 2012; Sánchez et al., 2017). Therefore, continuous research on H&S implementation is crucial.

Consequently, research has been conducted on H&S implementation. For instance, Kanchana, Sivaprakash, and Joseph (2017) investigated the causes of accidents on construction sites in India, while Okoye, Okolie, and Ngwu (2017) focused on the effectiveness of safety intervention and implementation strategies. Chileshe and Dzisi (2012) focused on the benefits of H&S management in design organisations in the United Kingdom (UK) construction industry, including safer workplace, improved work and organisational performance, decrease in accidents, enhanced company reputation and reduced sickness and days away from work. Alkilani, Jupp, and Sawhney (2013) identified factors hindering H&S practice and improvement measures in the Jordanian construction industry. Kheni et al. (2008) focused on internal influences on H&S management within small and medium enterprises in the Ghanaian construction industry, including accident reporting, documentation of method statements, H&S inductions and so on. Musonda and Smallwood (2008) dealt with H&S awareness and implementation in Botswana's construction industry and found that the management of contractors, as well as clients and designers were not committed to H&S implementation.

In South Africa, Smallwood and Haupt's (2006, 2007) studies investigated the impact of construction regulations on H&S performance, among project managers and architects.

However, although plentiful research has been conducted on the H&S performance, it appears that few studies have been focused on the motivators or drivers for implementing H&S. The objective of the current study is therefore to investigate the motives behind H&S implementation in organisations. The study provides evidence to understand what makes construction organisations decide to act on the prevention of incidents, accidents and fatalities. The findings will help in deciphering the root causes of poor H&S performance and in devising ways to improve construction H&S performance. The next section presents a review of the drivers/motivators as identified from literature. The methods adopted to conduct the research and the results of the study follow. Thereafter, the results are discussed, and conclusions are subsequently presented.

2. Literature review

2.1. Overview of safety in the construction industry

The International Labour Organisation (ILO) estimated that the sector accounts for one in every six fatal accidents recorded at work annually and at least 60,000 fatal accidents occur each year on construction sites around the world, representing one fatal accident every 10 min (Lingard, 2013). According to Alkilani et al. (2013), poor H&S performance in the industry accounts for approximately 30–40% of the world's related fatal injuries. The construction sector in industrialised countries employs between 6 and 10% of the workforce but accounts for between 25 and 40% of work-related deaths (Lingard, 2013).

In the United States of America (USA), there were over 10,000 fatalities and 195,000 non-fatal injuries from 2001 to 2010 and these cost the US economy in terms of lost work days, compensation costs and lost productivity (Orji, Enebe, & Onoh, 2016). More recent statistics revealed that 19.4% of the total fatal work injuries was in the construction industry (Bureau of Labour Statistics 2016). According to the Occupational Safety and Health Administration (2018), out of 4,693 worker fatalities in private industry in 2016, 991 or 21% were in the construction industry, that is, one in 5 worker deaths and these are mainly caused by falls electrocution, struck-by and caught-in-between accidents.

Although the construction industry in the United Kingdom (UK) accounts for 5% of the workforce, 22% of fatal injuries and 10% of reported major injuries occur in this sector (Construction Health & Safety Group, 2018). Construction has the highest number of fatal injuries at work by sector (Health & Safety Executive, 2017) (see Figure 1).

The Indian construction industry contributes 16.4% of fatal occupational accidents globally, despite having only 7.5% of the total world labour force (Kanchana et al., 2017). In Nigeria, the construction sector contributes 3.82% to the GDP of the economy (Okoye, Ezeokkonkwo, & Ezeokoli, 2016). However, the number of accidents, both reported and unreported, is still unabated (Okoye, Ezeokkonkwo, & Ezeokoli, 2016).

In South Africa, the situation is no different. According to statistics from the Federated Employer's Mutual Assurance Company (FEM) (2016), the construction industry within the Gauteng Province incurred accidents, as presented in Table 1. It is discernible that the number of accidents, although lower in 2015 (than in 2012 and 2013), was still high and companies incurred enormous costs. According to statistics from the FEM (2016), the number of workdays lost due to accidents in the year 2013 mounted up to 38 060, compared to 31 294 in 2014 and 22 163 in 2015.

While developed nations have demonstrated commitment to achieving a reduction in accident numbers, the same cannot be said of developing countries (Kheni et al., 2008). The status quo therefore necessitates continuous research into improvement strategies.

Figure 1. Number of fatal injuries by industry.

Source: Health and Safety Executive (2017).

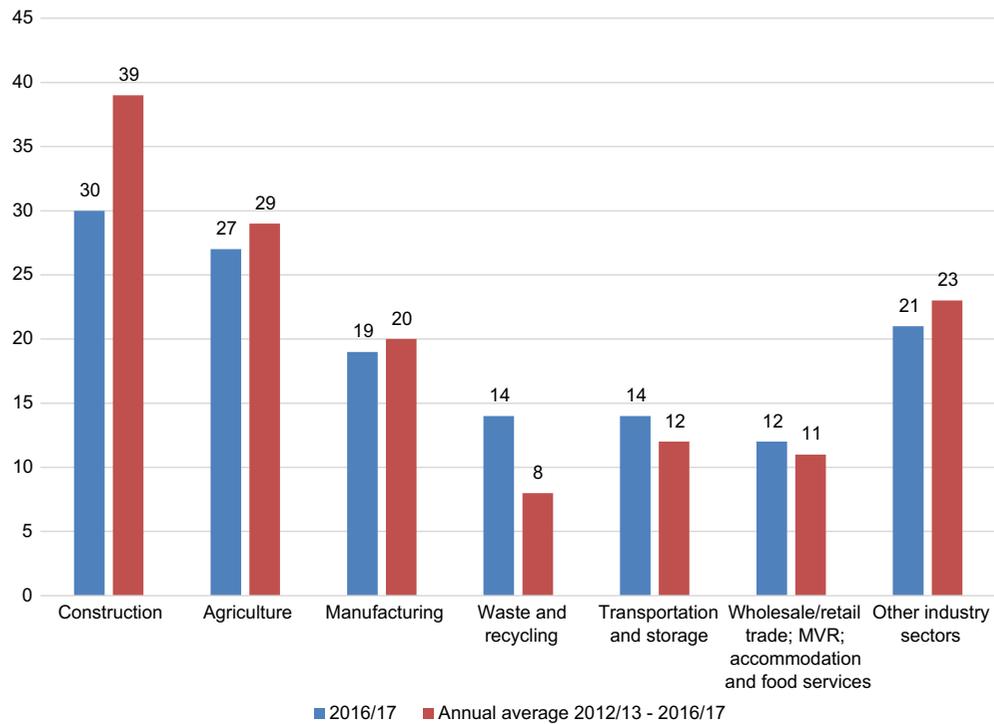


Table 1. Construction H&S statistics (as at May 2016)

Year of accident	No. of accidents	Lost days	Average cost/accident
2012	3,870	44,945	25,642
2013	3,942	36,763	27,264
2014	3,642	29,212	27,087
2015	3,767	22,163	31,869

Source: Federated Employer's Mutual Assurance Company (2016).

2.2. Importance of increased attention to health and safety implementation

Abdul Hamid, Abd Majid, and Singh (2008) indicated that construction accidents are rampant because clients and contractors tend to focus more on profit maximization, and less on H&S (health and safety) implementation. This results in poor housekeeping, decline in productivity, programme delay, increased cost of accidents, increased compensation insurance claims, improved work performance, organisational performance, reduction in number of accidents and lost work days, and harm to the environment, etcetera (Chileshe & Dzisi, 2012; Smallwood et al., 2009).

Consequently, recent approaches to safety management have advocated inclusion of perspectives where industry good practice is agreed, no level of risk is acceptable and implementation of higher safety performance standards is desirable (Zanko & Dawson, 2012). However, motivation to attend to safety issues may vary over time, through the life of the project (Zanko & Dawson, 2012). In addition, motivation to participate in H&S implementation may be influenced by different psychological, situational and organisational factors, which include *inter alia* beliefs, values, and vision of both employers and workers (Wachter & Yorio, 2014). Therefore, the present research reviews the motives for H&S implementation among construction organisations in a bid to identify the factors driving H&S systems implementation.

2.3. Review of health and safety implementation motivators

Literature reveals that H&S implementation can be motivated by the need to achieve quality, compliance with regulations, the need to avoid costs on site exigencies resulting from accidents and associated bad publicity and so on (Smallwood & Haupt, 2006, 2007). These factors are further discussed hereunder.

2.3.1. The need to comply with legislations/regulations

Safety regulations generally set out critical risk reduction measures and minimum standards that employers or individuals must adhere to (Horie, 2010; Umeokafor, Isaac, Jones, & Umeadi, 2014; World Health Organisation, 2013). For instance, under the 2007 Labour Contract Law and the Industrial Safety and Health Law of Japan stipulate minimum standards, which employers are obliged to make reasonable efforts to ensure employee health for foreseeable and avoidable risks (Horie, 2010). Similarly, the OHS Act (85 of 1993) and Construction Regulations of 2014 set out critical standards to which the performance of companies is expected to comply with and be monitored against (Othman, Maduna, Moodley, Paruk, & Thevan, 2008). These acts further specify or prescribe penalties for both individuals and organisations. Consequently, enterprise neglecting certain binding provisions of guidelines are likely to suffer significant business impact such as closure/sealing of the establishment, if judged to be responsible for accidents or occupational disease (Horie, 2010; Umeokafor et al., 2014). Prosecutions are an important deterrent and driver of compliance (Löfstedt, 2011). Therefore, on a project, H&S may be implemented to avoid penalties from defaulting with regulations and legislation.

2.3.2. Reducing the cost of accidents

Poor H&S management may lead to accidents, which cost organisations and economies hugely (Hughes & Ferrett, 2016). De Saram and Tang (2005) indicated that construction accidents have an immense impact on families and construction organisations in terms of damages and losses. The cost of a poor H&S record will may actually be greater than investment or implementation of H&S. The implementation of H&S systems is estimated to cost between 0.5 and 3% of the total project value whereas the cost of accidents is estimated at 5% of a completed project's value (Smallwood et al., 2009). Therefore, organisations may be motivated to implement H&S because of the desire to reduce costs associated with accidents.

2.3.3. The need to complete projects on time

Motivation to attend to safety issues can vary over a project's life cycle (Zanko & Dawson, 2012). At the start and finishing of a project, H&S implementation issues are at the forefront. However, in the middle, less resources tend to be allocated to safety issues. Hence, rapidity of work, with a focus on completion tends to give rise to risk-adverse behaviours (Zanko & Dawson, 2012). In addition, projects may be delayed when accidents occur on construction sites, which further result in exigent costs (Edwards et al., 2013; Lai, Liu, & Ling, 2011). Thus, achieving one of construction safety management outcomes to complete projects on time is a motivator for H&S implementation.

2.3.4. Improved quality

Nicholas and Steyn (2012) define quality as specifications or requirements that are being met. Ensuring that the requirements as specified are achieved on the project on the first attempt is a motivator for H&S implementation. Early implementation of H&S and environmental principles is essential to the success of projects as it can prevent poor quality outcomes and cost increases as a result (Edwards et al., 2013).

2.3.5. Preserve the image and reputation of the construction organisation

Bad publicity from such accidents may damage an organisation's name and strain relationships between project stakeholders. H&S implementation results in good H&S record and efficient systems

or programs (Holt, 2005; Ikpe, 2009). An enterprise that sustains a lot of injuries and accidents will be unattractive to current and future investors, and the public (British Safety Council, 2014). Thus, if proper safety measures are implemented to prevent or reduce the occurrence of accidents and injuries, the organisation's reputation will be in tact (Li & Poon, 2013).

2.3.6. Improved productivity and profitability

Profitability has to do with the monetary effects, while productivity considers the real progression that takes place among purely physical phenomena (Tangen, 2005). Poor H&S affects the productivity of workers and hinders the company's ability to achieve goals and objectives (Lingard, 2013). Organisation invest in safety implementation and management systems to reduce the number of accidents and achieve worker performance excellence (Wachter & Yorio, 2014). As a result of improved H&S, better services will be rendered with the same resources in a shorter timeframe. In addition, if an employer invests in their H&S, the employees are motivated to work harder, and in a stable and healthy psychological state, they can deliver as and when required (Aviva, 2011; Gatti & Migliaccio, 2013).

2.3.7. Achieve client satisfaction

The extent to which a project meets the expectation of the client is essential when it comes to the construction process development and client relationship (Kärnä, 2009; Omonori & Lawal, 2014). A good H&S record increases client satisfaction (Smallwood, 2017; Zou & Sunindijo, 2015). Thus, maintaining good client satisfaction and relationship is a motive for H&S implementation.

3. Methods

A quantitative research approach was adopted to achieve the objective of the study, which was to identify the motives behind H&S implementation in the Gauteng Province of South Africa. The quantitative method was selected because it collects numerical data, which can be subjected to statistical treatment for the purpose of agreeing or disagreeing (Williams, 2007). In addition, bias is reduced since it is objective in nature (James, 2012). The study objective was to establish the drivers behind H&S implementation in construction organisations within the Gauteng Province in South Africa.

3.1. Questionnaire design

A 5-point Likert-scale (from 1 = strongly disagree to 5 = strongly agree) survey questionnaire, developed from a detailed review of relevant literature, was used to collect empirical quantitative data on the motives for H&S implementation in construction organisations. The questionnaire was constructed in the English language and divided into two sections. The first section contained the demographic characteristics of the respondents, while the second section consisted of twelve close-ended questions relating to motivators/drivers behind H&S implementation.

3.2. Data collection

The questionnaire, which was accompanied by a cover letter explaining the purpose of the study, was distributed at construction sites in six different locations in the Gauteng Province including Boksburg, Sandton, Parktown, Midrand and Linksfield and Central Pretoria. Seven commercial building construction sites including shopping centres, office blocks, warehouse, bridge and a hospital were selected using snowball sampling. Snowball sampling identified other potential participants after the initial contacts (Etikan, Musa, & Alkassim, 2016). The researcher initially selected the company where the in-service training was undertaken, and other potential respondents were then further identified by the respondents in the first company.

The respondents comprised site engineers, site agents, contracts managers, construction managers and project managers at on-going construction sites. Judgemental or purposive sampling was used to select these respondents. The researcher deliberately selected these respondents due to the qualities they possess in terms of experience and managerial and/or supervisory positions to implement H&S in their various organisations (Etikan et al., 2016). These respondents were believed to be the most appropriate and were therefore included in the study.

Table 2. Proportion of respondents by employment position

Respondents	Contribution (%)
Site engineers	25
Site agents	23
Construction Managers	20
Contracts managers	16
Project managers	16
Total	100

Out of a total of 59 questionnaires distributed, 56 were completed; response rate of 95%. The high response rate was possible due to the fact that the questionnaires were hand-delivered, and follow-up reminders were sent to the respondents to ensure that the questionnaires were completed and returned. The 56 completed questionnaires were valid and were therefore used for the analysis.

3.3. Data analysis

The data were analysed using the Microsoft EXCEL software. The raw data were captured, and statistical techniques were applied to output descriptive statistics including mean item score (MIS) and standard deviation (SD) values. The mean is the sum of all values in the data-set, divided with the number of observations (Willemse, 2009). The SD explains the amount of variation in a measured process characteristic (Wachs, 2009). Prior to the descriptive analysis, Cronbach alpha was used to test the internal consistency reliability of the questions or measures. This coefficient measured the extent to which the H&S implementation motivating factors represented what they were supposed to measure (Zaiontz, 2014). The alpha index was 0.980, indicating good internal consistency (Zaiontz, 2014).

The factors were further ranked according to the mean scores. To identify the factors which were considered the most important in motivating organisations to implement H&S practices or systems.

4. Results

4.1. Demographic attributes of respondents

The distribution of responses from the sampled respondents is presented in Table 2. Site engineers comprised 25% of the respondents. Site agents comprised 23%, construction managers made up 20% of the respondents and 16% consisted of contracts and project managers, respectively. With regard to the age of the respondents, 29% were between the age of 21 and 30 years, 23% were between 31 and 40 years, 25% were between 41 and 50 years, 21% were between 51 and 60 years, lastly there was 2% in the age category of 60 years and above. Regarding the highest educational qualification of the respondents, 18% had a Certificate Diploma, 32% had a National Diploma, 16% had a Bachelor of Technology, 21% had a Bachelor's degree, 13% had an Honours Degree and none of the respondents had a Master's Degree or Doctoral Degree. Furthermore, the analysis of the respondents' level of experience showed that 34% had worked up to 7 years, 32% worked between 8 and 14 years, 20% worked between 15 and 21 years, 7% worked between 22 and 28 years. Lastly, there was 7% that worked for 29 years and above.

4.2. Findings on health and safety implementation motivators

The results of the survey are presented in Table 3. From the table, the need to manage hazards had the highest mean item score (MIS) (4.34) with standard deviation (SD) of 0.611. The factor ranked 2nd, was due to the fact that organisations regard H&S as important (MIS = 4.21, SD = 0.825). This was followed by compliance with the legislation (MIS = 4.20, SD = 0.564). The *m* placed among the last four were to avoid penalties (MIS = 3.64, SD = 1.052), to improve quality (MIS = 3.61, SD = 1.073), to improve productivity (MIS = 3.55, SD = 1.111) and profitability (MIS = 3.45, SD = 1.077).

Table 3. Findings on H&S implementation

Organisations implement H&S because of:	Agreement (%)					MIS	SD	Rank
	Strongly disagree	Disagree	Neutral	Agree	Strongly agree			
	1	2	3	4	5			
The need to manage hazards			7.14	51.79	41.07	4.34	0.611	1
They regard H&S to be important		3.57	14.29	39.29	42.86	4.21	0.825	2
To comply with the legislation			8.93	62.50	28.57	4.20	0.564	3
They consider H&S as the way to do business		3.57	14.29	50.00	32.14	4.11	0.779	4
To reduce costs associated with accidents and injuries	3.57	5.36	23.21	39.29	28.57	3.84	1.023	5
To preserve image and reputation of the company	3.57	5.36	16.07	57.14	17.86	3.80	0.923	6
To achieve client satisfaction	1.79	10.71	23.21	39.29	25.00	3.75	1.014	7
For ethical reasons	3.57	1.79	32.14	41.07	21.43	3.75	0.939	7
To avoid penalties		17.86	25.00	32.14	25.00	3.64	1.052	8
To improve quality	3.57	12.50	25.00	37.50	12.43	3.61	1.073	9
To improve productivity	5.36	14.29	17.86	44.64	17.86	3.55	1.111	10
To improve profitability	5.36	12.50	30.36	35.71	16.07	3.45	1.077	11
Average						3.85	0.916	

From the results, the area of concentration was on the “agree” and “strongly agree” categories of the scale. All the SD values, except for the factor ranked third, were close to 1, indicating that the responses were close to the mean (Rumsey, 2010). In other words, respondents had related opinions. The overall average MIS was 3.85 and the average SD 0.916. This suggests that respondents can be deemed to have had similar views regarding the motivators stated for H&S implementation, although having high and low rankings.

5. Discussion

The three top-ranked drivers, namely: the need to manage hazards, the importance of H&S and compliance with the legislation indicate that the sampled construction organisations are, in practice, mindful of the fact that the implementation of H&S in their work practices, through managing hazards in the workplace, provision of correct personal protective equipment (PPE), and so on, would reduce accidents. According to Aviva (2011) and the British Safety Council (2014), an employer investing in their employees’ H&S leads to a far more productive workforce (due to protection) and invests in success of the entire organisation, and thus improves quality, productivity and profitability in the long run.

The finding that improved quality, productivity and profitability ranked the least could indicate that the organisations included in the study did not really view H&S implementation as a means of improving profit margins (only). The responses of the sampled personnel regarding these drivers reflected a “neutral” stance, as shown by the mean score just above 3.0, indicating that these

factors may not be the underlying reasons why they implement H&S in the organisations. This finding is partly consistent with results in Smallwood (2004), which rated project parameters that were affected by poor H&S and found that quality is mostly affected. However, productivity and profitability ranked the least in that study, corresponding with findings in the current study. On the contrary, this finding that improving productivity was not deemed an important motivating factor does not align with studies which have shown that poor H&S reduces productivity and worker performance levels (Lingard, 2013; Wachter & Yorio, 2014).

In another study by Smallwood et al. (2009), it was found that productivity and quality were mostly affected by poor implementation of H&S. This suggests that productivity and quality were viewed as top reasons for H&S implementation. This is inconsistent with findings from the current study which determined that the need to manage hazards and regarding H&S as important were the top two drivers of H&S implementation.

The findings of the current study may have been slightly different because there is increased awareness of H&S performance in the construction industry and organisations are conscious of the fact that there is a need to focus on managing hazards and preventing accidents through compliance, rather than focusing on widening profit margins. This view was supported in Chiocha, Smallwood, and Emuze (2011), which acknowledged that legislations have an impact among project managers and contractors in particular, and on reducing accidents, but implied that the influence of legislations may be reactive rather than proactive. Issues relative to H&S should become business priorities and this will provide a platform for H&S improvement without the need to constantly change laws (Chiocha et al., 2011). In essence, this mind set will increase profitability and productivity (Muiruri & Mulinge, 2014).

Additionally, the findings that the need to manage hazards and provide a safer workplace for the workers is the most important motivating factor is consistent with the results from Chileshe and Dzisi (2012) conducted in Australia. On the other hand, preserving the image or reputation of the company was not deemed very important as it ranked sixth among the factors considered. This is different from the results in Chileshe and Dzisi (2012) which found that company reputation was one of the most important benefits of H&S management among design organisations. The difference in results may be as a result of the population sampled. In Chileshe and Dzisi (2012), designers whose future engagements may be dependent on past record and reputation, may deem this factor to be more significant, as opposed to site managers, contracts managers, site agents and contractors sampled in the present study.

6. Conclusion

Research on H&S implementation within the construction industry is critical as construction organisations continue to strive to improve their H&S performance on projects. This birthed the interest in the current study which sought to investigate the motivators of H&S implementation in construction organisations. The objective of the study was met. It was found that the need to manage hazards, regarding H&S as important and compliance with the legislation were the most important factors that motivate construction organisations to implement H&S. On the other hand, improvement in quality, productivity and profitability were the least important H&S implementation motivators.

With the current study findings, it can be said that the construction organisations sampled are driven more by the need to improve safety performance and importance of H&S of their employees, than by making profits. Therefore, organisations should continuously pay attention to managing hazards and preventing accidents through compliance.

The current study provides useful information to assist construction organisations to pay more attention to H&S implementation. However, the drivers included in the study may not be exhaustive and the data analysis methods used may not have been rigorous enough to draw more concrete conclusions. Further research could employ other research methods such as qualitative or mixed

methods to obtain more in-depth information regarding these H&S implementation drivers. Further, more sophisticated and rigorous techniques could be employed in data analysis to reach more concrete conclusions.

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Author details

Jacobus H.F. van Heerden¹

E-mail: drixvh@gmail.com

Innocent Musonda¹

E-mail: imusonda@uj.ac.za

ORCID ID: <http://orcid.org/0000-0001-7774-4137>

Chioma S. Okoro¹

E-mail: chiomasokoro@gmail.com

ORCID ID: <http://orcid.org/0000-0001-5377-6054>

¹ Department of Construction Management and Quantity Surveying, University of Johannesburg, Corner Siemert and Beit Street, Doornfontein 2028, Johannesburg, South Africa.

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