International Journal of Development and Sustainability
ISSN: 2186-8662 – www.isdsnet.com/ijds
Volume 15 Number 2 (2026): Pages 240-257
https://doi.org/10.63212/IJDS25092902

Occupational accidents and financial performance: Fatalities and injuries in JSE-listed high-risk firms

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Abstract

Occupational injuries and fatalities pose a serious global challenge in high-risk firms, with potential consequences for companies' operational stability and financial performance. This study employs panel data derived from annual reports to examine the association between injury frequency rates and firm financial performance among 58 high-risk firms listed on the Johannesburg Stock Exchange over the period 2015–2023, while controlling for firm size, firm age, and board independence. Using pooled OLS with year fixed effects and robust standard errors, the results show that the injury frequency rate is negatively and statistically associated with earnings per share, suggesting that occupational injuries lead to immediate operational disruptions and compensation costs that reduce firm profitability in the short run. However, study underscores the limitations of short-term accounting indicators in explaining delayed reputational, legal and regulatory economic costs of fatalities incidents, especially in larger and well-resourced companies where such costs may be deferred. The findings provide actionable insights for firm managers to implement occupational safety practices that prevent on-site accidents without anticipating immediate financial benefit. Policymakers should encourage investment in workplace safety through tax incentives for firms demonstrating strong workplace safety performance. This research suggests enhanced regulatory oversight and monitoring of occupational health and safety management systems (OHSMS) in high-risk companies as short-term profitability does not seem to encourage safe working conditions.

Keywords: Fatality Frequency Rate (FFR); Injury Frequency Rate (IFR); Occupational Health and Safety Management System (OHSMS); Johannesburg Stock Exchange

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Cite this article as: Madwe, M.C. and Nzuza, Z.W. (2026), "Occupational accidents and financial performance: Fatalities and injuries in JSE-listed high-risk firms", *International Journal of Development and Sustainability*, Vol. 15 No. 2, pp. X-X.

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1. Introduction

Occupational safety is becoming a global concern, with approximately 2.78 million workers dies annually from accidents worldwide (United Nations Global Compact, 2022; Wienharten et al., 2025). Beyond the social costs, occupational accidents impose substantial financial burdens on firm performance through compensation costs, production disruptions, insurance costs, reputational damage and regulatory penalties, all of which can negatively impact firm financial performance (Dai et al., 2022). The international labour organisations (ILO) estimates that 2.78 million workers die each year from occupational accidents, with an additional of 374 million workers experiencing accidents (ILO, 2020). It is estimated that poor occupational safety measures are responsible for 198 000 workplace accidents, with additional 22 000 occupational diseases being contracted per year in South Africa (Honeyman, 2024). According to Department of Employment and Labour (2024), these high-risk sectors continue to account for a disproportionate share of occupational accidents, with compensation claims exceeding R20 billion paid since 2019. This indicates significant financial implications for occupational accidents. The accidents compensation costs associated with these accidents indicate costs borne by employes and signal production disruptions, reputational harm, and decline in profitability.

These challenges are especially acute in high-risk firms such as manufacturing, construction, mining, retails and transportation, which play an important role in economic development, while exposing workers to unsafe working conditions (Haas and Yorio, 2021; Muthelo et al., 2022; Marimuthu et al., 2023; Bao et al., 2024). Occupational health and safety (OHS) refer to firm policies and practices develop to prevent work-related injuries, illnesses and fatalities and to ensure well-being of all employees (Jonathan and Mbogo, 2016). OHS has emerged as important element of social pillar of environmental, social and governance (ESG) performance. As results, companies increasingly disclosing workplace safety performance using standard indicators such as the fatality frequency rate (FFR) and injury frequency rate (IFR), consistent with Global Reporting Initiative (GRI 403) guidelines (Melchior and Zanini, 2019; Ramos et al., 2020; Taibi et al., 2025). These measures support comparability across firms and industries.

In South Africa, limited studies have analysed the association between occupational accidents and firm financial performance. High-risk firms continue to account for a disproportional share of occupational injuries and fatalities, together with significant compensation payouts and ongoing regulatory concerns (Department of Employment and Labour, 2024). At firm level, occupational accidents costs may be immediate, such as medical expenses and lost working hours, or delayed, such as litigation, enforcement actions and reputational damage. However, the extent to which workplace accidents affect firm performance remain underexplored, particularly in South African high-risk companies listed on Johannesburg Stock Exchange (JSE).

Despite the largely preventable nature of many workplace accidents, companies may be reluctant to invest in OHS, when financial gains are considered as uncertain or long term (Da Silva et al., 2021; Zondo, 2021). While substantial research explores OHS's impact on productivity, absenteeism, and EGS-linked performance (Adu-Gyamfi et al., 2021), the direct association between OHS metrics (e.g., injury/fatality rates) and firm financial performance remains underexplored, particularly in emerging countries. Although limited African studies suggest OHS improves firm performance (Shabani et al., 2023), broader evidence is inconsistent, with some studies report positive link (Bautista-Bernal et al., 2024; Xuanyu et al., 2023), while other show null (Kalemba, 2017) or even counterintuitive relationship where low-cost accidents may boost profitability (Forteza et al., 2017; Estudillo et al., 2024). This ambiguity, coupled with Africa's unique regulatory and

resource constraints, necessitates context-specific analysis. This study addresses this gap by empirically investigating the OHS-FP nexus among high-risk firms on the Johannesburg Stock Exchange (JSE).

This study aims to fill this gap by offering comprehensive understanding from South African high-risk firm by analysing association between occupational accidents and firm financial performance. Thus, study add another strand to the existing literature by empirically exploring the effect of injuries and fatalities accidents on firm performance.

2. Literature review, hypothesis and theoretical framework

2.1. Theoretical framework

This paper adopts a multi-theoretical framework to analyse the association occupational safety and health on financial performance measured my earnings per share (EPS). Each theory contributes a distinct prediction approach, enabling for differentiated expectations across accident types. Agency, stakeholder, institutional theory and resource-based view (RBV) are treated as complementary lenses that operate through different mechanisms influencing occupational health and safety (OHS) decision and firm financial performance. These theories are applied to offer a comprehensive understand on how occupational accidents are associated with firm financial performance.

Agency theory highlights conflicts arising when managers prioritise short-term profits over long-term OHS investment. In high-risk firms, managers may underinvest on safety protocols to minimise operational expenses and inflate short-term firm profitability at the expense of employee welfare, particularly in firms with weak regulated environment (Melchior and Zanini, 2019; Zungu et al., 2024). Occupational health and safety investments involves upfront costs, although their financial benefits may be uncertain or delayed. In these cases, executives may tolerate unsafe working conditions if accident-related cost do not immediately affect firm profitability.

Stakeholder theory highlights the role of that companies' relationship with employees, customers, suppliers, regulators, investors and local communities. From Stakeholder theory perspective, workplace safety is a critical element of firm corporate social responsibility, directly impact employees and local communities, thereby influence company's social acceptance and legitimacy. Investment in OHS signal ethical commitment, theoretical mitigating workplace accidents, fostering employee trust and safeguarding reputation, ultimately contributing financial performance (Zumente and Bistrova, 2021; Madwe et al, 2025a). According to this theory, poor workplace safety practices can cause negative stakeholder responses such as regulatory scrutiny, labour disputes, firm reputational damage, and investor concern. These stakeholder reactions may increase costs, reduce productivity or limit access to capital. This theory predicts that workplace accidents, especially injuries that occur frequently, are likely to be linked with reduced firm financial performance. However, financial implications of fatalities may be contingent on the intensity of stakeholder and regulatory pressures and social responsibility measures.

Resource-based review (RBV) considers occupational safety mechanisms as firm's valuable, inimitable and resource that can contribute to improved firm's competitive advantage. Effective workplace safety practices, such as employee safety training and education and robust OHS safety culture reduce operational disruptions, improve worker moral and improve firm productivity, thereby enhance firm financial performance (Martin-

de Castro, 2021). However, RBV also acknowledges that sustaining occupational safety demands substantial investment, which may reduce firm profitability in the short run. Therefore, financial gains of workplace safety may only translate into financial benefit gradually, creating a gap between firm performance and firm performance.

Institutional theory argues that companies adopt practices to conform to regulatory, normative and cognitive pressures. OHS investment are often influenced by labour law (coercive pressure), industry standard (mimetic pressures), or professional norms (normative pressures). In firm, where social responsibility enforcement is strong and penalties for non-compliance are substantial, companies realise financial benefits to invest in occupational safety mechanisms (Adu-Gyamfi et al., 2021).

This theory emphasises that under certain circumstances, company may implement workplace safety measures for compliance reasons rather firm-value creation, thereby reducing the immediate financial benefits. This theory posits that financial benefits of workplace accidents depend on firm's regulatory, stakeholder and normative pressure. In case where, regulatory pressure is weak, workplace accidents may have insignificant impact on firm performance.

These theories collectively suggest that the association between occupational safety and firm financial performance is context dependent and may vary between accident types. Workplace injuries that happen frequently and disrupt daily operations are more likely to impact short-term firm profitability. While severe fatalities may affect firm performance in the long run.

These theories support the study focus on injury and fatality rates as distinct measures of occupational safety and offers a theoretically foundation for exploring their association with firm profitability in high-risk companies listed on the JSE. Notably, these theories do not assume a uniform or immediate financial benefits of implementing occupational safety mechanisms but instead enables for comprehensive and potential different associations across divergent accident types and firm contexts.

2.2. Literature review and hypothesis development

Employee safety and health refer to the measures in place to prevent accidents, injuries, illnesses and hazards in the workplace ensuring well-being of all employees (Jonathan, 2016). Occupational safety and health (OSH) measures are indispensable to safeguarding employee safety and health (Frykman, Lundmark, von Thiele Schwarz et al., 2018). How well employees can be protected from workplace harm is largely dependent on firms' investment in OSH (Melchior and Zanini, 2019; Ramos et al., 2020). It is estimated that poor occupational safety measures are responsible for 198 000 workplace accidents, with additional 22 000 occupational diseases being contracted per year in South Africa (Honeyman, 2024). OHS is frequently measured using quantitative indicators such as the fatality frequency rate (FFR) and the injury frequency rate (IFR) (Emani, 2017).

FFR captures the incidence of total accidents relative to overall labour exposure and is widely recognised as key element of employee welfare monitoring, consistent with the Global Reporting Initiative (GRI 403) guidelines (Taibi, Hamaidi, Zerrouki and Chergui, 2025). The IFR, on the other hand, measures the number of non-fatal injuries per on million hours worked and serves as a proxy for operational safety culture and preventive measure in place (Bayona et al., 2024). Several studies have adopted these indicators to explore the

relationship between OSH and financial performance. For example, Emami (2017) and Taibi et al., (2025) used IFR to assess the relationship between workplace injuries and profitability. Similarly, Taibi et al. (2025) employed FFR to evaluate safety outcomes in Japanese construction companies. Although workplace accidents are normally preventable, many companies remain hesitate to invest in occupational safety and health (OSH) measures. This reluctance is often driven by the perception that the financial benefits from such investment are minimal or uncertain (Da Sivla et al., 2021). Nevertheless, several researchers suggest that costs associated with accident, injuries and fatalities surpass the expenses required to implement effective safety measures (Zondo, 2021).

There substantial body of empirical studies have investigated the economic implications of occupational accidents and injuries (Forteza et al., 2017; Frykman et al., 2018; Nanjunda, 2020). Much of this prior research has predominantly focused on the impact of employee safety and health on employee productivity, absenteeism, or general organisational performance (Adu-Gyamfi et al., 2021; Shabani et al., 2023). Furthermore, within the broader context of firm social sustainability, there is increasing academic interest in the association between ESG scores, especially the social pillar and financial performance. Despite this growing focus, the direct relationship between workplace safety and health and firm FS remains under-investigated, especially in developing economies.

A limited number of scholars have attempted to investigate this relationship in the African context. Adu-Gyamfi et al. (2021) explored the impact of health and safety practices on performance of Ghanaian universities and revealed a significant positive relationship. Similarly, Shabani, Jerie and Shabani (2023) found that OSH practices improved employee productivity and overall firm performance. Nevertheless, their study also underscored the challenges faced by developing countries, such as limited resources, lack of training and regulatory weakness that constrain the successful implementation of OSH systems. Outside of Africa, several scholars support the positive link between OSH and financial performance, for example, Bautista-Bernal, Quintana-Garcia and Marchante-Lara (2024) reported that safety management systems positively influenced FS in China, Yang, Lin and Maresova (2021) observed that pharmaceutical firms integrating OSH standards experienced enhanced profitability. Similarly, Xuanyu, Suxia, Qiang, Jingjing (2023) found that disclosing workplace safety information had a favourable impact on financial performance in high-risk industries listed on the Shenzhen Stock Exchange.

Nonetheless, results across the existing literature are inconsistent and sometimes contradictory. For instance, Kalemba (2017), in a study of the airline industry, found no significant relationship between safety practices and financial performance. This indicates that employee safety and health investment may not always yield financial benefits, especially in firms where safety is already high regulated. Moreover, Forteza, Corretero-Gomez and Sese (2017) investigated accident rates and financial performance across 272 construction firms in Spain. Their study a complex, non-linear relationship, whereby profitability increased alongside accidents rates when the total cost of accidents was relatively low. This counterintuitive finding implies that low-cost accidents may reduce the incentive for firms to invest in safety, especially in competitive industries. In recent years, Estudillo, Carretero-Gomez and Forteza (2024) studies the association between occupational accidents and a firm's profitability in construction sectors, also found a positive relationship.

Despite these developments, there is a noticeable gap in research within South Africa, particularly among higher-risk firms listed on the JSE, sector that plays a crucial role in attaining national sustainable development

goals. Although a few African studies have attempted to fill gap, these are geographically limited and do not adequately reflect the unique regulatory, economic and environmental contexts of South Africa industry. Furthermore, across the African continent, research on the relationship between OSH practices and firm FS remains sparse and fragmented.

This gap highlights the need for the current study, which seeks to explore the link between OSH, especially workplace safety and FS within higher-risk firms listed on the JSE.

Given the immediate operational and compensation costs associated with injuries, this research anticipates IFR to be negatively associated with EPS. For fatalities, the study expects negative association, however, the short-term accounting may be weaker due to rarity and delayed costs channels. Therefore, following hypothesis is proposed:

Main-Hypothesis 1(H1): Occupational accidents associated with firm financial performance. The following two sub-hypotheses were formulated from main hypothesis:

- *H1a:* Workplace fatality frequency rate is negatively associated with EPS
- *H1b:* Workplace injury frequency rate id negatively associated with EPS.

3. Material and methods

This study employed quantitative explanatory research methods to explore the causal association between occupational accidents and financial performance measured by earnings per share (EPS). The analysis was performed using ordinary least squares (OLS) regression method, which is suitable for addressing issues of heteroskedasticity and autocorrelation in panel data (Pham et al., 2022; Lemana et al., 2025). The OLS improves accuracy and reliability of parameter estimation in the presence of these common econometric problems (Fang et al., 2024).

A longitudinal panel covering a period of nine years (2015-2023) was employed. The panel data includes 58 higher-risks companies listed on the JSE. The study time frame was selected to ensure that recent ESG trend is captured, from 2015 the date when ESG performance was adopted in Paris Agreement. Longitudinal panel design was employed to observe changes and trends in occupational accidents and their impact on EPS over time.

Table 1. High-risk firms included in the sample

Sector	**Number of companies per sector**	**50% of the top companies in the population**	**Included in the sample**
Basic Material/Mining	45	50%	23
Consumer Goods	20	50%	10
Industrial	46	50%	23
Oil & Gas Production	3	50%	2
Total	**114**	**50%**	**58**

The study employs a purposive sampling approach based on market capitalisation, with the top 50% of firm within each high-risk sector included to ensure economic relevance and data availability. Table 1 details the sectoral composition of the population, the selection criterion applied, and the number of firms included in the sample.

Financial data was extracted from companies' financial statements, which is widely used by researchers and is esteemed for its reliability (Gholami et al., 2022). Data on occupational accidents was sourced from companies' sustainability/ESG reports.

3.1. Empirical econometric model

This study adopted OLS regression model to explore the association between occupational accidents and financial performance. OLS is widely employed to estimate the relationship between social performance and firm performance (Zhang et al., 2025). This estimate technique is appropriate given the nature of the study's data. The OLS regression model is specified as follows:

$$EPS_{it} = \alpha + \beta_1 FFR_{it} + \beta_2 IFR_{it} + \gamma_1 SIZE_{it} + \gamma_2 AGE_{it} + \gamma_3 BI_{it} + \varepsilon_{it} \quad \text{.....Equation (1)}$$

where:

EPS_{it} denotes EPS of firm i at t, α represents the constant term, $\beta_1 - \beta_2$ are the estimated coefficients measuring the marginal effects of FFR and IFR; γ_1 -γ_2 are the coefficients associated with the control variables SIZE, AGE and BI; ε_{it}*: Error term.*

3.2. Variable measurements

Following prior research occupational accidents (independent variables) are measured using fatality frequency rate (FFR) and injury frequency rate (IFR). The FFR and IFR are widely employed to investigate the impact of occupational accidents on financial performance (Forteza et al., 2017; Frykman et al., 2018; Nanjunda, 2020). Accidents rates are calculated using reported number of fatalities and injuries, combined with estimated total hours of work. Total hours worked were estimated derived from reported number of employees, assuming 52 working weeks per year and 40 working hours per week and standardised per one million hours worked. This variable is used to measure social performance in ESG research.

The financial performance measured by earnings per share (EPS) is a dependent variable. The EPS is used as accounting -based measures, as there has been a notable deficiency in research conducted in South Africa on the association between occupational accidents and financial performance (Amahulu and Okudo, 2023, An and Albattat, 2023).

Consistent with previous studies, this research uses control variables to address specification bias to enhance regression estimation. These variables are firm size (SIZE), firm age (AGE) and board independence (BI). The variables are presented in detail in Table 2.

Table 2. Description and measurement of variables

	Independent Variables		
Variable	**Description**	**Formula**	**Prior research**
FFR	Measures the number of workplace fatalities per million hours work by employees and contractors	FFR $\frac{Number\ of\ Fatalities}{Total\ Hours\ Worked}\ x\ 1\ M$	Melchior and Zanini (2019);Ramos, Afonso and Rodrigues (2020); GRI 403
IFR	Measure the number of workplace injuries per million hours worked	IFR $\frac{Number\ of\ Injuries}{Total\ Hours\ Worked}$ x 1 M	Melchior and Zanini, (2019);Ramos, Afonso and Rodrigues (2020);
Dependent Variable			
EPS	Measures shareholder value and firm profitability on a per-share basis	EPS $\frac{Net\ Income - Preference\ Dividends}{Weighted\ Average\ number\ of\ Shares}$	Setyaningsih and Wibowo (2024); Chawarura, Sibanda and Mamvvura (2025)
Control Variables			
SIZE	Measures firm scale and resource capacity, indicating the company's ability to invest in safety practices	Natural logarithm of total assets	Li, Tang and Li (2024); Madwe, Nzuza and Olarewaju (2025b)
AGE	Captures company maturity and accumulated operation experience, which may impact firm safety culture	Number of years firm in operation form its inception up to year of the study	Eltahir, Taha, Alnor, Adam and Musa (2025)
BI	Captures the strength of board monitoring and governance quality through the presence of non-executive director	The ratio of the number of independent directors to the number of all directors	Mashele, Mouton and Pelcher (2023)

where:

FFR_1: Fatality frequency ratio (time-varying and invariant regressor); IFR_2: Injury frequency ratio (time-varying and invariant regressor). EPS: Earning per share.

Number of Fatalities: Total work-related fatal injuries due to all causes recorded for both employees and contractors. Total hours worked: Total employees work hours in reporting period (52 week per year x 40 hours per week x number of employees); 1 000 000: Standardisation factors (per million hours worked. 1M: 1 000 000.

4. Findings and discussions

4.1. Descriptive analysis

The descriptive statistics in table 2 provide an overview of relationship between fatality frequence rate (FFR), injury frequency rate (IFR) and earning per share of higher-risk companies listed on the JSE. Descriptive results show a significant variability in EPS with minimum of -69,91 and standard deviation of 13.99, this suggests inconsistency in earning distribution across the sample. In terms of fatalities, the descriptive statistics indicate that fatal accidents are infrequent, but they exist, with FFR average of 0.0362. This is a concerning result over workplace safety in high-risks firms such as mining, construction, oil and gas and manufacturing. There is a significant disparity across the sample in maintaining workplace safety, as IFR averages 0.112, with a maximum of 1.60. These findings show that higher-risk companies may not adequately provide basic staff protection against occupational accidents, and matter directly impact sustainable development goal (SDG) 8 (decent work and economic growth).

Table 3. Descriptive statistics

Variable	Obs	Mean	Std. dev.	Min	Max
EPS	522	5.780411	13.99408	-69.91	147.45
FFR	522	0.036245	0.047637	0	0.254728
IFR	522	0.111968	0.247576	0	1.60368
SIZE	522	56.22	51.92	6.99	138
AGE	522	10.83	0.84	9.39	12.02

4.2. Pairwise correlation

Table 3 offers preliminary insight into the direction and strength of relationship between occupational accidents (FFR and IFR) and financial performance (EPS). Table 3 shows a positive and statistically significant relationship between fatality frequency rate and earnings per share ($r=0.225$, $p<0.001$). This is a surprising and unexpected finding that earnings per share continue to rise despite the increasing number of accidents in firms operating in hazardous sectors. SIZE is also positively associated with EPS ($r=0.1874$, $p< 0.05$), indicating that larger firms may absorb workplace accidents costs compared to smaller companies. However, this may

suggest that occupational safety strategies alone may not adequately explain firm financial performance. AGE association with EPS, highlighting accumulated operational experience that support firm profitability.

The weak negative relationship was observed between IFR and EPS (r= -0.0541), but this relationship is not statistically significant (p-value=0.2169). The study shows that larger companies have fewer injuries, possible because of well-established occupational safety mechanisms. The negative association between AGE and IFR, indicates that more mature firm are well equipped to mitigate injury rate. The positive association between BI and EPS underscore the importance of governance quality in influencing firm financial performance.

Table 4. Pairwise correlation

Variables	EPS	FFR	IFR	SIZE	AGE	BI
EPS	1					
FFR	0.2250***	1				
	0.0000					
IFR	-0.0541	-0.0189	1			
	0.2169	0.6662				
SIZE	0.1874**	-0.0416	-0.1328***	1		
	0.0134	0.3417	0.0018			
AGE	0.1642*	-0.0289	-0.1095**	0.3721***	1	
	0.0728	0.5074	0.0189	0.000		
BI	0.2146***	-0.1763**	-0.2018***	0.1467*	0.1189**	1
	0.0000	0.0246	0.0000	0.0812	0.0165	
Note: ***, **, and * indicate 1%, 5% and 10% significance levels, respectively.						

4.3. Regression analysis

Table 5 presents OLS regression findings conducted exploring the association between occupational accidents and financial performance. The financial performance (EPS) is regressed against the FFR and IFR, together with firm control variables. Prior to interpretation of regression results, diagnostic tests were performed to assess the validity of the model. The Breusch-Pagan test was conducted to examine the presence of heteroskedasticity under the null hypothesis of constant variance. This test (χ^2 = 172.36, p = 0.000) indicates rejection of null hypothesis, confirming the presence of heteroskedasticity and justifying the use of robust OLS estimates. The study also applied Driscol-Kraay standard errors to address serial correlation and cross-sectional dependence. This test strengthens the reliability of statistical inference without changing coefficient estimates. The variance inflation factor (VIF) was applied to assess and address multicollinearity. Following Ojejinka and Matemane (2024), VIF values exceeding 10 or a mean VIF above 2 suggest multicollinearity concerns. Al variable shows VIF values below 2, and with a mean VIF of 1.16, confirming a low degree of multicollinearity.

Table 5 shows that overall regression model is statistically significant (F(4,516) = 7.31, p < 0.001), with an R-squared value of 5.36%. This indicates that workplace accidents indicators explain a moderate proportion

of the variance in EPS, confirming that firm profitability is largely influenced by broader structural and market-related factors.

Regression findings show a positive statistically significant coefficient for FFR in both simple OLS (β =66.05, p =0.002) and robust OLS (β = 34.42, p < 0.001) and remains positive and statistically significant when Driscoll-Kraay standard errors are applied (β= 3.28. p < 0.01). The significant reduction in coefficient by 31,63 (66,05-34.42) in robust OLS indicates the problem of heteroskedasticity or outliers. However, the persistence of significance even if Driscoll-Kraay applied highlights that association is not shaped by serial correlation or cross-sectional dependence. Firm characteristics, such as scale of operations, capital intensity, governance quality may explain why firm financial performance remains strong despite the occurrence of fatalities. The positive association between SIZE and BI support this view, highlighting that larger and better-governed firms have ability to absorb the short-term costs associated with fatal incidents.

Consequently, these results challenges stakeholder and legitimacy theories, that posit that occupational safety mechanisms are anticipated to improve investors trust, employee welfare and enhance social legitimacy, thereby improving firm financial performance by enhancing employee welfare and operational continuity. The findings also question RBV assumptions which consider employee safety measures as valuable, inimitable and rare resource creating competitive advantage, and ultimately enhance financial performance. These results are inconsistent with previous studies such as Shabani, Jerie and Shabani (2023), who found a positive relationship between number of accidents and firm financial performance. These scholars found that firm profitability starts to decrease after reaching a considerable number of occupational accidents. However, these findings align Da Silva et al. (2021) and Xuanyu et al. (2023) who demonstrated that workplace accidents increase costs and reduce profitability.

In contrast, the IFR shows a statistically significant negative relationship with EPS under robust OLS (β = −2.395, p < 0.001). This suggests that higher injury rates are associated with lower firm profitability once heteroskedasticity is accounted for. This indicates that workplace injuries generate immediate operational disruptions, compensation costs and production loses that reduce short-term firm profitability. These findings are consistent with those of Argiles-Bosch, Garcia-Blandon and Ravenda (2022), Moon, Ikeda-Araki and Mun (2025) who found that occupational accidents negatively impact firm financial performance.

Among control variables SIZE, AGE and BI show positive association with EPS, while have a negative association with IFR. This highlights the importance of organisational maturity and governance quality in reducing occupational injuries. However, this indicates that even larger, better governed and older companies experience financial losses when injuries happen, indicating the immediate and unavoidable economic costs of occupational injuries. The results support stakeholders, legitimacy and RBV theories that argue that safety working conditions serve as strategic assets and operational license that enhance competitive advantage, thereby leading to firm financial performance.

Overall, these results reveal that workplace injuries exert a negative impact on firm profitability. This suggest that inherent profitability of firm operating high-risk sectors, however, occupational fatalities do not show a negative association with EPS. These results do not suggest that workplace fatalities are financially beneficial, rather shows the limitations inherent in short-term accounting indicators and OLS regression estimation in assessing full financial consequences of fatal incidents. The control variables show that other variables may explain firm profitability in high-risk companies, not only occupational accidents.

Table 5. Ordinary Least Squares (OLS), Robust regression, Driscoll-Kraay and VIF on EPS

EPS	**Ordinary Least Squares**		**Robust regression**		**Driscoll-Kraay**
	Coefficient	P>t	Coefficient	P>t	Coefficient
FFR	66.04808	0.000	34.4211	0.000	3.281***
IFR	-2.517853	0.315	-2.394981	0.000	-2.112***
SIZE	1.1623	0.021	0.8427	0.033	0.801**
AGE	0.4026	0.084	0.2914	0.097	0.254*
BI	4.3159	0.004	3.6128	0.006	3.487***
Number of obs	522		522		522
F (4, 517)	7.31		8.52		6.94
Prob > F	0.000		0.000		-
R-squared	0.0536		-		
Adj R-squared	0.0462		-		
Root MSE	19.335		-		
Test for multicollinearity - VIF			**Breusch-pagan (BP) test**		
	Coefficient	P>t	Assumption: Normal error terms		
FFR	1.07	0.934934	Variable: Fitted values of EPS		
IFR	1.04	0.962223	H0: Constant variance		
SIZE	1.18		chi2(1) = 172.36		
AGE	1.29		Prob > chi2 = 0.0000		
BI	1.21				
Mean	**1.16**				

4.4. Robustness check

Table 6. Pooled OLS with year fixed effects and robust standard errors

Variable	**Coefficient**	**Robust p-value**
FFR	3.108	0.002
IFR	-2.214	0.001
SIZE	0.791	0.041
AGE	0.268	0.112
BI	3.487	0.009
Year fixed effects		
Constant	-11,603	0.141
Model statistics		
Observations	522	
F-statistic	7.94	
Prob> F	0.000	
R-squared	0.071	

Table 6 assesses the robustness of OLS results to time-specific macroeconomic shocks, the model was re-estimated including year fixed effects. The inclusion of year dummies does not significantly change the main results. The IFR remains negatively and statistically associated with ESSP, indicating that injuries exert immediate negative impact on firm profitability. The FFR also continues to show positive association. Therefore, the consistency of association supports the robustness of the OLS.

5. Conclusions and recommendations

The aim of the study was to investigate the association between occupational accidents measured by FFR and IFR and financial performance proxied by EPS among 58 high-risk companies listed on the JSE. The findings show a positive statistical relationship between FFR and firm financial performance, while IFR reveal as statistical negative association with firm financial performance. Importantly, the positive association between FFR and EPS does not imply that occupational incidents improve firm financial performance. Instead, it suggests that in high-risk industries, short-term accounting measures may remain strong despite poor OSH mechanisms, especially in better-governed and larger companies that can absorb costs associated with workplace accidents. Therefore, Hypothesis H1a, which postulates a negative effect of workplace fatalities on firm profitability, is not empirically supported.

Contrarily, the findings reveal a statistically significant negative impact of occupational injuries (IFR) on EPS, offering string support for Hypothesis H1b. These results align with prior research such as Shabani, Jerie and Shabani (2023), found that unsafety working conditions negatively impact firm financial performance. This empirical evidence indicates that companies prioritizing injury prevention and employee safety are more likely to improve firm earnings, supporting existing studies that position occupational safety as a crucial element of operational efficiency and firm performance.

Overall, the results indicate a discrepancy between short-term accounting measures and the broader economic consequences of workplace accidents. Although study reports immediate negative impact of injuries on firm profitability, the financial effect of fatalities may materialize in the long run through firm reputational damage, regulatory sanctions, and erosion of stakeholder trust, all of which may not be adequately measured by short-term accounting indicators such as EPS. The low average fatality rate (0.0362) observed in the sample, highlighting rare fatalities, may explain insignificant impact of occupational fatalities on the short-term firm financial performance in high-risk companies listed on the JSE. The firms must not be complacent even in the absence of the immediate impact of fatalities on firm financial performance, because firm reputational damage, legal claims and production disruptions can have a delayed but severe effect in long run.

This research contributes the body of knowledge by positioning occupational accidents as pillar of social performance, an area that limited investigated in South Africa. Therefore, this study offers comprehensive understanding on how workplace accidents as critical pillar of social sustainability influence firm financial performance of high-risk companies listed on the JSE.

The implications of this study are far-reaching and have significant suggestions for policy and practical implications. Firstly, policymakers should only rely on firm financial performance as an indicator of responsible workplace health and safety (OHS) practices. Instead, the findings encourage strong regulatory oversight and enforcement, particularly by the Department of Employment and Labour, to support compliance with OHS standards despite their financial consequences. Although this research does not assess specific policy

instruments, the results suggest proactive investment in injury prevention such as tax capital allowances for technological safety equipment, training and education programs that support improved workplace safety. However, OHS mechanisms should be considered as risk management mechanisms rather than as instruments for immediate financial benefits. Secondly, investors should integrate occupational safety performance together with governance mechanisms in investment assessments, especially in high-risk firms where the economic costs of workplace accident may not be immediately reflected in firm profitability.

The study has several limitations that should be acknowledged. Firstly, the use of earnings per share (EPS) that captures only short-term firm financial performance may not fully measure long-term financial implications of workplace accidents. Therefore, the costs of firm's reputational damage, regulatory penalties and loss of social acceptance and legitimacy associated with fatalities often materialize over long periods and may not be immediately captured in short-term accounting indicators. Therefore, future studies could use market-based indicators such as Tobin's Q (TQ) to measure long-term financial implications of occupational accidents. Secondly, the sample is confined to 58 high-risk companies listed on the JSE, limiting generalizability of the findings to other sectors. Future research should expand the sample by including lower risks or cross-country comparisons. Finally, the reliance pooled OLS estimation with the Breusch-Pagan test as only test to assess the presence of heteroskedasticity, enables researchers to offer initial insights on the association between these variables. However, these estimates do not correct problem of heteroskedasticity, serial correlation and unobserved firm-specific heterogeneity. This also limits causal inference. Future studies should consider including advanced econometrics models, such as quantile regression, fixed effects (FE) or random effects (RE) models, two-step system GMM that can reveal more comprehensive impact of occupational accidents on firm financial performance.

References

Adu-Gyamfi., He, Z., Nyame, G., Boahen, S. and Frempong, F. (2021), "Effects of internal CSR activities on social performance: The employee perspective", *Sustainability* 2021, Vol. 13 No, 11, p. 6235. https://doi.org/10.3390/su13116235

Amahalu, N.N. and Okudo, C.L. (2023), "Effect of corporate social responsibility on financial performance of quoted oil and gas firms in Nigeria", *Research Journal of Management Practice,* Vol. 3 No. 3, pp. 25-38.

An, R. and Albattat, A.R.S. (2023), "Examining the effect of corporate social responsibility on financial performance in China: Agency cost as mediator", *International Journal of Professional Business Review,* Vol. 8 No. 6. https://doi.org/10.26668/businessreview/2023.v8i6.1399

Argiles-Bosch, J.M., Garcial-Blandon, J. and Ravenda, D. (2022), "Labour accidents and financial performance: Empirical analysis of the type of relationship in the Spanish context", *International Journal of Occupational Safety and Ergonomics,* Vol. 28 No. 2. https://doi.org/10.1080/10803548.2020.1851921

Bautista-Bernal, I., Quintana-Garcia, C. and Marchante-Lara, M. (2024). "Safety culture, safety performance and financial performance: A longitudinal study", *Safety Science,* Vol. 172. https://doi.org/10.1016/j.ssci.2023.106409

Bayona, A., Moyen, H., Hallowell, M.R. and Bhandari, S. (2024), "Exploring the hypothesized mechanisms by which serious injuries and fatalities impact business performance", *In Construction Research Congress 2024* (pp. 565-574). https://doi.org/10.1061/9780784485293.057

Bao, X., Sadiq, M., Tye, W. and Zhang, J. (2024), "The impact of environmental, social, and governance (ESG) rating disparities on corporate risk: The mediating role of financial constraints", *Journal of Environmental Management,* Vol. 371. https://doi.org/10.1016/j.jenvman.2024.123113

Chawarura, W.I., Sibanda, M. and Mamvura, K. (2025), "An assessment of the roles of the government, regulators, and investors in ESG implementation in South Africa", *Adm. Sci.,* Vol. 15 No. 6. https://doi.org/10.3390/admsci15060220

Dai, Y., Tong, X. and Wang, L. (2022). "Workplace safety accident, employee treatment, and firm value: Evidence from China", *Economic Modelling,* Vol. 115. https://doi.org/10.1016/j.econmod.2022.105960

Da Silva, W.V., Zanini, R.R., Su, Z. and da Veiga, C.P. (2021), "Show you the money-firms investing in worker safety have better financial performance: Insights from a mapping review", *International Journal of Workplace Health Management,* Vol. 14 No. 3. https://doi.org/10.1108/IJWHM-11-2020-0200

Department of Employment and Labour (2024), "Decent work can be achieved, while work-related fatalities and injuries can be prevented against the stats narrative", Republic of South Africa. Available at: https://www.labour.gov.za/decent-work-can-be-achieved-while-work-related-fatalities-and-injuries-can-be-prevented-against-the-stats-narrative-%E2%80%93-empl (accessed on 21 December 2025)

Eltahir, I.A.E., Taha, M.A., Alnor, N.H.A., Adam, S.H. and Musa, E.H.E. (2025), "The role of financial compensation oversight committee in improving the financial performance governance of Saudi Banks", *Journal of Risk and Financial Management,* Vol. 18 No. 9. https://doi.org/10.3390/jrfm18090514

Estudillo, B., Carretero-Gomez, J.M. and Forteza, F.J. (2024),. "The impact of occupational accidents on economic performance: Evidence from the Construction", *Safety Science,* Vol. 177. https://doi.org/10.1016/j.ssci.2024.106571

Emani, F. (2017), "Application of competency management system in safety performance: A case of a Canadian Structural Steel and Erection Industry", Master's Dissertation, University of Alberta.

Fang, Y., Koreisha, S.G. and Shao, Q. (2024), "Revisiting the use of generalised least squares in time serioes regression models", *Journal of Data Science,* Vol. 22 No. 4. https://doi.org/10.6339/23-JDS1108

Forteza, F.J., Corretero-Gomez., J.M. and Sese, A. (2017), "Occupational risks, accidents on sites and economic performance of construction firms", *Safety Science,* Vol. 94. https://doi.org/10.1016/j.ssci.2017.01.003

Frykman, M., Lundmark, R., von Thiele Schwarz, U., Villaume, K. and Hasson, H. (2018), "Line managers 'influence on employee usage of a web-based system for occupational health management", *International Journal of Workplace Health Management,* Vol. 11 No. 4. https://doi.org/10.1108/IJWHM-12-2017-0104

Gholami, A., Murray, P. and Sands, J. (2022), "Environmental, social, governance & financial performance disclosures for large firms: Is this different for SME firms? "Sustainability, Vol. 14 No. 10. https://doi.org/10.3390/su14106019

Haas, E.J. and Yorio, P.L. (2021). "Exploring the differences in safety climate among mining sectors", *Min, Metall. Explor.,* Vol. 38 No. 1. https://doi.org/10.1007/s42461-020-00364-w

Honeyman, D. (2024), "Compensation for occupational injuries ad diseases: Half of SA business non-compliant", FAnews. https://www.fanews.co.za/article/commercial-short-term-insurance/15/general/1217/compensation-for-occupational-injuries-and-diseases-half-of-sa-businesses-non-compliant/39264 (Accessed 29 January 2026).

Jonathan, G.K. and Mbogo, R W. (2016), "Maintaining health and safety at Workplace: Employee and employer's role in ensuring a safe working environment", *Journal of Education and practice,* Vol. 6 No. 28.

Kalemba, N. (2017), "Quality and safety in the airline industry and influence on company profitability", Doctoral thesis, UNIVERSITAT ROVIRA I VIRGILI.

Lemana, P., Matemane, R. and Makobane, M. (2025), "Corporate Social Responsibility as a driver of financial performance: An Exploration of South African Companies", *Journal of Risk Financial Management,* Vol.18 No. 5. https://doi.org/10.3390/jrfm18050278

Li, Q., Tang, W. and Li, Z. (2024). "ESG systems and financial performance in industries with significant environmental impact: A comprehensive analysis", *Frontiers in Sustainability,* Vol. 5. https://doi.org/10.3389/frsus.2024.1454822

Madwe, M.C., Maytana, M. And Oluka, A. (2025a), "The impact of corporate governance mechanisms on impression management in top 40 JSE-Listed companies", *International Journal of Applied Research in Business and Management,* Vol. 5 No. 2. https://doi.org/10.51137/wrp.ijarbm.2024.mmti.45614

Madwe, M.C., Nzuza, Z.W. and Olarewaju, O.M. (2025b), "The impact of energy efficiency on financial performance: Evidence from polluters in South Africa", *Sustainability 2025,* Vol. 17 No. 23. https://doi.org/10.3390/su172310630

Marimuthu, R., Sankaranarayana, B. and Karuppiah, K. (2023), "Prioritizing the factors affecting the occupational health and safety of workers in the mining industry using the SWARA Technique", *J. Current Sci. Technolo.,* Vol. 12 No. 1.

Mashele, A., Mouton, M. and Pelcher, L. (2024). "Corporate governance and financial performance: Family firms vs. non-family firms", *Journal of Risk and Financial Management,* Vol. 17 No. 10. https://doi.org/10.3390/jrfm17100444

Melchior, C. and Zanini, R.R. (2019), "Mortality per work accident: A literature mapping", *Safety Science,* Vol. 114. https://doi.org/10.1016/j.ssci.2019.01.001

Moon, J., Ikeda-Araki, A. and Mun, Y. (2025), "The association between financial performance and occupational injuries/diseases in workplaces of South Korea: Interpretation based on managerial characteristics of workplaces", *Eur J Med Res,* Vol. 20. https://doi.org/10.1186/s40001-025-02698-x

Muthelo, L., Mothiba, T.M., Malema, N.R., Mbombi, M.O. and Mphekgwana, P.M. (2022), "Exploring occupational health and safety standards compliance in South African mining industry, Limpopo Province, using principal component analysis", *International Journal of Environmental Research and Public Health 2022,* Vol. 19No. 16. https://doi.org/10.3390/ijerph191610241

Nanjunda, D.C. (2020), "Impact of socio-economic profiles on public health crisis of road traffic accidents: A qualitative study from South India", *Clinical Epidemiology and Global Health*, In press.

Ojeyinka, T.A. And Matemane, R. (2024), "Do board characteristics affect the interplay between managerial ownership and firm performance?", Evidence from South African Banks. *African Journal of Business and Economic Research,* Vol. 19 No. 3.

Pham, T.N., Tran, P.P., Le, M., Vo, H.N., Pham, C.D. andnd Nguyen, H. (2022), "The effects of ESG combined score on business performance of enterprises in the transportation industry", *Sustainability.* Vol. 14 No. 14. https://doi.org/10.3390/su14148354

Ramos, D., Afonso, P. And Rodrigues, M.A. (2020), " Integrated management systems as a key facilitator of occupational health and safety risk management: A case study in a medium sized waste management firm", *Journal of Cleaner Production,* Vol. 26. https://doi.org/10.1016/j.jclepro.2020.121346

Setyaningsih, W. and Wibowo, R.S. (2024), "Does earning per share contribute to the effect of ESG score on share price of mining sector?", Advances *in Accounting Innovation,* Vol. 1 No. 1.

Shabani, T, Jerie, S. and Shabani, T. (2023), "The impact of occupational safety and health programs on employee productivity and organisational performance in Zimbabwe", *Saf. Extreme Environ.,* Vol. 5. https://doi.org/10.1007/s42797-023-00083-7

Taibi, H., Hamaidi, B., Zerrouki, H. and Chergui, A. (2025), "Modelling safety barriers and risks analysis in cement firing systems: A BORA-based approach incorporating risk influencing factors", *Proceedings of the Institution of Mechanical Engineers, Part O: Journal of Risk and Reliability*. https://doi.org/10.1177/1748006X251325579

The International Labour Organisation (ILO) (2020), "Safety + Health for All - An ILO Flagship Programme - Key facts and figures (2016–2020)", available at: https://www.ilo.org/global/topics/safety-and-health-at-work/WCMS_764208/lang--en/index.htm (Accessed 29 January 2026).

United Nations Global Compact. (2022), "A safe and healthy working environment", available at: https://unglobalcompact.org/take-action/safety-andhealth (Accessed on 21 December 2025).

Wiengarten, F., Durach, C.F., Pagell, M.and Humphreys, P. (2025), "Who should manage worker safety to reduce occupational accidents?", *International Journal of Operations & Production Management*, Vol. 45 No.13. https://doi.org/10.1108/IJOPM-11-2024-0977

Xuanyu, Z., Suxia, L., Qiang, M. and Jingjing, Z. (2023), "The influence of work safety information disclosures on performance of listed companies in high-risk industries: Evidence from Shenzhen Stock Exchange", *Heliyon*, Vol. 9 No. 10. https://doi.org/10.1016/j.heliyon.2023.e20494

Yang, M., Lin, Q. and Maresova, P. (2021), "Does employee care trigger innovation under a healthy and safe working environment? Evidence from the pharmaceutical industry in China", Healthcare, Vol. 9 No. 2. *https://doi.org/10.3390/healthcare9020194*

Ying, M. and Allaqtta, M.A.M. (2025), "The impact of culture, risk mitigation, and sustainability on business performance: The mediating role of employee engagement in Palestinian small and medium-sized enterprises", *Sustainability,* Vol. 6 No. 10. https://doi.org/10.3390/su17104361

Zhang, Y., Tat, H. and Zhang, Z. (2025), "Sustainable development in the tourism sector: The impact of environmental, social and governance performance on operational efficiency- A multilevel analytical approach", *Sustainable Futures*. https://doi.org/10.1016/j.sftr.2025.100923

Zondo, R.W.D. (2021), "Assessing the effectiveness of an occupational health and safety systems in selected automative assembly organisation in South Africa", South *African Journal of Economic and Management Sciences,* Vol. 24 No. 1. https://doi.org/10.4102/sajems.v24i1.3553

Zumente, I. and Bistrova, J. (2021), "ESG importance for long-term shareholder value creation: Literature vs practice. *Journal of Open Innovation", Technology, Mrket, and Complexity,* Voll. 7. https://doi.org/10.3390/joitmc7020127

Zungu, A., Chonco, C.M. and Madwe, M.C. (2024). "Brief analysis of the results of compliance audit in KwaZulu-Natal Provincial government departments in South Africa", *Interdisciplinary Journal Economic and Business Law,* Vol. 13.