




Effects of physical stock loss on the financial performance of retail enterprises



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Dates:

Received: 06 Nov. 2023

Accepted: 07 Mar. 2024

Published: 18 June 2024

How to cite this article:

Tabane, T.L., Phume, T.B. & Retief, M-M., 2024, 'Effects of physical stock loss on the financial performance of retail enterprises', *South African Journal of Economic and Management Sciences* 27(1), a5410. <https://doi.org/10.4102/sajems.v27i1.5410>

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Background: Small, medium and micro retail enterprises (SMMEs) in South Africa are regarded as having a high failure rate. The reason behind the failure can be ascribed to a wide variety of issues. Stock shrinkage is one of the challenges contributing towards the failure of businesses particularly if not safeguarded.

Aim: The study aimed to investigate the effects of stock shrinkage as a cause of physical stock loss on the financial performance of retail SMMEs in the City of Tshwane.

Setting: The sample of the study was drawn from retail SMME owners, managers and owner-managers.

Method: A quantitative research approach in the form of a questionnaire was adopted and a non-probability, convenience sampling method was employed. Regression analysis was conducted using IBM SPSS (version 27) to test the hypotheses.

Results: Stock spoilage and internal theft are the strongest predictors of profitability and sales volume loss.

Conclusion: It is concluded that stock shrinkage as a cause of physical stock loss relates to the financial performance of retail SMMEs. However, not all physical stock loss variables carry the same weight in terms of their contribution to retail financial losses.

Contribution: The study contributes to retail SMMEs and stock shrinkage literature by identifying the causes of stock shrinkage as a result of physical stock loss. It further sheds light on high predictor variables of physical stock loss which can threaten the financial sustainability of businesses.

Keywords: stock shrinkage; retail small, medium, and micro retail enterprises; physical stock loss; profitability loss; sales volume loss.

Introduction

Small businesses are perceived to be the major drivers of economies around the world; for instance, in the United States (US), small businesses account for 99.7% of all companies (Oni & Omonona 2020). Statistics from the European Parliament revealed that 99% of European Union (EU) companies are small, medium and micro retail enterprises (SMMEs) (Gonda et al. 2020). Gross domestic product (GDP) remains an indicator of the contribution of SMMEs to economies. In countries such as China and Japan, small to medium enterprises contribute about 60% to the GDP while in the United Arab Emirates (UAE), the contribution is approximately 52% (Kawira, Mukulu & Odhiambo 2019). In most nations, small to medium enterprises account for more than 50% of employment and GDP (Enaifoghe 2023).

Similarly, the contribution of SMMEs to the GDP of South Africa stands at about 50%, with the sector employing approximately 80% of the national workforce (Bruwer 2020). Insights from the National Development Plan (NDP) (2015) indicate that the sector is expected to create 90% of employment by 2030. Recent studies show that small businesses account for over 80% of employment in South Africa (Mhlongo & Daya 2023). The retail SMME sector's contribution towards this goal is significant. Research shows that 70% of SMMEs operating in South Africa are in the retail sector, making it the fourth largest contributor to the GDP (Arndt et al. 2020; Tuomala & Grant 2022).

Despite the impressive socio-economic contribution of SMMEs, it is disconcerting to note that these South African business entities are regarded as having the highest failure rate in the world (Maduku & Kaseeram 2021; Matekenya & Moyo 2022). The reason behind the failure can be ascribed to risks such as scarce resources, poor access to finance, ineffective stock management and

inadequate internal control (Ekegbo et al. 2018). Challenges derived from the COVID-19 pandemic as well as supply chain complexities worsened the risk of survival and led to the closure of many SMMEs in South Africa (Grimmer 2022). Stock shrinkage in retail outlets is another major pressing factor that results in the loss of profit and leads to business failure if not safeguarded (Eminue, Titus & Udo 2019:43; Li et al. 2022). Chanda and Mwanza (2023) estimate that shrinkage costs retail outlets approximately 2.6% of sales.

Stock shrinkage occurs when stock is lost because of factors such as shoplifting, employee theft, damaged stock, administrative errors, vendor fraud, theft of stock by manufacturers or at the point of sale (Kumar et al. 2020). Widespread research in literature categorises stock shrinkage into four main categories: external theft, internal theft, administrative errors and vendor dishonesty. These categories have come to be known as the 'four buckets' of shrinkage (Beck 2017; Cannella et al. 2015; Ekegbo et al. 2018; Rekik 2011). In this study, stock shrinkage is defined in relation to total retail loss as proposed by Corsten (2013:20) and endorsed by the efficient consumer response (ECR).

The typology by Corsten (2013:20) describes various causes of stock shrinkage, including process variance, physical stock losses, value variance and unknown losses contributing to total retail losses. In this article, the researchers only focused on physical stock loss as a cause of stock shrinkage and its effect on retail profitability and sales volume loss. According to Kang and Gershwin (2005) as well as Rekik, Syntetos and Glock (2019), physical stock loss includes all forms of loss of products available for sale, mainly because of damages, spoilage, internal theft, shoplifting and burglary. The 2020 NRF report indicates that the most common form of stock shrinkage reported by retail organisations are those associated with physical losses including internal and external theft (NRF 2020); hence, the focus is on physical stock loss in the current study. Therefore, the following aim and objectives have been formulated.

Aim of the study

The study aims to investigate the effects of stock shrinkage as a cause of physical stock loss on the financial performance of retail SMMEs in the City of Tshwane.

Objectives of the study

In support of the aim, the study intends to:

- test the hypothesised relationship between physical stock loss variables and retail SMMEs' profitability losses.
- test the hypothesised relationship between physical stock loss variables and retail SMMEs' sales volume losses.

In the article, the 'Literature review' section provides the conceptual framework developed to address the hypotheses. This is followed by the methodology, data collection method, data analysis and ethical considerations. The remainder of the article contains findings, recommendations, a conclusion, limitations of the study and implications for future research.

Literature review

Shrinkage in relation to financial performance

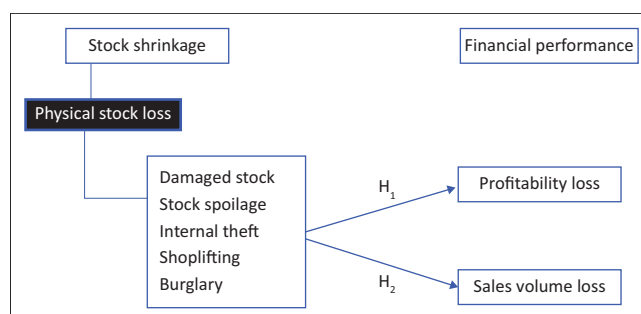
Total retail losses can be defined as 'events and outcomes that negatively impact a retailer's profitability without making any positive, identifiable and intrinsic contribution to generating income' (Beck 2016). Total retail losses can further be sub-classified according to stock shrinkage and cash losses (Corsten 2013:20). Cash loss refers to unaccounted money because of improper cash handling, either intentionally or unintentionally or as a result of collusion, which involves employees and efforts from shoppers to get cash out of the store (Balas & Keya 2019). Cash loss can thus be the result of internal theft, external theft, errors or unknown reasons (Corsten 2013).

Of interest in this study is the effect of stock shrinkage as a cause of physical stock loss on retailers' financial performance. Financial performance relates to the company's financial condition over a period of time which includes the collection and use of funds as measured by several indicators of capital adequacy ratio, liquidity, leverage, solvency and profitability (Fatihudin 2018). For this study, financial performance will be measured in terms of profitability and sales volume, where shrinkage percentage levels are determined by dividing sales value loss by actual profits (shrinkage as a percentage of profit) and sales volume loss by sales volumes sold (shrinkage as a percentage of sales volume) (Choi, Rabinovich & Richards 2019).

The conceptual framework in Figure 1 portrays physical stock loss and its associated variables as a cause of stock shrinkage. These variables are indicated to be directly related to a retail business financial performance measured in terms of profitability and sales volume targets.

Damaged stock

Stock damages occur at different levels of the supply chain; for instance, stock can be damaged at the production facilities during or after production or at the warehouse when handling or storing takes place (Frei, Jack & Krzyzania 2020). At the retail store, stock damages are common when products are picked for merchandising or when stock is neglected outside during bad weather. Examples include cartons of stock being crushed by a forklift, fresh produce being bruised



H, hypothesis.

FIGURE 1: Conceptual framework.

during handling or glass bottles getting smashed (Beck & Peacock 2015). The result is that the expected sales revenue from damaged stock cannot be realised as the stock is deemed worthless (Choi et al. 2019). Although the value of damaged stock may reflect any allowances received from suppliers or income received from stock reclamation, the envisaged sales income of the product cannot be realised because of a decrease in the sales volume that affects profitability targets. Moreover, additional costs are incurred through handling, storage, shipping and disposing of the damaged products (Vhenge 2016).

Stock spoilage

Stock spoilage refers to stock that has reached expiration dates or has gone beyond the agreed temperature parameter and is no longer fit for selling (Horoś & Ruppenthal 2021). In the retail industry, it is imperative that perishable stock remains within fixed temperatures as exposure to extreme temperatures during transit may reduce the shelf life of products (Adedeji 2020). Apart from being obsolete or decayed, decreased usefulness was also identified as a cause for spoilage by Panda, Saha and Nandi (2012). Spoilage can also be attributed to products not being sold on time because of overstocking and neglecting to rotate accordingly (Dengetsha 2004).

Furthermore, the Global Retail Theft Barometer (GRTB) (2021:32) argued that while perishable products may be used by retailers in the deli department before they spoil, this approach does not necessarily yield the envisaged sales targets. The effects of spoilage on a retailer's customer base can be lasting as apart from sales and profits being affected and disgruntled customers may refrain from visiting the store in the future because of a previous encounter where spoiled products were noted or bought (Vhenge 2016).

Internal theft

This study is concerned with internal theft relating to stock shrinkage, which refers to theft of merchandise by employees of the retail store. While the broader definition of internal theft relating to stock shrinkage includes cash losses, this study will not be focusing on cash losses but rather merchandise theft (Velandia-Bautista 2019). Researchers (Ikurayeke, Konya & Ejo-Orusa 2019; Shukla 2018) distinguish between various forms of internal theft by means of value. Pilferage refers to the act of stealing small amounts or small quantities of stock, which is regarded as 'petty theft' whereas thievery relates to small things of low value or price to the organisation that have been stolen by employees (Ikurayeke et al. 2019:44). Although these scholars classified various forms of internal theft by means of value, this study holistically acknowledges internal theft as a source of stock shrinkage ascribed to theft by the SMME retail employees, regardless of the value or quantities. According to Bamfield and Hollinger (2020), internal theft reaps off profits from retail stores because sales generated from other products must be used to compensate for losses from stolen stock.

The 2014 GRTB conducted in 24 countries (including African countries), among 222 retailers, revealed that shrinkage caused by dishonest and fraudulent employees contributes around 43% towards the total loss of profits retailers experience (GRTB 2015). Thus, internal theft puts business viability at risk, implying that jobs, including those of honest employees, are at risk while the end consumer pays for a transgression through price increases (Korgaonkar et al. 2021).

According to Boniface (2016), employee theft perpetrated by managers, supervisors and floor employees causes the most damage to retail annual sales losses. Failure to combat employee theft through effective measures can lead to other crimes in the workplace such as workplace violence and shoplifting (Jensen, Cole & Rubin 2019). Moreover, management may need to postpone business growth plans, halting increased sales and profits (McGoey 2015).

Shoplifting

Shoplifting is a growing problem for all retailers. It refers to an act of theft against a retailer committed during operating hours by a person who appears to be a legitimate customer (Kibacia, Kamau & Siror 2017; Özaşçılar & Ozturk 2023). An item stolen by a shoplifter from a retail store results in the business being unable to sell that item, pay for the costs associated with the acquisition of the product or account for any other expenses related to stocking it such as rent and employee wages (Becerra, Brynildsen & Korgaonkar 2022). The retail store thus ends up with decreased profits, increased expenses, decreased revenue and decreased sales (Hayes et al. 2019).

Özaşçılar and Ozturk (2023) add that legal claims from wrongly accused shoplifters, or anyone harmed during shoplifting incidents cut further into retail profits. Additionally, retailers are negatively affected as investment on personnel and equipment designed to detect and prevent shoplifting are required (Abdelhadi et al. 2013). Shrinkage of stock caused by shoplifting has long been a consistent and resilient problem in the retail sector (Leisching & Woodside 2019). A proactive approach to guide retailers against the loss of profit and sales involves developing a clear understanding of the community, the retail location, items most shoplifted and how competitors are affected by external theft before embarking on any strategy to combat shoplifting (Hayes et al. 2019).

According to Leisching and Woodside (2019), shoplifting is regarded as one of the most commonly committed crimes in modern society. Hence, the shoplifters are classified by their experience such as semi-professional, professional or amateur (Caputo & King 2015; Leisching & Woodside 2019). Of greater concern to retailers is the impact that professional shoplifters have on retail profits as opposed to theft committed by the general public (National Retail Federation [NRF] 2015).

Scott (2023:13) describes professional shoplifters as those shoplifters who are in the business of theft and stealing for a living. In most cases, professional shoplifters are highly skilled, hardest to identify and interested in high-demand

easily resalable items. As such, they would use methods such as dropping stock in bags, hiding stock in newspapers and making use of false compartments in clothing items, while others would 'crotch-walk' items by placing stock between thighs and walking out of the retail stores (Woodside & Leischnig 2019). The indirect peripheral losses caused by professional shoplifters on retail SMMEs are high.

Burglary

Burglary can be defined in the broader context of retail crime (Van Der Walt, Jonck & Lange 2016). Burglary refers to criminality and/or disorderly behaviour committed by or against businesses and might be targeted against employees, a single business owner, or part of a broader pattern of crime which unfavourably impacts a number of businesses in the same zone, or in the same geographic area (Chamberlain, Boggess & Fisher 2022). In this section, burglary is discussed as a form of retail crime that contributes to stock shrinkage and deprives retailers of maximum profits and sales.

A study by Nyathi (2022) identified burglary as one of the constraints that hampers the sustainability of retail SMMEs. In retail, burglars are tempted to commit a crime when a store has insufficient overnight security and keeps stock in containers that are left unattended. According to Saleemi and Amir-ud-Din (2019), inadequate business policies and disorganised accounting operations may lead to poor inventory control which may invite burglars.

Retail businesses are reluctant to expand or employ more employees because of crime-related losses such as burglary, impacting upon annual turnover, thus, resulting in direct and indirect costs associated with burglaries (Nyathi 2022). Direct costs encompass fiscal losses as a result of stolen stock, while indirect costs refer to losses as a result of repairs to damaged windows, doors and locks (Lange 2014). Mahadea and Khumalo (2020) establish that both direct and indirect costs constitute a heavy burden for SMMEs in a South African context.

The above variables relate to the holistic effect of physical stock loss on retail financial performance; thus, the following hypotheses were developed:

H₁: Higher levels of stock shrinkage as a cause of physical stock loss, positively relate to higher levels of profitability loss within a retail SMME.

H₂: Higher levels of stock shrinkage as a cause of physical stock loss, positively relate to higher levels of sales volume loss within a retail SMME.

Methodology

The study was empirical in nature and thus adopted a quantitative research approach in the form of a structured survey questionnaire with predetermined responses to choose from. The approach allowed numerical quantification of various factors of stock shrinkage as a cause of physical stock

loss and the effect thereof on a retail SMME's financial performance. Furthermore, a positivist approach was followed as hypotheses were generated and statistical analysis was conducted to predict the relationship between physical stock loss variables and retail SMMEs profitability and sales volume losses.

Population and sampling

The target population of the study comprised of owners, managers and owner-managers of SMMEs as they bear the required financial knowledge of the SMME to respond to the survey questions. The study relied on non-probability, convenience sampling techniques. With non-probability sampling, not all units of the population have an equal chance of taking part in the study (Etikan, Musa & Alkassim 2016; Williams 2022). The researchers chose convenience sampling for practical purposes as it involves the use of respondents who are easily accessible or readily available within the City of Tshwane Metropolitan Municipality region (Etikan & Bala 2017; Pace 2021). Making use of non-probability sampling techniques also presents the advantage of reduced respondent sourcing time which served as a cost-efficient measure (Berndt 2020). Respondents had to adhere to the following list of delineation criterion in order to partake in the study:

- Respondents should be from retail businesses classified as SMMEs, thus employing less than 250 employees.
- The retail business' annual turnover should not exceed 80 million rand or alternatively reflect a gross asset value of 6 million rand or less.
- All SMMEs should operate in the retail industry.
- Respondents should be owners, managers or owner-managers of the retail SMME.
- All SMMEs should operate within the City of Tshwane region.

The above delineation criteria were necessary to ensure that the target population as defined in the study is adhered to and to align the research topic with the overall objectives of the study. A list obtained from the City of Tshwane containing businesses registered within the City's business support database was used as a sample frame. The sample frame contained a population of 183 SMME retail stores. Based on the convenience of the researcher and availability of the respondents, respondents mainly situated in the Tshwane Central Business District (CBD) as well as in the North and West of Tshwane were approached to take part in the study. This resulted in 130 respondents representing retail owners, managers and owner-managers.

Data collection procedure

Primary data were collected using survey questionnaires, which were hand-delivered to SMMEs across the City of Tshwane to collect data from SMME retail managers, owners and owner-managers. Items developed by Ekegbo et al. (2018), Mabhungu (2017), National Retail Federation (NRF) (2020) and Vhenge (2016) were adapted to form part of a

single questionnaire for this study. To ensure that the targeted population took part in the survey, section one of the questionnaire related to the demographics of the respondents and classification of retail SMMEs; this also helped the researcher to determine the demographic profile of the respondents as well as the profile of the represented retail SMMEs.

The rest of the questionnaire contained closed-ended, multiple-choice questions as well as 5-point Likert scales with items ranging from 1 = 'Not at all' to 5 = 'To a great extent'. Information about physical stock loss and its effect on retail financial performance was obtained. Damaged stock, stock spoilage, employee theft, shoplifting and theft through burglary were the physical stock loss factors investigated. The respondents were further asked to indicate the value of stock loss ascribed to physical loss and the number of units lost. According to Leedy and Ormord (2019), Likert scales allow the measuring of behaviour, attitudes, perceptions or phenomena, while multiple choice questions are applied because of their ease of implementation and their efficiency in collecting and analysing data from large samples of respondents (Merry, Elenchin & Surma 2021). Both of these formats of questions are applicable to achieving the objective of the study. The questionnaire was pre-coded using numerical values at the design phase.

Validity and reliability

Validity expresses the degree to which the measuring instrument measures what it intends to measure (Ahmed & Ishtiaq 2021; Mellinger & Hanson 2020). Jameel, Shaheen and Majid (2018) regard reliability as the 'consistency and stability of the findings to make accurate and stable measures in a certain collection of items to yield interpretable statements about individual differences'. According to Saunders, Lewis and Thornhill (2009), assessing the validity of the questionnaire forms part of the questionnaire development process. The researchers, in particular, followed a systematic process in the development of a questionnaire to ensure acceptable validity.

A wide variety of sources on stock shrinkage, including books relevant to the study, conference papers, academic journal articles, prior these and studies, course materials and other relevant sources of information appropriate to the study were consulted to maintain validity. The above-mentioned assessment aided the researcher in quantifying what was assumed to be measured. Furthermore, respondents for this study were chosen based on the overall objectives and purpose of the research project. Retail SMME managers, owners and owner-managers who are responsible for the overall operations of the retail business and are aware of stock shrinkage-related issues as well as their effects on retail financial performance served as respondents for the study. Prior to the actual data collection process, a pre-test was conducted with eight respondents to ensure acceptable validity of the data collection instrument. According to

Zimbardo and Boyd (2014), validating a questionnaire through a pre-test may result in reduced bias.

In order to ensure the acceptable reliability of the data collected, the researchers had to consider the level of sampling accuracy (Van Zyl & Pellissier 2017). Data were thus collected from a sufficient sample size. Researchers have conceded that there are no specific rules for determining the sample size (Gill 2020). A decision to take a sample too small could produce misleading information about the statistical population, imprecise statistics or a high probability of retaining a false hypothesis. Instead, increasing the sample size improves the precision of estimations and the power of statistical tests, but will also increase its costs (Guerra-Castro et al. 2021).

Despite being a common method for testing the reliability of an instrument, in the context of this study, Cronbach alpha was not justified as the research instrument did not include scales that measure the same underlying construct but aimed at identifying specific areas that need to be attended to in limiting stock shrinkage as a cause of physical stock loss (Pallant 2020). The researchers rather made use of the split-half method of assessing reliability in the context of producing data stability. Chi-square test of independence was used to test for significant differences between the two sub-sample groups in the current study with the objective of determining the reliability of the dataset. The results of the split-half method in Table 1 showed a significance value of more than 0.05 supporting the notion of data reliability and stability.

Descriptive statistics and regression data analysis

Descriptive statistics were used to summarise findings on demographic data of respondents and characteristics of the SMME represented. The effects of physical stock loss variables on financial performance of retail SMMEs were provided, revealing further data characteristics that needed further understanding through regression analysis. During data analyses and reporting on the regression analysis results, the bi-variate correlations were firstly considered together with evidence that suggests a linear relationship between the independent and dependent variables, specifically physical stock loss factors and financial variables. Secondly, the researchers proceed to report on the significance of the entire model, individual coefficients as well as the standardised beta. Lastly, the researchers report on multiple regression, which shows the overall strength between the independent variables

TABLE 1: Internal consistency reliability.

Physical stock loss	Sig	Hypotheses
Independent variable: Random split		
Damaged stock	0.663	No
Stock spoilage	0.677	No
Internal theft	0.713	No
Shoplifting	0.504	No
Burglary	0.331	No
Approximate rand value loss	0.887	No
Approximate sales volume loss	0.269	No

Sig, significance.

and dependent variables as well as the assumptions of normality relating to the error term. In other words, the researcher followed a model-building strategy that consist of exploration, estimations and diagnostics.

Ethical considerations

This study was conducted in such a way that all standard ethical guidelines, principles and procedures laid out by the University's Research Ethics Committee were adhered to as specified by the ethical approval obtained prior to conducting the study. Ethical clearance to conduct this study was obtained from the Tshwane University of Technology, Faculty of Management Science, Research Ethics Committee (reference no.: FCRE2021/FR/06/003-MS(2)). Permission was also requested from retail owners, managers and owner-managers. Respondents were informed that participation in the study was voluntary and were requested to sign consent forms indicating voluntary participation and the right to withdraw with no implications. All respondents were informed about the purpose, benefits and risks associated with the study. Responses obtained from respondents were used only for the study, and confidentiality and anonymity are guaranteed by not disclosing any names of respondents or their respective organisations.

Results and discussions

This section details the descriptive demographic information of the respondents as well as the characteristics of retail SMMEs that took part in the study and it also depicts regression analysis findings, interpretation and whether the hypothesis was accepted or rejected. Physical stock loss variables affecting profitability and sales volume loss are also provided.

Descriptive statistics

The descriptive results of the demographic characteristics of respondents as well as the classification of retail SMMEs are set out in Table 2.

A total of 183 retail SMMEs were identified from the sample frame provided by the City of Tshwane. Questionnaires were distributed to retail SMMEs situated in Tshwane CBD, north and west and one hundred and thirty ($N = 130$) usable questionnaires were derived from retail SMME owners, managers and owner-managers. Taking into consideration the sample frame as well as the returned questionnaires, a response rate of 71% was obtained.

As shown in Table 2, the majority of the respondents hold a senior certificate (44.6%; $n = 58$) or gained tertiary qualifications up to NQF level 7 (47.7%; $n = 67$). The highest percentage of respondents fulfil the role of owners 38.5% ($n = 50$), followed by 36.9% ($n = 48$) of managers, with only 24.6% ($n = 32$) of the respondents being owner-managers. The results revealed that most respondents (75.4%; $n = 98$) who took part in the study represented micro enterprises employing up to 10 people. With no respondents representing SMMEs with more

TABLE 2: Demographic profile of respondents and retail small, medium, and micro retail enterprises represented.

Demographic of respondents and retail SMMEs represented	Sample size	%
Level of education		
National Senior Certificate	58	44.6
Advanced Certificate/Diploma (NQF level 6)	34	26.2
Bachelor's Degree (NQF level 7)	28	21.5
Honours Degree/Post Graduate Diploma (NQF level 8)	9	6.9
Master's Degree (NQF level 9)	1	0.8
Doctoral Degree (NQF level 10)	0	0.0
Employee position at work		
Owner	50	38.5
Manager	48	36.9
Owner-manager	32	24.4
Number of employees apart from the owner		
0	20	15.4
1–5	48	36.9
6–10	30	23.1
11–50	28	21.5
51–100	4	3.1
101–200	0	0.0
201–250	0	0.0
Type of retail store		
General retail store	43	33.1
Speciality store	24	24.6
Liquor store	28	21.5
Spaza shop	35	26.9
Other	0	0.0
Company size by annual turnover		
≤ R500 000	36	27.7
R500 001 – R1 000 000	32	19.2
R1 000 001 – R10 000 000	24	18.5
R10 000 001 – R20 000 000	22	16.8
R20 000 001 – R39 000 000	14	10.8
R39 000 001 – R80 000 000	2	1.5
Company size by gross value		
≤ R200 000	50	38.5
R200 001 – R500 000	37	28.5
R500 001 – R1 000 000	12	9.2
R1 000 001 – R3 000 000	10	7.7
R3 000 001 – R6 000 000	21	16.2

NQF, National Qualification Framework.

than 100 employees. General retail stores were most represented (33.1%; $n = 43$) among the retail categories that took part in the study. The majority (87.7%; $n = 114$) of the respondents represented micro enterprises, generating an annual turnover not exceeding 20 million rand and a gross asset value of (67.0%; $n = 87$) up to half a million rand. Table 3 reflects the percentage distribution of the effects of stock shrinkage as a cause of physical stock loss on the financial performance of retail SMMEs.

Half of the respondents (50.0%; $n = 65$) confess that damaged stock affects the financial performance of the retail SMME a lot. According to the results, all retail SMMEs suffer losses because of damaged stock. The majority of respondents indicated that stock spoilage (63.9%; $n = 83$) and internal theft (69.2%; $n = 90$) affect the financial performance of retail SMMEs somewhat to a lot. Only 3.8% ($n = 5$) of respondents indicated not to be affected by spoilage, these could be retail SMMEs that do

TABLE 3a: Descriptive analysis on the effects of stock shrinkage as a cause of physical stock loss on the financial performance of retail small, medium and micro retail enterprises.

Physical stock loss	Not at all		Very little		Somewhat		A lot		To a great extent	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
To what extent, does the following stock shrinkage factors affect your retail store's financial performance?										
Damaged stock	0	0.0	20	15.4	36	27.7	65	50.0	9	6.9
Stock spoilage	5	3.8	34	26.2	40	30.8	43	33.1	8	6.2
Employee theft	4	3.1	27	20.8	46	35.4	44	33.8	9	6.9
Shoplifting	7	5.4	42	32.3	37	28.5	38	29.2	6	4.6
Theft through burglary	15	12.3	64	49.2	27	20.8	20	15.4	4	2.3

TABLE 3b: Descriptive analysis on the effects of stock shrinkage as a cause of physical stock loss on the financial performance of retail small, medium and micro retail enterprises.

Average rand value loss	≤ R50 000		R50 001 – R100 000		R100 001 – R200 000		R200 001 – R500 000		≥ R500 001	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
What was the approximate rand value loss because of physical stock loss during the indicated financial year?										
2020	59	45.4	18	13.8	15	11.5	16	1.3	22	16.9

TABLE 3c: Descriptive analysis on the effects of stock shrinkage as a cause of physical stock loss on the financial performance of retail small, medium and micro retail enterprises.

Average sales volume loss	≤ 100		101–200		201–500		501–1000		≥ 1001	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Indicate the approximate sales volume loss because of physical stock loss										
2020	15	11.5	23	17.7	22	16.9	22	16.9	48	36.9

not sell perishable goods or those that succeed in implementing methods to combat the effect thereof well in advance such as marking down the items on the sell by date to get rid of it. Similarly, 3.1% ($n = 4$) of respondents represented retail SMMEs that are not affected by internal theft at all, this might be those retail SMMEs that do not have any other employees in the business apart from the owner.

Shoplifting together with burglary forms part of the broader category of external theft, which constitutes stock shrinkage. Although the results contradict that of a study conducted by Singini (2020) that the South African retail sector is highly prone to burglary-related crimes, it is encouraging to note that almost half (49.2%; $n = 64$) of retail SMME owners, managers and owner-managers surveyed are of the view that burglary is not a major financial loss contributory factor in retail SMMEs. However, 57.7% ($n = 75$) of retail SMMEs representatives conceded to be affected by shoplifting somewhat to a lot. Less than 10% of the respondents indicated that physical stock loss variables affect the financial performance at their retail SMME to a great extent. Almost 50% (45.5%; $n = 59$) of respondents attributed losses equal or less than 50 000 rand to physical stock loss variables, while 36.9% ($n = 48$) of the respondents suffered a loss of over 1000 units in their retail SMMEs because of physical stock losses.

Multiple regression analyses

Based on the assumptions of multiple regression analyses (Hair et al. 2014), the regression analysis was confirmed as appropriate to analyse the data. Multicollinearity concerns were waved as the variance inflation factor (VIF) was less than 10. Multiple regression analysis was conducted to test

the hypotheses developed for the study. When evaluating the model, all variables were added in predicting the effect of stock shrinkage as a cause of physical stock loss on the financial performance of retail SMMEs. The researchers considered the *R*-squared which indicates how much of the variance in the respective dependent variables is accounted for by the predictors in the model (Kumari & Yadav 2018). The standardised coefficient beta which indicates which independent variables account for the strongest unique contribution to the dependent variable, is also reported. Most importantly, the *p*-values are checked for statistically significant relationships ($p \leq 0.05$) between the individual predictor variables and the respective dependent variable (Plonsky & Ghanbar 2018).

The *R*-square value indicates that 31% of the variance in rand value loss can be attributed to physical stock loss variables. As shown in Table 4, the analysis further revealed that stock spoilage ($p = 0.011$), internal theft ($p = 0.015$) and shoplifting ($p = 0.046$) have a statistically significant relationship with profitability loss, as the *p*-values were below the level of significance ($p \leq 0.05$). The results did not detect a statistically significant relationship between damaged stock ($p = 0.092$) and burglary ($p = 0.446$) with profitability loss. Thus, hypothesis H_1 is accepted in the following manner:

H_1 : Higher levels of stock shrinkage as a cause of physical stock loss, specifically because of stock spoilage, internal theft and shoplifting positively relates to higher levels of profitability loss within a retail SMME.

It is also worth noting that while the literature identified internal theft as the biggest stock shrinkage factor in retail businesses (GRTB 2015), in the context of this study, stock spoilage ($\beta = 0.220$) showed the highest standardised beta coefficient, followed by employee theft ($\beta = 0.212$) and

TABLE 4: Regression analysis on physical stock loss.

Physical stock loss	Average rand value loss		Average sales volume loss	
	Sig	Beta	Sig	Beta
Damaged stock	0.092	0.151	0.126	0.119
Stock spoilage	0.011	0.220	0.000	0.217
Internal theft	0.015	0.212	0.000	0.317
Shoplifting	0.046	0.183	0.018	0.190
Burglary	0.446	0.065	0.040	0.152

Sig, significance.

shoplifting ($\beta = 0.183$). This might be because of the fact that 15.4% ($n = 20$) of the respondents in this study are the owners of retail SMMEs who do not employ any other people within the business, thereby eliminating the potential of employee theft within those enterprises. It is concerning that in a recent study by Song and Li (2022), it was revealed that along with external theft, internal theft result in at least 74.7% of stock shrinkage. Thus, it is compromising the future sustainability of the retail business (Peters & Maniam 2016). The level of internal theft in retail businesses remains problematic as confirmed in the current study and can perhaps be attributed to the fact that employees who should be preventing stock shrinkage are often the perpetrators of theft in retail stores (Eminue et al. 2019:43).

Considering the findings identifying stock spoilage as the biggest contributor to profitability loss, this study is in line with that of a study investigating stock shrinkage and stock-outs in retail stores wherein Marques and De Carvalho (2021) revealed that stock spoilage is one of the largest contributors of stock shrinkage. Results explain the financial losses retailers suffer because of expired stock. Shoplifting ($\beta = 0.183$) and damaged stock ($\beta = 0.151$) had the lowest standardised beta coefficient values. It is widely recorded in research that shrinkage of stock caused by shoplifting has long been a consistent and resilient problem in the retail sector (Leisching & Woodside 2019). This notion is shared by the results of this study which proves that shoplifting continues to significantly threaten the sustainability of retail SMMEs.

With reference to H_2 , the R -square value reveals that 47% of the variance in sales volume loss can be attributed to physical stock loss variables. All variables except damaged stock ($p = 0.126$) have a statistically significant relationship with sales volume loss. Therefore, hypothesis H_2 is accepted as follows:

H_2 : Higher levels of stock shrinkage as a cause of physical stock loss, specifically because of stock spoilage, internal theft, shoplifting and burglary positively relates to higher levels of sales volume loss within a retail SMME.

In addition, the standardised beta coefficient showed that internal theft ($\beta = 0.317$) is the strongest predictor of sales volume loss followed by stock spoilage ($\beta = 0.217$) and shoplifting ($\beta = 0.190$). These results are consistent with the results of Boniface (2016) who stated that internal theft imposes a detrimental effect on retail financial targets. Some researchers (Kiprugut, Mwangi & Mwaeke 2021) have stated that shoplifting continues to be a major source of loss in retail

businesses, despite the introduction of many new and advanced technologies aimed at minimising it. It is further noted that the rate and severity of shoplifting have not subsided in the past few decades. Burglary ($\beta = 0.152$) recorded the lowest standardised beta coefficient, implying it being the weakest predictor of sales volume loss within retail SMMEs.

Conclusion, limitations and future research

The main objective of the study was to investigate the effects of stock shrinkage as a cause of physical stock loss on the financial performance of retail SMMEs. The findings established that while all hypotheses were found to be statistically and partially significant, variables such as burglary and damaged stock realised a statistically insignificant relationship with profitability and sales volume loss. Based on the beta coefficients, stock spoilage is the strongest predictor of profitability loss and internal theft being the strongest predictor of sales volume loss. It is recommended that retail managers and owners enforce stock rotation policies that will enable merchandisers to draw stock from the backup based on expiry dates. A close eye must also be kept on short-dated stock delivered by suppliers. To deter employees from stealing stock, the introduction of meals and discounts can help reduce employee tardiness.

The utilisation of the correct security tools such as a combination of CCTVs, electronic article surveillances (EASs) and security personnel may prove to be more effective in dealing with shoplifting. Retailers can also opt for cost-efficient measures such as keeping the stores well lit. Posting rules and measures that the store takes when dealing with shoplifting incidences may alert shoppers that prosecutors will be dealt with and might be enough to deter shoplifters. An interesting contribution derived from the findings is that losses in profitability are not equitable to losses in sales volume. The article contributes managerially by shedding light on physical stock issues which can threaten the financial sustainability of a business.

Taking into consideration the identified contributions of the study, the research is not free from limitations. Firstly, data were collected from SMMEs operating in the CBD, Tshwane West and North, neglecting the East and South of Tshwane because of limited financial resources and time constraints. Secondly, data collection was paper-based and did not include any electronic form of data collection. Adequately resourced researchers should consider extending the study into the remaining areas of Tshwane or the province.

Thirdly, this article only focused on the influence of physical stock loss on the financial performance of SMMEs. Future research can also explore the influence of process variance, value variance and unknown loss to retail losses. Lastly, this study explored stock shrinkage from retail SMMEs,

these included spaza shops, liquor stores, general retail stores and specialty stores. There is a need for researchers to adopt a more focused approach and investigate stock shrinkage from each specific type of retail store. We suggest more research into liquor stores and specialty stores as both of these store groups were least represented.

Acknowledgements

The authors would like to acknowledge Dr D. van Zyl for statistical support.

This article is partially based on T.L.T., the first author's thesis, entitled 'Effects of stock shrinkage on the financial performance of retail small, medium, and micro enterprises (SMMEs) in the city of Tshwane metropolitan municipality', towards the degree of Magister Technologiae: Logistics in the Department of Marketing, Supply Chain and Sport Management, Faculty of Management Sciences, Tshwane University of Technology, South Africa, received September 2022, with supervisor Dr T.B. Phume and co-supervisor: Dr M. Retief, available here: <https://doi.org/10.13140/RG.2.2.14251.66083>.

Competing interests

The authors declare that they have no financial or personal relationship(s) that may have inappropriately influenced them in writing this article.

Authors' contributions

T.L.T. wrote the original manuscript from his master's dissertation. T.B.P and M-M.R. reviewed and added their inputs.

Funding information

The authors received no financial support for the research, authorship, and/or publication of this article.

Data availability

The data that support the findings of this study are available from the corresponding author, T.L.T., on reasonable request.

Disclaimer

The views and opinions expressed are those of the authors and do not necessarily reflect the policy or positions of any affiliated agency.

References

- Abdelhadi, A., Foster, C., Whysall, P. & Rawwas, M., 2013, *Attitudes towards shoplifting: A preliminary cross-cultural study of consumers*, viewed 21 July 2023, from <https://irep.ntu.ac.uk/id/eprint/12937/>.
- Adedeji, A.E., 2020, *Fresh food products inventory control management: The challenges in avoiding perishability at the retailers' shelf*, viewed 11 August 2024, from <https://www.diva-portal.org/smash/record.jsf?pid=diva2:1440421>.
- Ahmed, I. & Ishtiaq, S., 2021, 'Reliability and validity: Importance in medical research', *Journal of the Pakistan Medical Association* 71(10), 2401–2406. <https://doi.org/10.47391/jpma.06-861>

- Arndt, C., Davies, R., Gabriel, S., Harris, L., Makrelow, K., Modise, B. et al., 2020, 'Impact of Covid-19 on the South African economy', Southern Africa-Towards Inclusive Economic Development Working Paper, 111, viewed 11 September 2023, from <https://sa-tied.wider.unu.edu/sites/default/files/pdf/SA-TIED-WVP-111.pdf>.
- Balas, A.N. & Kaya, H.D., 2019, 'The global economic crisis and retailers' security concerns: The trends', *Socio-Economic Challenges* 3(2), 5–14. [https://doi.org/10.21272/sec.3\(2\).5-14.2019](https://doi.org/10.21272/sec.3(2).5-14.2019)
- Bamfield, J. & Hollinger, R.C., 2020, 'Managing losses in the retail store: A comparison of loss prevention activity in the United States and Great Britain', in G. Mars (ed.), *Occupational crime*, pp. 401–410, Routledge, New York.
- Becerra, E.P., Brynildsen, G. & Korgaonkar, P., 2022, 'The effects of acculturation on Hispanic Americans' perceptions of shoplifting', *Journal of Retailing and Consumer Services* 68, 103006. <https://doi.org/10.1016/j.jretconser.2022.103006>
- Beck, A., 2016, *Beyond shrinkage: Introducing total retail loss*, Retail Industry Leaders Association, University of Leicester, Leicester.
- Beck, A., 2017, 'Reconceptualising loss in retailing: Calling time on "shrinkage"', *The International Review of Retail, Distribution and Consumer Research* 27(4), 407–423. <https://doi.org/10.1080/09593969.2017.1319402>
- Beck, A. & Peacock, C., 2015, *New loss prevention: Redefining shrinkage management*, Macmillan Publishers Limited, London.
- Berndt, A.E., 2020, 'Sampling methods', *Journal of Human Lactation* 36(2), 224–226. <https://doi.org/10.1177/0890334420906850>
- Boniface, O., 2016, 'Integrated strategies for mitigating stock shrinkage in retail enterprises', *European Journal of Business Management* 8(2), 111–121, viewed 09 September 2023, from <https://core.ac.uk/download/pdf/234627042.pdf>.
- Bruwer, J.P., 2020, 'The sustainability of South African small medium and micro enterprises (SMMEs) operating in the retail industry amidst the ever-increasing excise taxation on tobacco products, alcohol products and plastic bags: A literature review', *Alcohol Products and Plastic Bags: A Literature Review* (March 23, 2020), viewed 12 February 2023, from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3559059.
- Cannella, S., Framinan, J.M., Bruccoleri, M., Barbosa-Póvoa, A.P. & Relvas, S., 2015, 'The effect of inventory record inaccuracy in information exchange supply chains', *European Journal of Operational Research* 243(1), 120–129, viewed n.d., from <https://www.sciencedirect.com/science/article/pii/S0377221714009254>.
- Caputo, G.A. & King, A., 2015, 'Shoplifting by male and female drug users: Gender, agency, and work', *Criminal Justice Review* 40(1), 47–66. <https://doi.org/10.1177/0734016814568012>
- Chamberlain, A.W., Boggess, L.N. & Fisher, T., 2022, 'Traveling alone or together? Neighborhood context on individual and group juvenile and adult burglary decisions', *Crime & Delinquency* 69(2), 001112872110671. <https://doi.org/10.1177/00111287211067177>
- Chanda, C. & Mwanza, B.G., 2023, 'Evaluating the significant sources of inventory shrinkage at a Zambian Department Chain Store', *Management Journal for Advanced Research* 3(6), 30–36. <https://doi.org/10.54741/mjar.3.6.4>
- Choi, M., Rabinovich, E. & Richards, T.J., 2019, 'Supply chain contracts and inventory shrinkage: An empirical analysis in the grocery retailing industry', *Decision Sciences* 50(4), 694–725. <https://doi.org/10.1111/deci.12356>
- Corsten, D., 2013, 'Profit protection new ways to combat shrinkage', *Consumer and Goods* 1, 1–40.
- Dengetsha, M.R., 2004, 'Retail shrinkage at two selected stores', Doctoral dissertation, University of KwaZulu-Natal, Durban.
- Ekegbo, T.V., Quede, B., Mienahata, C., Siwangaza, L., Smit, Y. & Bruwer, J.P., 2018, 'Shrinkage risk management initiatives in retail SMMEs operating in the Cape Town City Bowl', in *International Conference on Business and Management Dynamics*, viewed 11 March 2024, from <https://digitalknowledge.cput.ac.za/handle/11189/8274>.
- Eminue, U.O., Titus, C.U. & Udo, L.O., 2019, 'Stock management strategies and safeguarding of inventory shrinkage in large-scale retail outlets in Akwa Ibom state, Nigeria: An empirical review', *European Journal of Economic and Financial Research*, viewed 11 March 2023, from <https://oapub.org/soc/index.php/EJEFR/article/view/575>.
- Enaifoghe, A., 2023, *Enhancing the Role and Contributions of Small and Medium Enterprises (SMEs) in a Globalized and Innovative Economy: Challenges and Opportunities*, viewed n.d., from <https://www.preprints.org/manuscript/202305.1748>.
- Etikan, I. & Bala, K., 2017, 'Sampling and sampling methods', *Biometrics & Biostatistics International Journal* 5(6), 00149. <https://doi.org/10.15406/bbij.2017.05.00149>
- Etikan, I., Musa, S.A. & Alkassim, R.S., 2016, 'Comparison of convenience sampling and purposive sampling', *American Journal of Theoretical and Applied Statistics* 5(1), 1–4. <https://doi.org/10.11648/j.ajtas.20160501.11>
- Fatihudin, D., 2018, 'How measuring financial performance', *International Journal of Civil Engineering and Technology (IJCIET)* 9(6), 553–557, viewed 28 August 2023, from <https://repository.um-surabaya.ac.id/id/eprint/3260>.
- Frei, R., Jack, L. & Krzyzaniak, S.A., 2020, 'Sustainable reverse supply chains and circular economy in multichannel retail returns', *Business Strategy and the Environment* 29(5), 1925–1940. <https://doi.org/10.1002/bse.2479>
- Gill, S.L., 2020, 'Qualitative sampling methods', *Journal of Human Lactation* 36(4), 579–581. <https://doi.org/10.1177/0890334420949218>
- Global Retail Theft Barometer, 2014, *The new barometer*, Checkpoint Systems, Inc., Thorofare, NJ.
- Global Retail Theft Barometer, 2015, *The new barometer*, Checkpoint Systems, Inc., Thorofare, NJ.
- Global Retail Theft Barometer, 2021, *The new barometer*, Checkpoint Systems, Inc., Thorofare, NJ.

- Gonda, G., Gorgenyi-Hegyessy, E., Nathan, R.J. & Fekete-Farkas, M., 2020, 'Competitive factors of fashion retail sector with special focus on SMEs', *Economies* 8(4), 95. <https://doi.org/10.3390/economies8040095>
- Grimmer, L., 2022, 'Lessons from the COVID19 pandemic: The case of retail and consumer service firms', *Journal of Retailing and Consumer Services* 68, 1–11. <https://doi.org/10.1016/j.jretconser.2022.103012>
- Guerra-Castro, E.J., Cajas, J.C., Simões, N., Cruz-Motta, J.J. & Mascaró, M., 2021, 'SSP: An R package to estimate sampling effort in studies of ecological communities', *Ecography* 44(4), 561–573. <https://doi.org/10.1111/ecog.05284>
- Hair, J.F., Black, W.C., Babin, B.J. & Anderson, R.E., 2014, *An analysis of mental wellbeing and mental psychopathology of gifted students by an emotional and social developmental process perspective*, viewed 22 August 2023, from https://www.researchgate.net/profile/Sarah-Kwang-Surk-jeong-gwangseog/publication/361684201_An_analysis_of_relations_of_mental_well-being_and_mental_psychopathology_of_gifted_students_by_an_emotional_and_social_developmental_process_perspective/links/63f7a45a574950594539286e/An-analysis-of-relations-of-mental-well-being-and-mental-psychopathology-of-gifted-students-by-an-emotional-and-social-developmental-process-perspective.pdf
- Hayes, R., Strome, S., Johns, T., Scicchitano, M. & Downs, D., 2019, 'Testing the effectiveness of anti-theft wraps across product types in retail environments: A randomized controlled trial', *Journal of Experimental Criminology* 15, 703–718. <https://doi.org/10.1007/s11292-019-09365-2>
- Horoš, I.K. & Ruppenthal, T., 2021, 'Avoidance of food waste from a grocery retail store owner's perspective', *Sustainability* 13(2), 550. <https://doi.org/10.3390/su13020550>
- Ikurayake, B.J., Konya, K. & Ejo-Orusa, H., 2019, 'Employee dissatisfaction and workplace theft of retail firms in Port Harcourt, Nigeria', *International Journal of Advanced Academic Research* 5(5), 44–57, viewed 24 August 2023 from, <https://www.ijaar.org/articles/Volume5-Number5/Social-Management-Sciences/ijaar-sms-v5n5-may19-p4.pdf>
- Jameel, B., Shaheen, S. & Majid, U., 2018, 'Introduction to qualitative research for novice investigators', *Undergraduate Research in Natural and Clinical Science and Technology Journal* 2, 1–6. <https://doi.org/10.26685/urncst.57>
- Jensen, J.M., Cole, M.S. & Rubin, R.S., 2019, 'Predicting retail shrink from performance pressure, ethical leader behavior, and store-level incivility', *Journal of Organizational Behavior* 40(6), 723–739. <https://doi.org/10.1002/job.2366>
- Kang, Y. & Gershwin, S.B., 2005, 'Information inaccuracy in inventory systems: Stock loss and stockout', *IIE Transactions* 37(9), 843–859, viewed n.d., from <https://www.tandfonline.com/doi/abs/10.1080/07408170590969861>
- Kawira, K.D., Mukulu, E. & Odhiambo, R., 2019, 'Effect of digital marketing on the performance of MSMEs in Kenya', *Journal of Marketing and Communication* 2(1), 1–23, viewed 09 August 2023, from <https://api.semanticscholar.org/CorpusID:182011573>
- Kibacia, D.G., Kamau, G. & Siror, J., 2017, 'Establish the effectiveness of system controls on countering shoplifting in supermarkets in Nairobi', *International Journal of Academic Research in Business and Social Sciences* 7(8), 29–38. <https://doi.org/10.6007/IJARBS/v7-i8/3203>
- Kiprugut, T.P., Mwaeke, P. & Mwangi, W., 2021, 'Supermarket operators' perception of effects: Shoplifting crimes within the CBD in Nairobi County, Kenya', *European Journal of Humanities and Social Sciences* 1(6), 39–47. <https://doi.org/10.24018/ejsocial.2021.1.6.168>
- Korgaonkar, P., Becerra, E.P., Mangleburg, T. & Bilgihan, A., 2021, 'Retail employee theft: When retail security alone is not enough', *Psychology & Marketing* 38(5), 721–734. <https://doi.org/10.1002/mar.21460>
- Kumar, V., Nigam, V. & Rakesh, M., 2020, 'An empirical analysis of inventory shrinkage in retail sector of India', *European Journal of Molecular & Clinical Medicine* 7(8), 5076–5088.
- Kumari, K. & Yadav, S., 2018, 'Linear regression analysis study', *Journal of the practice of Cardiovascular Sciences* 4(1), 33–36, viewed n.d., from https://journals.lww.com/jpcps/fulltext/2018/04010/linear_regression_analysis_study.9.aspx
- Leedy, P.D. & Ormrod, J.E., 2019, *Practical research*, Pearson Prentice-Hall, Upper Saddle River, viewed 11 July 2023, from <https://www.pearsonhighered.com/assets/preface/0/1/3/4/0134802764.pdf>
- Leisching, A. & Woodside, A.G., 2019, 'Who approves fraudulence? Configurational causes of consumers' unethical judgments', *Journal of Business Ethics* 158, 713–726. <https://doi.org/10.1007/s10551-017-3703-3>
- Li, R., Song, J.S.J., Sun, S. & Zheng, X., 2022, 'Fight inventory shrinkage: Simultaneous learning of inventory level and shrinkage rate', *Production and Operations Management* 31(6), 2477–2491. <https://doi.org/10.1111/poms.13692>
- Mabhungu, I., 2017, 'A performance measurement framework to enhance the success and survival of retail micro, small and medium enterprises', Doctoral dissertation, University of South Africa.
- Maduku, H. & Kaseeram, I., 2021, 'Success indicators among black owned informal small micro and medium enterprises (SMMEs) in South Africa', *Development Southern Africa* 38(4), 664–682. <https://doi.org/10.1080/0376835X.2021.1913997>
- Mahadea, D. & Khumalo, S., 2020, 'Entry into and exit from informal microenterprise entrepreneurship in a South African municipality: A tale of resilience', *Journal of Developmental Entrepreneurship* 25(3), 1–23. <https://doi.org/10.1142/S108494672050020X>
- Marques, P.A. & De Carvalho, A.M., 2021, 'Reducing shrinkage and stockouts in a food retail store: A Portuguese case study', *Jurnal Teknik Industri* 23(2), 93–100. <https://doi.org/10.9744/jti.23.2.93-100>
- Matekenya, W. & Moyo, C., 2022, 'Innovation as a driver of SMME performance in South Africa: A quantile regression approach', *African Journal of Economic and Management Studies* 13(3), 452–467. <https://doi.org/10.1108/AJEMS-06-2021-0306>
- Mcgoey, C.E., 2015, *Retail loss prevention; employee theft*, Aegis Books Inc., Brisbane.
- Mellinger, C.D. & Hanson, T.A., 2020, 'Methodological considerations for survey research: Validity, reliability, and quantitative analysis', *Linguistica Antverpiensia, New Series—Themes in Translation Studies* 19, 172–190. <https://doi.org/10.52034/lanstts.v19i0.549>
- Merry, J.W., Elenchin, M.K. & Surma, R.N., 2021, 'Should students change their answers on multiple choice questions?', *Advances in Physiology Education* 45(1), 182–190. <https://doi.org/10.1152/advan.00090.2020>
- Mhlongo, T. & Daya, P., 2023, 'Challenges faced by small, medium and micro enterprises in Gauteng: A case for entrepreneurial leadership as an essential tool for success', *Southern African Journal of Entrepreneurship and Small Business Management* 15(1), 1–12. <https://doi.org/10.4102/sajesbm.v15i1.591>
- National Retail Federation, 2015, *The 2015 national retail security survey*, University of Florida, Washington, DC.
- National Retail Federation, 2020, *The 2020 national retail security survey*, University of Florida, Washington, DC.
- Nyathi, L., 2022, 'Challenges facing SMEs in the Western Cape townships with a focus on gender issues', Master's thesis, Faculty of Commerce, University of Cape Town.
- Oni, O. & Omonona, S., 2020, 'The effect of COVID-19 on small retail', *The Retail and Marketing Review* 16(3), 48–57. <https://doi.org/10.10520/ejc-irmr1-v16-n3-a5>
- Özaşçilar, M. & Ozturk, H., 2023, 'Shoplifting in shopping malls in an emerging market: Evidence from Turkey', *Journal of Applied Security Research* 18(1), 70–85. <https://doi.org/10.1080/19361610.2021.1933323>
- Pace, D.S., 2021, 'Probability and non-probability sampling—an entry point for undergraduate researchers', *International Journal of Quantitative and Qualitative Research Methods* 9(2), 1–15, viewed 18 July 2023, from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3851952.
- Pallant, J., 2020, *SPSS survival manual: A step by step guide to data analysis using IBM SPSS*, McGraw-Hill Education (UK), London.
- Panda, S., Saha, S. & Nandi, S., 2012, 'Retailers optimal pricing and economic order quantity in stock and price sensitive demand environment', *International Journal of Operational Research* 15(4), 406–423. <https://doi.org/10.1504/IJOR.2012.050148>
- Peters, S. & Maniam, B., 2016, 'Corporate fraud and employee theft: Impacts and costs on business', *Journal of Business & Behavioral Sciences* 28(2), 104–117, viewed 06 October 2023, from http://asbbs.org/files/2016/JBBS_28_2_Fall_2016.pdf#page=105.
- Plonsky, L. & Ghanbar, H., 2018, 'Multiple regression in L2 research: A methodological synthesis and guide to interpreting R2 values', *The Modern Language Journal* 102(4), 713–731. <https://doi.org/10.1111/modl.12509>
- Rekik, Y., 2011, 'An analysis of the impact of RFID technology on inventory systems', in D. Ranasinghe, Q. Sheng, S. Zeadally (eds.), *Unique Radio Innovation for the 21st Century: Building Scalable and Global RFID Networks*, pp. 435–450, Springer, Heidelberg, viewed n.d., from https://link.springer.com/chapter/10.1007/978-3-642-03462-6_20.
- Rekik, Y., Syntetos, A.A. & Glock, C.H., 2019, 'Modeling (and learning from) Inventory Inaccuracies in e-retailing/B2B contexts', *Decision Sciences* 50(6), 184–1223, viewed n.d., from <https://onlinelibrary.wiley.com/doi/abs/10.1111/deci.12367>.
- Saleemi, M.W. & Amir-ud-Din, R., 2019, *How does quality of governance influence occurrence of crime? A longitudinal analysis of Asian countries*, viewed 09 September 2023, from <https://mpr.ub.uni-muenchen.de/id/eprint/94142>.
- Saunders, M., Lewis, P. & Thornhill, A., 2009, *Research methods for business students*, Pearson Education, London.
- Scott, P.M., 2023, 'The booster, the snitch, and the bogus false arrest victim: Retailers and shoplifters in Interwar America and Britain', *Enterprise & Society* 24(1), 123–148. <https://doi.org/10.1017/eso.2021.26>
- Shukla, Y., 2018, 'New opportunities in inventory management in the hotel industry', *Journal of Commerce, Economics & Management [Online]* 2(1), 46–57, viewed n.d., from <http://management.nrjp.co.in/index.php/JCEM/article/view/197>.
- Singini, O.J., 2020, 'Criminological analysis on mechanisms used to control shoplifting in Durban Central Business District', Doctoral dissertation, University of KwaZulu-Natal, Durban.
- Song, L. & Li, X., 2022, 'Enterprise e-commerce management strategies based on light weight deep learning model in the context of new retail', *Mobile Information Systems* 2022, 1946521. <https://doi.org/10.1155/2022/1946521>
- South Africa. Department of Presidency, 2015, *National development plan 2030*, viewed 11 September 2023, from <https://www.gov.za/issues/national-development-plan-2030>.
- Tuomala, V. & Grant, D.B., 2022, 'Exploring supply chain issues affecting food access and security among urban poor in South Africa', *The International Journal of Logistics Management* 33(5), 27–48. <https://doi.org/10.1108/IJLM-01-2021-0007>
- Van Der Walt, F., Jonck, P. & De Lange, J.J., 2016, 'Exploring retail crime in a business sector of South Africa', *Academic Fora* 15(1), 1–9, viewed 26 July 2023, from https://www.researchgate.net/profile/Petronella-Jonck-2/publication/305407604_Exploring_Retail_Crime_in_A_Business_Sector_of_South_Africa/links/578e135e08ae81b4466eb534/Exploring-Retail-Crime-in-A-Business-Sector-of-South-Africa.pdf
- Van Zyl, D. & Pellissier, R., 2017, 'Surveys as research strategy', in P. Venter & D. van Zyl (eds.), *Economic and management research*, pp. 131–155, Oxford University Press, Cape Town.

Velandia-Bautista, F., 2019, 'Employee theft predictors: A systematic review', Master's thesis, Universidad Católica De Colombia.

Vhenge, W.K., 2016, 'The effect of shrinkage on company performance: Case of Choppies supermarket Mkoba branch', Bcom honours disseration, Midlands State University Zimbabwe.

Woodside, A. & Leischnig, A., 2019, 'Who Approves Fraudulence? Configurational Causes of Consumers', *Unethical Judgments. Journal of Business Ethics* 158(3), viewed n.d., from <https://philpapers.org/rec/WOOWAF-3>.

Williams, B., 2022, 'Record linkage in statistical sampling: Past, present, and future', in *Recent advances on sampling methods and educational statistics: In Honor of S. Lynne Stokes*, pp. 187–198, Springer International Publishing, Cham, viewed 27 September 2023, from https://link.springer.com/chapter/10.1007/978-3-031-14525-4_9.

Zimbardo, P.G. & Boyd, J.N., 2014, 'Putting time in perspective: A valid, reliable individual-differences metric', in M. Stolarski, N. Fieulaine & W. van Beek (eds.), *Time perspective theory; review, research and application: Essays in Honor of Philip G. Zimbardo*, pp. 17–55, Springer International Publishing, Cham.