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The correlation between safety mindset, safety performance and safety culture in organisations

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Abstract. Understanding the factors leading a Safety Culture of Zero Harm has been a recurring topic of discussion and research for many decades. Pivotal to understanding a Safety Culture is to understand what the people in the work environment think about safety and how they do safety. For so long focus has always been on the doing part, which is the behaviour related to safety. The missing element is to scrutinise the 'thinking' which are core to the belief systems of people. Safe behaviour or at-risk behaviour can only be changed when these core beliefs are addressed. This study is to investigate the Safety Mindset, which is key to the foundation of the beliefs and to understand the relation of this mindset to the doing of safe safety. The essence is, therefore focussed on understanding the relationship between Safety Mindset (beliefs) and Safety Performance (Behaviours). The research in this dissertation sought to establish the correlation between Safety Mindset and Safety Performance and to understand how this significant combination leads to a Safety Culture of Zero Harm.

Keywords. Safety mindset, safety performance, safety culture, at risk behaviour, zero harm

1. Introduction

Leadership culture has progressively come to the fore as a significant aspect of safety, safety culture and Safety Mindset. Very little literature is found of this concept within this industry. Safety and specifically in the occupational safety arena is under the spotlight as fatalities are seen as the primary cause. The research is initiated to comprehend the effect of organisational leadership factors on safety in an African owned operation, with the view of finding ways to improve workplace safety. The research will report on the effect a Safety Mindset has on Safety Performance and how these two factors correlate with indicating safety culture. The investigated problem allows for an opportunity to focus and write and articulate the outcomes of the investigation. Furthermore, the core subject matter found in scholarly communication is presented and utilised to arrive at different conversation topics leading to new understanding and knowledge. Tacit knowledge of the past two decades suggested that there is a profound and direct correlation between Safety Mindset, Safety Performance and safety culture. Employees, in general, undervalue risk in the workplace. Their Safety Mindset (how they think about safety) will result in low levels of Safety Performance (the way we do safety), this mindset of the perceived way thinking will become a common belief

and will result in a specific safety culture (the way we think about and do safety). The *perceived* intent of leadership is to manage by fear trying to force or to compel workers to be safe in their work environment, should a worker transgress any of the safety rules then punitive actions can be expected. However, this 'fear environment' has an opposite reaction whereby the mindset is not focussed on safe production instead of trying the best to stay out of trouble.

Despite many efforts to improve safety culture, it is found that many of these efforts are not as effective as the current state of the organisation's Safety Mindset is not understood. Many organisations are at different stages to embrace safety as a core value. The readiness to embrace safety as a core value should be a pre-requisite of to any intervention as this will guide the organisation at which level to pitch actions that will ultimately improve the Safety Mindset, Safety Performance and safety culture.

2. The research problem

This research problem is relevant to an internalised safety culture as this study deals with Safety Mindset, Safety Performance and safety culture as its focus in an occupational safety context.

This research aims to provide greater insight into the intricacy of the facets of Safety Mindset and Safety Performance to improve an organisational safety culture

This topic of this research is understudied, as most available literature refers to central concepts in isolation.

The majority of literature regards the addressing at-risk behaviours as a solution to move an organisation into the desired safety culture, typically by identifying at-risk behaviours, determining a critical safe behaviour and then forcing the workforce to implement these desired behaviours, usually by policing and sanctions. The difficulty with this specific focus is that it should cause a misunderstanding of what the beliefs of the workforce are; then it is unknown what the workforce thinks and feel, which will lead to specific behaviour. A quantitative and descriptive study design was performed at one South African organisation in the secondary sector of the economy in order to warrant the accomplishment of this research. The conclusions of the research will be valuable to the organisation as it will advance sensitivities into its current Safety Mindset and how it affects safety culture.

3. Objectives of the study

Paler-Calmorin and Calmorin (2007) define a research objective as a "purpose statement of the research to be conducted". The research is exploratory, as it investigated the theme in order to attain insight and concepts about its essential make-up (McNabb, 2014).

- **Objective 1** – To explore whether Safety Mindset positive positively relate to Safety Performance.
- **Objective 2** – To explore how Safety Mindset and Safety Performance positively relate to safety culture.
- **Objective 3** – To explore whether a combined focus on Safety Mindset and Safety Performance, positively relates to safety culture within the South African secondary sector context.

The occupational safety arena specifically within the primary is facing a magnitude of challenges from society, legislation and stakeholders as the loss of life cannot be quantified in money as the perception of all parties involved will see that there is blood on the final product.

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Confusion exists surrounding the relationship of Safety Mindset and safety culture, this results that many culture and climate assessment tools are used interchangeably, and since the relationship is not clear, a magnitude of assessment tools are used to assess both safety climate, and safety culture as some organisations view them as one as distinct whilst others view them as two different aspects. The lagging indicator, i.e. Safety Performance, is thus used in most instance to drive safety strategy, and the result of this approach proves to be fatal in some instances.

It is essential for a consensus regarding the technical definitions for safety climate, Safety Performance and for Safety Mindset, the relationship between should be clarified between Safety Mindset and Safety Performance and the combination thereof with regards to safety culture. The current study will address these gaps of understanding and by the specific interaction between safety-mindset, safety performance and safety culture.

4. Conceptional Framework

Variables relevant to the research study, will, in this chapter, be defined, deliberated, and conceptualised. These variables are Safety Mindset, Safety Performance and safety culture.

The conceptional framework aims to explain the reciprocated dependency between Safety Mindset and Safety Performance which and influences safety culture as depicted in Figure 1

4.1. Safety Culture

Edwards, Davey and Armstrong (2015) conceptualises Safety Culture as a combination of systems and structures (organisational), shared beliefs, mindsets, and principles. Familiar attitudes toward safety culture, which have been stated to as a normative approach, commonly accentuate to having a sustainable safety culture, which can be deliberated by addressing the existence and degree of diverse organisational characteristics, or assessments of leadership traits. These assessments are based on safety-climate-and-culture surveys to scrutinise the apparent levels that lead to climate and culture. The fundamental essentials scrutinised in these investigations generally defines the assessments of the workforce view of its leadership (Guldenmund, 2007). (Cooper, 2001), clearly states that the establishment of a safety culture requires high-level and well-defined super goal like *Zero Harm*, which is accomplished by dividing the goal into sub-goals that are projected to direct the awareness of the workforce towards 'working safely'. Though, the correlation between enhanced Safety Performance and higher safety culture and climate scores is not strongly reinforced by evidence as these have been mis measured in the past.

The author sees Safety Culture as is the 'instantaneous and direct sensation' that employees have regarding on 'how safety is done' at the workplace – and this sensation originates from work life experiences by employees at their workplace. Employees assimilate countless 'sensations' (experiences) at the workplace and experience those as the safety culture.

A high Safety Culture reflects a compelling and inspirational work environment as perceived and embraces an authentic and caring work atmosphere. Such a cohesive work atmosphere is conducive to the alignment of employee expectations and company goals and becomes an automatic driver of positive behaviour.

A low Safety Culture indicates a demoralising and to some extent, false (untrue) work environment, as perceived, and embraces an uncaring and probably a hostile work atmosphere. Such an unpleasant work atmosphere tends to misalign worker expectations and company safety goals, disharmonising work relationships and has the potential to impact on attitudes, thoughts and behaviours negatively, and therefore enhances a fatalistic approach toward work and safety at work.

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4.2. Safety Mindset

Dweck, 2006; Yeager et al. (2011), states that the origin of work engagement and mindset research are found in the studying of learning strategies of individuals at academical institutions. A relatively fixed mindset is explained as individuals who have specific, characteristics (traits), like their ability and intelligence which are constant and unchanging, whereas people with a growth mindset, are seen to believe in their flexibility of specific characteristics (traits) (Murphy and Dweck, 2016). Learning performance has a direct correlation to a growth mindset. Studies focussing on education have indicated that there is a positive correlation between mindset and learning (Dweck, 2006; Asbury *et al.*, 2015).

Yeager *et al.* (2011), also reiterated the positive correlation between mindset and resilience. Yeager argues that individuals respond better to difficult situations when they have a fundamental belief, that past behaviours, do not define them. These situations, such as setbacks are instead seen as opportunities for learning and growth. Yeager *et al.* (2011), further explain that motivated employees give their best when they believe that their essential traits can be changed. Until recently, most studies have failed to link mindset to engagement, especially at work and in this study, the relationship to engaged safety.

Five mechanisms were identified by Keating and Heslin (2015) where the mindset of employees can prompt their level of engagement, namely, their excitement for self-development, their focus on attention, how they see personal setbacks and how eager they are instilled in the efforts of what they do.

Keating and Heslin (2015), identified five means by which the mindset of employees can positively prompt their engagement by; having enthusiasm for self-development, understanding their efforts, focused attention, self-analysis of setbacks and having quality interpersonal interactions.

Schutte P.C. (1998), reported to 'The Sustained health, safety and conformance. Safety in Mines Research Advisory Committee' (SIMRAC) that the Safety Mindset of a workforce is permanently moulded safety climate also described as work-life experiences consisting of the relationships between employees and their superiors. Strong leadership and leadership culture ensure stable relationships by creating a safe climate and a stimulating work atmosphere resulting in specific safety engagement beliefs. The lack of real leadership culture that certifies an efficient workplace, and the subsequent absence of safety beliefs, will lead to a narrow Safety Mindset thus to a fatalistic approach towards safety (Schutte P.C., 1998). Thus, leadership culture is seen as the key, to the development of desired employee behaviours contributing to a safe environment (climate) also towards the minimising of work-related incidents and injuries. It is thus implied that leaders in a safe-organisational framework have a Safety Mindset that encourages safe-production; their subordinates would also mature into a comparable Safety Mindset, ensuring safe behaviours. It is thus imperative that leaders inspire the workforce to have a growth mindset. Growth mindsets from the workforce, and particularly those of leadership, guarantee consistent success and growth (Dweck, 2006).

The author perceives the Safety Mindset as the state of inspiration, as apparent by the workforce. The Safety Mindset also echoes the caring atmosphere and the authenticity of the working relationship instilled by leadership and experienced in the organisation, it, consequently, reproduces a level of the employee engagement towards safety. The Safety Mindset, therefore, will contextualise of employee/workforce behaviours. A high Safety Mindset is indicative of an inspirational work environment, a supportive work culture, positive team morale, including

employee engagement towards safe production. A low Safety Mindset reflects an immature work relationship, possible damaging work culture, possibly demotivated employees or pockets of employees, with a lack of employee engagement and such a climate has the risky likelihood to reinforce a fatalistic attitude towards safe production.

4.3. Safety Performance

Safety Performance is also viewed as a sub-system of the organisation's performance. Usually, the concept inside an organisation, regarding safety-performance has been connected to lagging safety indicators and the implementation of the statutory safety system such as the Occupational Safety and Health Act (OSHA). Experience has taught that mere reliance on general safety is not enough to address Safety Performance and will put the organisation at risk (Cooper, 2001). Christian *et al.*, (2009) also accentuates this as it is found that reporting in most cases are indicative to skewed distribution as many companies only make use of the number of incidents while the workforce does not report incidents due to the fear of the consequences thereof. The resultant effect is that the calculation of psychological antecedents based on the safety-related incidents, tends to be weak (Zohar, 2010). Recognisably is that trends to improve safety based on the statistics indicate that safety as a whole has reached a plateau – referred to as a safety glass ceiling (Akpan, 2011).

Akpan states that organisations cannot find a way to break through proverbial 'glass ceiling' as they struggle to reduce the incidents, injuries and fatalities (Akpan, 2011). Taylor, names this inability to improve 'the culture gap' and maintains if more significant commitment, involvement and Safety Ownership is facilitated, coached and mentored by leadership, it is possible to break through the glass ceiling and close the gap (Taylor, 2002; Akpan, 2011).

Hudson terms this gap or glass ceiling 'the developmental line' and contends the gap is due to the result of what follows on the achievement of technology and systems regarding Safety Performance; he further argues that only an explicit knowledge-and-understanding of the organisational culture will close this gap (Hudson, 2007).

Through many years and an international safety community, organisations have realised that an adequate safety framework is required to ensure that the target of zero harm is achieved. The mere fact, to only comply with international standard and legislation, is not enough as a business are compelled to go beyond the mechanistic way of compliance measures. Added onto this are the associated costs of failed Safety Performance due to personal injury, loss of equipment and legal costs, (Sawacha, Naoum and Fong, 1999; Zhang *et al.*, 2017).

The majority of countries across the globe, of the developed world, have laws that oversee workplace safety and organisations being responsible for managing and implementing those laws. (Petersen, 2000), challenges this notion as he states that the most significant impact on the reduction on safety-related incidents is not by enforcing the law; instead, the implementation of a robust management system. It is further argued that stable workplace social structures combined with technical arrangements, ensure the capacity to accomplish operational safety goals and objectives, (Mearns, Whitaker and Flin, 2003).

Pidgeon, further debated that the breakdown of organisational beliefs regarding hazards defines humanmade disasters, and not just the physical impact. (Pidgeon, 1991). Flin *et al.* (2000), states that it is equally essential for an organisation to drive and support a culture that reflects safety as the effort put in to prevent safety-related incidents. Safety Performance can only be achieved if the safety culture of the organisation supports it (Flin *et al.*, 2000). Organisations have evolved the past period in their thinking and started to comprehend the importance of a safe culture to reliably

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predict the perceived importance of safety from the organisation's employees in their workplace, (O'Neill, Wolfe and Holley, 2013). This will ensure that in the future that employees' perceptions regarding safety will improve not only the Safety Performance but also the safety culture of the organisation, (Griffin *et al.*, 2000; Zhao, Teng and Wu, 2018).

O'Toole (2002) has found and argues it is the positive employee perception regarding safety that leads to Safety Performance, to achieve Zero Harm.

At-Risk Behaviours, safe decisions and proactiveness are directly related to the safety perceptions of the employee, (O'Toole, 2002; Zhao, Teng and Wu, 2018). Additionally, to this, it has also been found that the positive attitude an employee has towards the organisation's management and their subsequent commitment results into Safety Performance improvements, furthermore the mere forcing down of safety systems onto employees will not gain the commitment from teams and individuals regarding safety. It requires that leadership 'walk the talk' and leads by example, showing their commitment to the safety values of the organisation, (Taylor, 2002; Mearns, Whitaker and Flin, 2003; O'Connor *et al.*, 2011).

Employee perceptions in terms of the leadership's commitment as well as leadership's support to the source the best safety training, will directly impact the likelihood of the employee to perform safely and to comply with willingly and, internalise safety and health policies and rules, (Bailey, 1989).

Cooper and Phillips (2004) argue that to achieve high levels of Safety Performance based on the reduction of safety incidents and the mitigation of safety costs, that a supportive safety culture that includes leadership commitment, effective safety systems and buy-in of all employees.

5. Research Framework

The different components discussed above will be fit into a proposed framework and evaluated in terms of their contribution and correlation to each other. Key to be depiction below is to understand the specific correlation between Safety Mindset and Safety Performance and how these two dimensions together address safety culture.

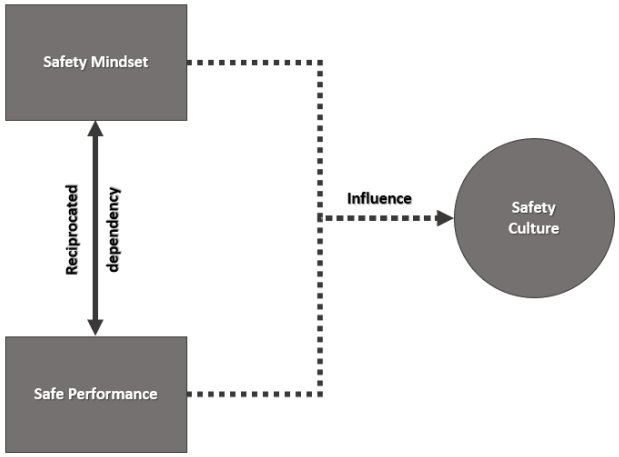

FIGURE 1: Research framework

Drivers of Safety Mindset

The literature review highlighted that there are various drivers of a Safety Mindset. These drivers have specific relationships and correlations, towards Safety Mindset and are listed as; the

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relationship between workers and their supervisors, the level of safety engagement and how the organisation instils an atmosphere of safety involvement, leading to Safety Ownership. Also indicated is that Safety Mindset is a pure reflection of the safety climate as seen as a facet to indicate the level of a particular Safety Mindset.

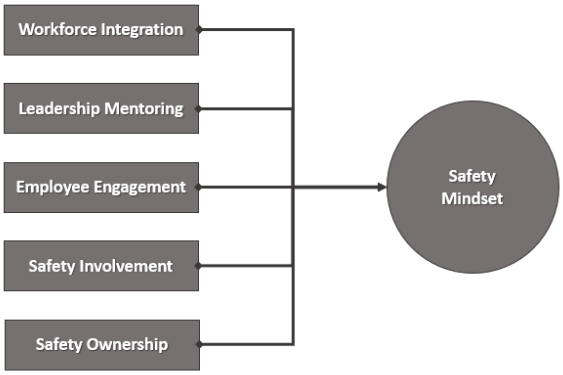

FIGURE 2 – Drivers effecting of Safety Mindset

Drivers of Safety Performance

The literature review highlighted that there are multiple drivers of Safety Performance. These drivers have a direct correlation with safe behaviours and are listed as; the level of the perceptiveness of the organisation towards safety, conformity as an indication towards following safety rules, how the workforce personifies safety and how teams, work levels and individuals work together indicating overall Safety Performance.

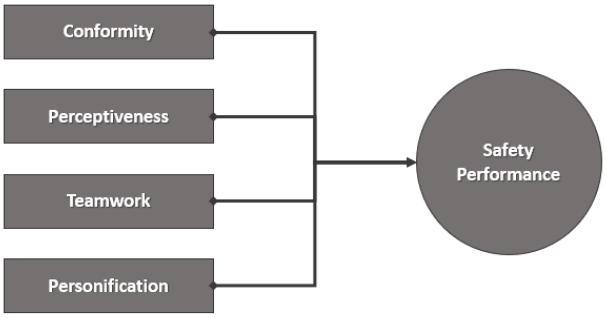

FIGURE 3 – Drivers affecting Safety Performance

Proposed framework

The proposed framework will explain all the drivers and facets that will determine the levels of Safety Mindset and Safety Performance. Additionally, it will attempt to prove the reciprocated dependency and correlation between Safety Mindset and Safety Performance, and finally, it will report on the topic of this research which is to explore the correlation between Safety Mindset and Safety Performance and how these factors indicate safety culture.

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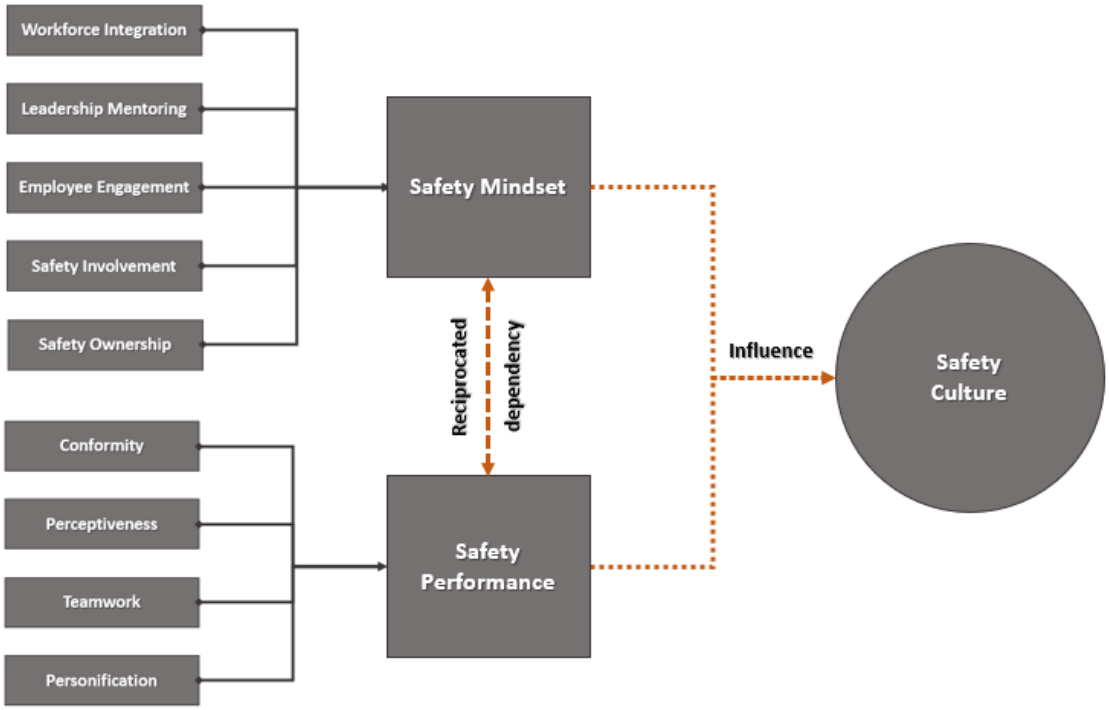

FIGURE 4 – Proposed research framework

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6. Methods and materials

The details of the methods and materials will explain how the research was carried to answer to each of the research objectives.

The research was done in November 2018 in the heart of KwaZulu Natal at a sugar refinery. This factory is part and parcel of the existence of the whole surrounding community and is also part of a large international stock exchange conglomerate. It also provides the livelihood of most of the farmers in the region and has over the years built long and lasting co-dependent relationships throughout the primary economic sector in the region.

Instrument

Quantitative data was collected using the PDS™ question set owned by JvR Safety PTY (LTD). The PDS™ is a globally utilised and statistically validated items, used to determine an organisation's status quo within three separates, yet interdependent, fundamental elements of this research study. The PDS™ consists of 83 items, and the respondent needed to indicate the occurrence of the item, i.e. Always, Often, Sometimes and Never. These items were captured on the StratisQ Software. Special permission was granted by the board of directors of JvR Safety PTY (LTD). The process entailed a paper and pencil exercise which took place during a facilitated session where all items were translated and interpreted when required.

Sample and dataset

The accessible population of the research study equated to a maximum of 420 respondents and participants which comprised of the general manager and senior managers, senior foremen, supervisors, and employees. A 75,34% response rate was reached and is depicted in Table 1.

The majority of the respondents were permanent employees (98,73%) while a tiny and insignificant portion were contract workers (1,27%). From the respondents, 11 (3,48%) were part of the senior leadership team, 61 (26,6%) represented the middle and supervisory levels while 233 (70,6%) denoted the number of frontline staff that participated in the survey.

The majority of the respondents (75,9%) fell within the specialist technical disciplines such as artisans and engineer, divided between maintenance and operations. The rest of the population (24,9%) represented support services

The bulk of the workers are below 40 (54,1%) while the rest of the employees are above 41 (45,9%). The greater part of the respondents, more specifically, 68,7% or 217 individuals, are male; in comparison to female respondents who were 23,7% of the respondents. 7,6% chose not to indicate their gender, finally 69,9% of the respondents have been less than ten years in their roles. A possible concern could be the fact that a young population of the workforce are also representing the oldest, which might be indicative of an ineffective talent management process

Reliability

According to Zohrabi (2013), the level to which a measurement gives comparable results on repeated studies explains the level of its reliability. Cronbach's alpha coefficient (α) was used in this research study to measure the reliability of each of the factors/constructs measured.

Reliability denotes thus to the level how results are consistent, stable and repeatability verified, i.e. the outcomes and the results of a research study will be deemed reliable when the same outcomes and results are achieved from different circumstance yet identical situations. The Cronbach alpha internal consistency reliability coefficients were calculated for each of the scales of Safety Mindset and Safety Performance. The results are shown in Table 2 The

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reliability coefficient meets or exceeds the required values of 0.70 or higher, indicating satisfactory reliability.

Table 2: Reliability Coefficients

Survey	Scale	alpha (α)	lower	upper
Safety Mindset	Safety Involvement	0.88	0.87	0.89
	Employee Integration	0.84	0.84	0.85
	Safety Ownership	0.73	0.71	0.75
	Leadership Mentoring	0.88	0.87	0.89
Safety Performance	Employee Engagement	0.77	0.58	0.78
	Teamwork	0.78	0.77	0.80
	Perceptiveness	0.82	0.59	0.84
	Conformity	0.70	0.68	0.72
	Personification	0.71	0.69	0.73

Validity

Zohrabi (2013) defines as the accuracy and certainty of the conclusions offered in a rigorous research study and whether it may be functional to other population. In the effort to guarantee the validity, an instrument should be designed and developed to measure the particular issue in question.

Thatcher (2010) defines validity as the magnitude a measurement tool will successfully measure the planned measure. The following will be used as guidelines to prove validity: Three facets of validity, namely, construct, internal, and external validity, will be discussed.

Construct Validity

This research study grounded the validity of the survey on construct validity, meaning that the survey used ensured to measure the facet or concept that it is intended to measure. Connaway and Powell (2010), state that construct validity encompasses more than professional opinion, and in order to authorise construct validity, the survey instrument must be evaluated that it measures the constructs and facets in question, (Connaway and Powell, 2010). Connaway and Powell (2010), define a Rasch analysis as a set of progressive statistical approaches utilised in evaluating explicit theories linked to the structure supporting the variables in a research study. Rasch analysis was utilised to look at the interchange between each respondent's perception of Safety Mindset, Safety Performance, and safety culture, as well as (b) the ease or difficulty it was to agree or disagree with each of the items.

Item measure

The item measure is an indication of the item difficulty. The higher the item measure, the more difficult the item is to endorse (answer). Also, the higher the item measure or item difficulty, the higher the person's ability needs to be to answer that particular question (Peral and Geldenhuys, 2018).

Analysing the items utilising the RASH analysis, the items for Safety Mindset and Safety, the items fit the Rasch model well within the range of 0.50 and 1.50 (a very lenient criterion range). None of the items displayed misfit for these two facets.

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Item-person map (Wright Map)

The item-person map, also known as the Wright map, were used to plot the relationship between the difficulty of the items and the ability of the persons. It assessed the ability whether a person is able to effectively answerer the item or whether the measure was too difficult to be answered. In all the cases, the mean person ability was more significant than the mean item difficulty, suggesting that the sample found this measure/scale relatively easy to answer.

Category functioning

A four-point rating scale was used to capture individuals' responses to the Safety Mindset questionnaire, where 1 = Never, 2 = Sometimes, 3 = Often, 4 = Always. The categories all displayed good fit, and the category measures increased with each increase in the respective category option.

Internal Validity

Cause-and-effect assumptions can be drawn from the research outcomes as this guaranteed by internal validity, and a study resulting in a high internal validity carries underlying information about behaviour, (Zohrabi, 2013) The researcher had control over redundant influences that could have affected the observation; the process increased the level of internal validity, added on to this all items on the survey were pre-tested, ensuring that the respondents understood the validated questionnaire. This research compares two indexes to explain structural equation modelling fit, i.e., The Bentler's Confirmatory Fit Index (CFI) and the Root Mean Square Error of Approximation index (RMSEA) by Steiger and Lind. For the in structural equation modelling (SEM), the research utilised the model-fit indices as well as the chi-square statistic-fit indices to have an overall evaluation of the model fit. Widely applied model fit indices, i.e. the Tucker-Lewis index (TLI), comparative fit index (CFI) and the Root mean square error of approximation (RMSEA) and the to evaluate model-data fit.

To order the data and to determine categories the diagonally weighted least squares (DWLS) estimator were utilised. Uncorrected chi-square statistics from DWLS were applied to for robust corrections ensuring the alignment of the first and second order moments with the target. This DWLS, with the appropriate corrections, is referred to as the mean and variance-adjusted weighted least squares (WLSMV) estimator.

Since the chi-square statistic is adjusted by replacing the uncorrected statistics (Chi-square) with vigorous and robust statistics (Chi-square), by implication, TLI, the CFI and the RMSEA are subsequently adjusted and corrected.

Exploratory factor analysis with ordinary least squares extraction and Promax rotation indicated that extracting five factors resulted in the best fitting and most interpretable model of Safety Mindset Index, items (RMSR = .03; TLI = .925; RMSEA = .034).

The data were then fit to an oblique five-factor confirmatory model using the weighted least squares mean-variance adjusted (WLSMV) estimator. The fit of the six-factor model is moderately good (CFI = .884, TLI = .875, RMSEA = .052). When parcelling was applied to improve item stability the fit statistics improved significantly (CFI = .901, TLI = .889, RMSEA = .064)

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TABLE 3: Factor Pattern Matrix

Safety Mindset Scale	*Loading*
Employee Integration	0.79
Leadership Mentoring	0.75
Employee Engagement	0.85
Safety Involvement	0.82
Safety Ownership	0.55

Table 4: Fit Statistics

Fit Statistic	Score	Desired
Comparative Fit Index (CFI)	0.953	=> 0.90
Tucker Lewis Index (TLI)	0.948	=> 0.90
RMSEA	0.051	=< 0.06
SRMR	0.045	=< 0.08

External Validity

External validity referred to as the level to which the outcomes of a research study is positively confirmed by a population outside of that in the specific study and may thus be generalised to a greater environment, (Zohrabi, 2013). Due to the nature of a descriptive statistics study, the outcomes of the research study may only be generalised to the organisation used as the sample population, but may still be applied as a theoretical framework for other organisations within the primary sector of the South African economy.

Correlation Analysis

Safety Mindset

TABLE 5: Correlation between Safety Mindset drivers

Safety Mindset	Safety Involvement	Workforce Integration	Safety Ownership	Leadership Mentoring	Employee Engagement
Safety Involvement	1.00				
Workforce Integration	.616	1.00			
Safety Ownership	.479	.406	1.00		
Leadership Mentoring	.599	.613	.315	1.00	
Employee Engagement	.577	.547	.440	.571	1.00
*Note. ** p < .001; *p <. 05*					

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The drivers of Safety Mindset were correlated with one another to identify possible links. Strong correlations were found to exist between Safety Mindset drivers. The results of the correlations are shown in Table 5.

Safety Performance

The drivers of Safety Performance were correlated with one another to identify possible links. Strong correlations were found to exist between Safety Performance drivers. The results of the correlations are shown in Table 6

TABLE 6: Correlation between the Safety Performance drivers

Safety Performance	Teamwork	Perceptiveness	Conformity	Personification	Safety Performance
Teamwork	1				
Perceptiveness	.127**	1			
Conformity	.519**	.120**	1		
Personification	0.566**	.096*	.465**	1	
Safety Performance	.702**	.344**	.634**	.651**	1
*Note. ** p < .001; *p <. 05*					

7. Correlation between Safety Mindset and Safety Performance

The scale scores of each of the assessments (Safety Mindset and Safety Performance) were correlated with one another to identify possible links. Strong correlations were found to exist between Safety Mindset and updated Safety Performance.

The correlation between Safety Mindset and Safety Performance is 0.785 and can be seen as a strong effect. The 'P' value of smaller than .001 indicates this effect is significant. The results of the correlations are shown in Table 7.

TABLE 7.: Correlation between Safety Mindset and Safety Performance

Scale	Safety Performance	Safety Mindset
Safety Performance	1	
Safety Mindset	.785	1
*Note. ** p < .001; *p <. 05*		

The two assessments, i.e. Safety Mindset and Safety Performance, all demonstrate sufficient reliability evidence to be used as a tool within an organisational development process focussing on Safety Culture.
The factor structures for the two assessment match the scale structures, and the relationship between tests is as expected. This suggests good validity evidence.

In conclusion, it appears that the structural integrity of the two assessments is sound and can assist in providing information on which to base organisational development outcomes in terms of safety behaviour and subsequently, Safe Culture.

8. Discussion and Findings

A strong correlation was found between the way we thing about safety (Safety Mindset) and the way we do safety (Safety performance). This correlation is also positive in nature meaning that when an individual has a high mindset of safety that it would directly be indicated by higher and improved safety performance. Achieving a high safety mindset however is directly linked to specific drivers derived from a specific leadership culture which will not only motive workers but also serve as an inspiration to change beliefs regarding safety. Conversely a focus on safety performance driven by best-practices and world-class standards, endorsed and lived by leadership, will result in higher safety performance which will have a positive effect on safety mindset due to the positive correlation between Safety Mindset and Safety Performance.
The author has learnt over the years that people are, in most cases, alive due to luck. The majority of leaders being interviewed over decades have sleepless nights if their workers will make it through an incident-free shift and for that matter a facility-free shift. Safety has become a ‘tick box’ exercise where are so many ‘things’ that need to be done to keep ‘someone’ happy and to keep yourself out of ‘trouble’. In this aspect, safety has become a burden and not ‘way of life’, it has become a fear factor, and workers dread the word safety as either extra work or trouble.
The subsequent result is that organisations are found ‘doing the right things,’ i.e. doing the tick boxes and yet when it comes to the simple and essential elements of safety they fail. Recently during the research process, it became clear the impact of leaders has on Safety Mindset and Safety Performance. A clear and concise drive from leadership ‘motivated’ the workforce to comply at all cost as they should not comply, they will pay the consequences. Their lack, however, was to foster a Safety Mindset which will influence Safety Performance, where an essential intrinsic believe about caring about each other’s safety to be involved in safety matters and to have true safety situational-leadership. The consequence of; a lack of safety ownership and safety internalisation, both leadership and the workforce displayed at-risk behaviours that led to a fatality.
Petersen (2000) reiterated and argued continuously that safety leader is substantially more important than any safety policy and that through the actions and decisions by a leader, the worker will have a certain Safety Mindset and a certain level of Safety Performance. Therefore, the key reason for this research is to provide insight into the importance of the relationship between these two facets (Safety Mindset and Safety Performance) and to understand the impact thereof on Safety Culture.

9. Conclusions of the research

The goal of the research study (statistical analysis) was to establish if there is a correlation between the facets; Safety Mindset and Safety Performance and if so is it positive or negative in nature. Further, this was to determine if the drivers of each of the facets have a correlation

on the drivers of the other facets and once more to determine the nature thereof, whether it be positive or negative.
The literature review explained the role of leadership culture on both of the facets mentioned above. The key drivers of both of these facets are directly derived from leadership culture, which has a direct impact on Safety Culture (Choi and Behling, 2015).
The research study's objectives were met as follows.

- **Objective 1** – To explore whether the critical drivers of Safety Mindset and Safety Performance positively correlate positively to the proper facet.
- The Pearson correlation coefficient displays a positive relationship between the drivers of Safety Mindset and the drivers of Safety Performance.
- **Objective 2** – To explore whether Safety Mindset positive positively correlate to Safety Performance. The Pearson correlation coefficient displays a positive relationship between Safety Mindset and Safety Performance.
- **Objective 3** – To explore whether a combined focus on Safety Mindset and Safety Performance, positively relates to safety culture within the South African secondary sector context.
- In the CFA, a series of models were tested to investigate the factor structure of two measures, namely Safety Mindset and Safety Performance. In conclusion, it appears that the structural integrity of the two assessments is sound and can assist in providing information on which to base organisational development outcomes in terms of safety behaviour and subsequently, Safe Culture.

9.1 Summary of the findings

The research study exhibited that there is a reliable and positive correlation Safety Mindset and Safety Performance. Further to this, the study showed a healthy and positive relationship (correlation) between the drivers of the two facets. Finally, a CFA was run based on the analysis to build a model utilising all items, drivers and facets as a conceptional framework to indicate that Safety Mindset and Safety Performance are critical to the establishment of Safety Culture. The research raises to additional questions that will be discussed in recommendations, i.e. the *empirical* analysis of Leadership culture as a reliable driver of Safety Culture and *how* the model built in TABLE 4.8 be tested and validated within the secondary economic sector.

9.2 Implications on leadership

Theoretically, this research study provides evidence that leadership culture is vital in the establishment of a Safety culture through the influencing the core beliefs of the workforce. Leaders need to lead by example and must be seen as partners with entrenched safety believes; this will have an impact on the Safety Mindset of the workforce. Furthermore, leadership need to ensure that they are totally committed to a high level of safety performance that will enable the organisation to meet an objective of Zero Harm. Decisions are required at the highest level of an organisation how they see as an inspiration to the workforce; they are needed to be seen adhering to the simple 'rules of the game', how they can assist the workforce to be proactive, how they would reward safety innovation and safety teamwork.
Paramount is that leader must understand, to get workers engaged to the organisation and in this case safety, leaders must induce relationships at all possible levels and actively involve the workforce when it comes to their safety. To internalise and own safety is not that easy as the vast majority in the world is born and bred in unsafe conditions and live in at-risk environments. The influence and motivation form leadership and the leadership culture should, therefore, be seen as the most critical factor to get to a goal of Zero Harm.

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9.3 Limitations of the study

Thinkable limitations of the research should be acknowledged. Firstly, while the study used global validated items from the PDS™, it was used at a single factory in KZN for the purposes of this research study only. Having said this is that similar studies (non-empirical) outside the scope of this research was done and came to the same conclusions as to the author.

9.4 Summary of contributions

Though the single case study ratified conclusions in the literature on Safety Culture, it reiterated the power that Leadership Culture has on the overall Safety Culture. Furthermore, the research highlighted the reciprocated dependence between Safety Mindset and Safety Performance; it discounted the fact that only one of those facets is required to achieve Zero Harm.
Learned from this single case study research results, Leadership Culture will determine the level of Safety Mindset and Safety Performance.

9.5 Recommendation for future studies

Future research should endeavour a diverse sample concerning primary and secondary economic sectors across various industries. A clear differentiation should be made between culture and regions to try and build a model more predictive certain regions, cultures and industries.
Additionally, it is recommended to scrutinise the Leadership Culture drivers in this research study to establish their exact contribution to the reciprocated dependent facets. The outcome of such a study will assist the leader to focus on the most essential drivers who will positively influence both facets dealt with in the research, i.e. Safety Mindset and Safety Performance.

9.6 Conclusion remarks

The research problem, as highlighted, was logically studied and researched. The available literature, previous research studies and validated research tools were employed to set a baseline for the study.
Validated survey instruments such as the PDS™ and StratisQ™ were used to gather and collate data from the factory in the secondary sector of the South African economy.
The data was put through a rigorous process, firstly to test the item fit of the items posed to the respondents by utilising the *Rasch analysis*, then the reliability as tested using methods such as the Cronbach's alpha. Following-on, the facets were built utilising the CFA (confirmatory factor analysis), the TLI (Tucker-Lewis index), the CFI (comparative fit index) and the RMSEA (Root mean square error of approximation) to evaluate model-data fit and amongst others and finally the correlations were evaluated applying the Pearson's correlation coefficient.
All three of the research objectives were met, and all three research questions were answered: determining the correlations between Safety Climate and Safety Performance and how these factors indicate Safety Culture.

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