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# The Effect of Transformational and Transactional Leadership, Safety Culture on Safety Outcomes

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A research project submitted to the Gordon Institute of Business Science, University of Pretoria, in partial fulfilment of the requirements for the degree of Masters of Business Administration

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# ABSTRACT

Leaders are organisational architects with an ability to influence the inputs and outputs of business performance which includes safety performance. Inputs and outputs in the context of this study include the safe behaviour of employees and the leader's role in creating a safe working environment. Studies in safety leadership have shown that transformational leadership results in high employee safety participation whereas transactional leadership results in increased safety compliance. Recent studies have focused mainly on the impact of the two leadership styles on the safety climate. This study aims to bridge the existing gap in understanding the effect of transformational, transactional leadership and safety culture on safety outcomes. Self-administered and online questionnaires were used to collect data in chemical organisations in Durban. The number of returned valid questionnaires was 250. Analysis included various correlation tests and multiple regression analysis to test the relationships between the three variables. Results revealed that transformational and transactional leadership lead to different safety outcomes. In addition, transactional leadership positively impacts on safety culture when compared with transformational leadership which has demonstrated a negative relationship.



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## KEYWORDS

Safety leadership; safety culture; safety outcomes; chemical industry



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# DECLARATION

I declare that this research project is my own work. It is submitted in partial fulfilment of the requirements for the degree of Master of Business Administration at the Gordon Institute of Business Science, University of Pretoria. It has not been submitted before for any degree or examination in any other University. I further declare that I have obtained the necessary authorisation and consent to carry out this research.

_____

Thembelihle Sibiya

Date signed:



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# CHAPTER 1: INTRODUCTION TO THE RESEARCH PROBLEM

## 1.1 Introduction

In today's business environment, there are many challenges facing many organisations on a day to day basis. Within the South African context there are several critical issues such as the role of business in the communities in which they operate and ensuring a safe workplace for employees and other persons. These types of challenges compel business leaders to consider the impact of their actions in achieving short and long term economic success.

Despite the number efforts towards improving safety in the workplace, according to the Chamber of Mines Annual Report (2013), 96 fatalities were recorded during the year 2013 within the mining sector in South Africa. Within the chemical sector during the year 2013, five people died and 96 people suffered major injuries as a result of chemical operations and transportation of chemicals (Chemical Allied Industries Association Report, 2013).

**Table 1: Fatality performance data from the mining industry (Chamber of Mines 2013 Annual Report)**

| Mining Industry Fatalities (2003-2013) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Commodity** | **2004** | **2005** | **2006** | **2007** | **2008** | **2009** | **2010** | **2011** | **2012** | **2013(P)** |
| Gold | 108 | 105 | 114 | 115 | 85 | 81 | 62 | 51 | 53 | 37 |
| PGMs | 65 | 47 | 40 | 53 | 36 | 41 | 34 | 37 | 28 | 28 |
| Coal | 20 | 16 | 20 | 15 | 20 | 18 | 12 | 12 | 11 | 7 |
| Chrome | 16 | 6 | 2 | 4 | □ | □ | □ | □ | □ | □ |
| Diamonds | 15 | 7 | 3 | 12 | □ | □ | □ | □ | □ | □ |
| Copper | 2 | 0 | 2 | 1 | □ | □ | □ | □ | □ | □ |
| Clay | 3 | 3 | 2 | 8 | □ | □ | □ | □ | □ | □ |
| Iron Ore | 1 | 2 | 2 | 4 | □ | □ | □ | □ | □ | □ |
| Granite DS | 2 | 0 | 0 | 1 | □ | □ | □ | □ | □ | □ |
| Limestone | 3 | 5 | 5 | 1 | □ | □ | □ | □ | □ | □ |
| Other | 11 | 10 | 10 | 6 | 30 | 28 | 19 | 23 | 20 | 21 |
| **TOTAL** | **246** | **201** | **200** | **220** | **171** | **168** | **127** | **123** | **112** | **93** |
| 2013(P) - Provisional data | | | | | | | | | | |
| □ Now included in other | | | | | | | | | | |

Based on the data in Table 1, there has been an improvement in the performance of the mining sector when comparing the year 2013 to prior years. However, the evidence shows that a considerable number of individuals are still suffering fatalities whilst performing work activities.



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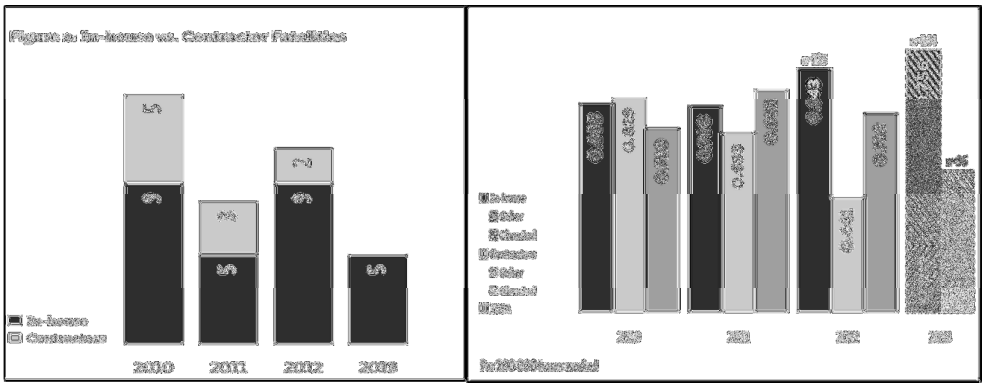
**Figure 1: Safety performance from year 2010 to 2013 within the chemical industry (CAIA 2013 Annual Report)**



The data in Figure 1 indicates that safety management in the chemical industry remains a concern and challenge for organisational leaders. The challenge of addressing safety at work is further exacerbated by other push factors such as economic, legislative requirements and ethical and moral duties of employers. As a result, this puts additional pressure on how this challenge is managed by leaders within an organisation and also during organisational changes. As shown in Table 1 and Figure 1, 105 people lost their lives as a result of mining and chemical manufacturing related processes and activities.

*1.1.1 Economic Factors*

Injuries and fatalities have a financial impact on organisations related to injury treatments, claims, time spent during the accident investigation and the number of working and production days lost due to an injury. Therefore effective safety management does not only contribute to improved safety but it also contributes to the reduction of financial costs associated with workplace incidents. During the year 2013, the Department of Labour reported that the number of reported workplace injuries had increased dramatically between the years 2008 and March 2013; the Compensation Fund paid out claims of more than R1 billion to people injured at work (Seabo, 2013). The figure that is reported is the cost of claims against the department as a result of workplace injuries. Injuries at work are costly for the government and also to the employers.

*1.1.2 Legislation*

In South Africa there is well established legislation which governs health and safety in the workplace with which employers must comply. Legislation includes Occupational Health and Safety Act 85 of 1993 (OHS Act), applicable to all employers and workers except in the mining industry. The mining sector and other mining related activities are guided by the Mine Health and Safety Act 29 of 1996 (MHSA).



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*1.1.3 Ethical and moral obligations*

Apart from legislative requirements, there are ethical obligations that organisations take into consideration during decision making. These include obligations such as ethics of rights (Crane & Matten, 2010) ensuring that employees and other persons have a right to work in an environment that will not be harmful to their health and safety (OHS Act, 1993). There are a number of employee representative structures within organisations that represent the interests of employees. These include the health and safety representatives and trade union representatives. The representatives' duties are to ensure that safety concerns raised by employees are addressed by the organisation to enable a healthy and safe workplace for employees and other persons. Therefore these representative structures engage regularly with the leadership of the organisation.

Freeman (1984) argued that firms do not only have a duty to shareholders but also to other stakeholders; stakeholders include anyone from other groups who has a stake or can have a claim on the firm, such as the suppliers, local community, customers, employees and management. Therefore, companies need to consider their responsibility towards all their stakeholders in order for an organisation to remain competitive.

## 1.2 Research Purpose

The evidence as outlined above from the mining and chemical industries highlights that the risk of getting hurt or even suffering a fatality in the workplace still exists. This indicates a need for a better understanding of the underlying factors that influence the likelihood of accidents, fatalities and injuries occurring within the various industries and especially within the chemical industry in South Africa. In understanding the underlying factors, leadership and the safety culture play a significant role in influencing the behaviours of individuals (Giberson, Resick, Dickson, Mitchelson, Randall & Clark et al., 2009). Therefore, there is a need to evaluate the role of leadership in the context of transformational and transactional leadership and how these two leadership styles impact on safety outcomes.

Safety management in the workplace involves creating a safe working environment that will eliminate the likelihood of harming an individual because of the organisation's activities and processes. These systems are largely driven by leaders and managers. As part of the safe management system, there are a number of safe work practices that organisations could put in place to improve safety and these include policies, procedures, safety related programmes, accident and other safety related incident investigations. These practices have continued to evolve; due to the evolving nature of



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business, the concept of safety in the workplace has also evolved. Despite improvements in practices for safer working environments, the question remains: Why do we still have injuries and fatalities in the workplace? What can be done in the area of safety leadership to improve the current situation?

Giberson et al. (2009) pointed out that leaders play a critical role in the success or failure of organisational change and development initiatives. The area of safety management is often affected by organisational changes hence it is important to understand the role that leaders play with regards to their influence as it relates to safety at work so as to minimise injuries and fatalities. Therefore there is a need to further understand how leaders can influence safety outcomes through their leadership style. There are existing studies that have evaluated the correlation between safety leadership, safety climate and safety performance (Wu, Chen & Li, 2008; Dejoy, Schaffer, Wilson, Vandenberg & Butts, 2004; Zohar 2002a), safety culture (Glendon & Stanton, 2000; Guldenmund, 2000; Carillo, 2010) and safety leadership (Clarke, 2013).

The study aims to fill the gap in the area of safety leadership and safety culture by establishing the effect of transformational and transactional leadership on safety outcomes in the chemical industry. It also aims to provide further insights into the role of transactional leadership style in relation to safety since this topic has not been researched vastly. Clarke (2013) in the metal-analytic review of transformational and transactional leadership styles in relation to safety illustrated the need for this study, the author stated that there has been little research that has investigated the role of transactional leadership as it relates safety.

Organisations are continuously changing and change is part of the environment of business, and leaders within organisations need to respond to these changes. Therefore there is a need to respond to the changes and developments related to safety in the workplace too. The leaders in the workplace need to be well-equipped with dealing with these changes and their impact on the safe behaviour of employees.

This research study could be of interest to both academia and business. Within the academic arena, the research provides further insight into the areas of safety leadership. It establishes a better understanding of the influence of leadership styles such as the transformational and transactional leadership styles, of safety culture and their impact on the safety outcomes. The study aims to discover the specific leadership behaviours that are associated with better safety outcomes which has a potential to challenge existing findings in this field. The study also contributes to existing knowledge around accident prevention theories, mainly from the human or behavioural side.



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For businesses, the study is useful for assisting organisations in developing specific leadership interventions for improving safety performance in the workplace, which is different from general leadership training or intervention. In addition, the findings could assist management and leadership within the various industries to better understand their role in influencing safety performance and outcomes, and how this can be improved by applying specific leadership practices and behaviours. The study will also assist the safety practitioners in developing effective safety programmes.

Various sectors, such as mining, chemical, construction, aviation, nuclear could find the study useful both in the South African and the global context. These sectors have well-developed safety improvement programmes and have, over time, put in place several measures to reduce or eliminate the risk of injuries or even death that may result due to their complex nature of their processes. Industries within these sectors measure safety performance as part of their organisational objectives; it is therefore expected that these industries have a keen interest in understanding new developments in the area of safety improvement and the role of leadership as it relates to safety.

Furthermore, the understanding of organisational culture is a topic of considerable interest to organisational researchers, management consultants, and corporate executives (Giberson et al., 2009); safety culture is a sub-unit of an organisational culture. The findings contribute to further research in the area of safety leadership and how an organisation's culture can be improved to prevent injuries and fatalities in the workplace.

For business to remain competitive, there is a need for organisations to respond to the needs of the various stakeholders. In the above mentioned sectors, the stakeholder profile entails employees, communities, customers, regulators, such as the Department of Minerals and Energy, and the shareholders. Therefore, further insight into managing safety effectively and the adoption of the programmes ensure that stakeholder relations and the reputation of the company are improved.

The understanding of an organisation's culture and leadership style is not a new topic; there are several studies in the South African context that have been conducted to establish the relationship between organisational culture and leadership and their impact on organisational commitment, job satisfaction, propensity to stay (Kolisang, 2004; Manetje & Martins, 2009) but there is a lack of evidence regarding how this has been applied in the field of safety within the chemical industry. Guldenmund (2010) in a review of safety culture and safety climate, supported the proposed study by highlighting the need for increased attention in the safety literature, to better understand the role of managers and supervisors together with their leadership styles



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and influence in safety management processes. This research study aims to contribute to bridging this gap.

## 1.3 Research Objectives

This research study aims to understand the impact of transformational and transactional leadership style and an organisation's safety culture on safety outcomes so as to improve the safety performance in the chemical industry in South Africa.

The main research question is: Do transformational and transactional leadership style lead to different safety outcomes? The sub-questions related to the main research question are:

1) Do transformational and transactional leadership result in different safety outcomes?

2) What is the difference in the impact of each leadership style on the safety culture?

3) How does a combination of leadership style and different safety cultures impact on safety outcomes?

The study sought to discover findings that would assist organisations in developing more effective safety improvement interventions and to guide the leadership to develop more effective intervention programmes in order to improve the safety of employees in the workplace. The research study was not aimed at establishing a grand theory to solve all the issues related to safety management processes in an organisation but it aimed to contribute to the existing body of knowledge through empirical research. Through the review of the work conducted in the area, the researcher aimed to contribute to the existing knowledge around safety leadership and finding alternative ways of improving safety performance in the various industries which would lead to reduced injuries and fatalities in the workplace.

Whilst the research is an element of leadership and organisational performance, this particular study did not test all the other elements of leadership and organisational performance, but rather tested safety leadership as it related to both transformational and transactional leadership styles.

Lastly, the research study focused on the chemical industries within the South African context. The choice for choosing the chemical industry is also influenced by the fact that chemical companies are classified as high reliability organisations (HROs) which have high complexity and the hazards associated with their processes are greater than most other industries (Guldenmund, 2010).



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## 1.4 Conclusion

This chapter has described the aims and objectives of the research study: the study aims to understand the impact of transformational and transactional leadership style, safety culture on safety outcomes so as to improve the safety performance in the chemical industry in South Africa. The next chapters include the review of literature associated with the research study, a presentation of the research questions and associated hypotheses, a description of the research methodology, a presentation of the results from the study followed by a discussion of the results in relation to the literature review and the study concludes with the summary of the findings and implications for future research.



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# CHAPTER 2: LITERATURE REVIEW

## 2.1 Introduction

Chapter 1 discussed the aim, purpose, business and academic need of this research study. This chapter is about understanding and discussing what is known regarding the proposed topic, what is not known and where the researcher aims to contribute. Based on what is known, key themes of relevance to the research study were used to search for more literature; these include: safety leadership, transformational and transactional leadership, organisational culture, safety culture and safety outcomes, including performance.

## 2.2 Leadership Styles

In recent years there has been an increase in the studies associated with safety leadership (Fernández-Muñiz, Montes-Peon & Vazquez-Ordas, 2014; Hoffmeister, Gibbons, Johnson, Cigularov, Chen & Rosecrance, 2014; Clarke, 2013; Kapp, 2012; Mullen, Kelloway & Teed, 2011; Zohar, 2002a) and its impact on organisational outcomes, such as safety performance. In order to prevent or reduce workplace injuries a more pro-active approach which is focused in key predictors of safety for including leadership is proposed by Zohar (2002 cited in Hoffmeister et al., 2014). This suggestion is also supported by work conducted by Mullen et al. (2011) who stressed the need for good safety leadership and its impact in inspiring and promoting positive safety-related attitudes and behaviours in the workplace.

The assertion by Mullen et al. (2011) about good safety leadership therefore creates a need to understand deeper safety leadership as it relates to both transformational and transactional leadership styles and how these styles influence safety outcomes. Leadership is one of the drivers of performance and safety is one of the key performance areas; therefore the understanding of the effect of transformational and transactional leadership on safety outcomes is crucial. The understanding of the impact of leadership styles have also been supported by Fernández-Muñiz et al. (2014) who claimed there is a need for a better understanding of the determinants of safety performance in organisations so as to ensure improvement in workplace safety.

### 2.2.1 Transformational Leadership

The concept of transformational leadership has been explored intensively in literature (Kuhnert and Lewis, 1987; Podsakoff, MacKenzie, Moorman & Fetter, 1990; Bass & Bass, 2009) and has gained popularity in the leadership theory. This concept was introduced by Burns (1978; cited in Bass & Bass, 2009) who described



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transformational leaders as the kind of leaders that are able to inspire individuals to meet goals beyond their own and enable people to see the value of meeting those goals beyond their own self-interest. In another study by Kuhnert & Lewis (1987) the authors found that the transformational leader has an ability to shift the follower's beliefs by paying attention to the needs and the values of the follower and this results in a better exchange or interaction quality and greater concern for welfare (Lu & Yang, 2010).

Katz and Kahn (1978 cited in Podsakoff et al., 1990) further added to the work on understanding transformational leaders and revealed that the transformational leader's ability to inspire others and shift their behaviours and values, results in followers being motivated to perform at a level that is above and beyond mechanical compliance with the normal routine organisational directives. Therefore these leaders, through their behaviour, motivate their followers to be creative when conducting work and encourage followers to move away from compliance driven behaviours. These findings by Katz and Kahn are useful for this research study for assessing whether these behaviours demonstrated by the transformational leaders do have an impact on safety outcomes.

More recent work by Bass and Bass (2009), in support of the work done by Burns (1978 cited in Podsakoff et al., 1990), claimed that the ability of transformational leaders to inspire their followers to achieve more, beyond minimum requirements, can be measured using four facets:

- *Charisma/idealised influence* – this occurs when the leader articulates clearly the vision thereby instilling a sense of confidence and pride in the followers;
- *Inspirational motivation* – where the leader communicates clearly the expectations, thus giving meaning and clarifying the important purpose or intent;
- *Intellectual stimulation* – whereby the leader evokes intelligence and encourages problem solving and creativity amongst the followers; and
- *Individual consideration* – this is achieved when leaders give personal attention to each member of the team and show concern for their welfare.

These four characteristics related to transformational leaders are useful in developing constructs associated with understanding transformational leadership and its role in influencing safety outcomes.

### 2.2.2 Transactional Leadership

According to Bass and Avolio (2000 cited in Fernández-Muñiz et al., 2014) transactional leadership is focused on achieving compliance with the set objectives,



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monitoring and controlling the results. In addition, transactional leaders' behaviours are based on an exchange process whereby the leader provides rewards in return for the subordinate's effort; the leader sets expectations in terms of performance and rewards the followers for achieving objectives and good performance (Burns, 1978 cited in Podsakoff et al., 1990). This results in a mutually dependent relationship.

According to Bass and Bass (2009) transactional leaders can operate in one of four ways:

- *Contingent reward* in that the leaders' actions entail exchanges for effort and rewards for good performance. The leader would communicated the desired behaviours, the associated rewards to the employees and would follow up when the outcomes are not desired (Hoffmeister et al.,2014).

- *Management by exception (active)* where the leader plays a more proactive role, plan for safety in advance, checks for deviations and implements corrective actions to address these deviations;

- *Management by exception (passive)* which is the opposite of the above and more of an inactive style of leadership: this occurs when the leader intervenes only when standards have not been met; the leader would react once the events have occurred rather than planning for them in advance and be more proactive;

- *Laissez faire* is also another form of inactive style of leadership and this occurs when the leader has a tendency to not be involved in the activities in the workplace, avoid making decisions and does not take responsibility for the behaviour of the followers.

These four kinds of transactional leadership behaviours are useful in developing constructs associated with understanding transactional leadership and its role in influencing safety outcomes. Whilst all four kinds of transactional leadership are reviewed, management by exception (passive) and laissez faire have been associated with ineffective behaviours and result in inactive forms of leadership (Mullen et al., 2011). However all four facets of transactional leadership are explored in this research study in order to determine their existence and impact on safety outcomes in the chemical industry.



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## 2.3 Linking Transformational and Transactional Leadership to Safety Outcomes

For this research study, it was important to link the leadership style to safety outcomes. The links between the two leadership styles i.e. transformational and transactional leadership and safety outcomes are reviewed in light of the suggestion from Hoffmeister et al., (2014) who suggested that the behaviours of managers and leaders and the attention given to safety in the workplace reflects what is priority and this influences the behaviour of the employees regarding the significance of safety.

A recent meta-analytic study by Clarke (2013) evaluated the role of transformational and transactional leadership styles as antecedents for employee safety behaviours through the evaluation of employee safety participation and employee safety compliance. The findings of this study indicated that transformational leadership is more strongly related to employee safety participation as compared to transactional leadership which is associated with employee safety compliance.

Employee safety participation and employee safety compliance are not the only measurements for safety outcomes. Several studies (Fernández-Muñiz et al., 2014; Neal & Griffin, 2006; Martinez-Córcoles, Gracia, Tomas & Peiro, 2011; Christian, Bradley, Wallace & Burke, 2009) have presented two different approaches that have emerged in the area of safety research to understand the evaluation or measurement of safety outcomes. The first approach describes a concept for evaluating safety outcomes by making reference to the occurrence of accidents and number of injuries in an organisation. The second approach is associated with measuring the safe or at risk behaviours of employees within an organisation. Both these approaches are being used in the workplace as an indication of safety outcomes and safety performance.

The second approach, which refers to safe and at risk behaviours has been used recently in safety research (Martinez-Córcoles et al., 2011; Clarke, 2013) and the two types of safety behaviours are safety compliance and safety participation. Martinez-Córcoles et al. (2011) proposed that safety compliance refers to performing mandatory safety activities associated with the task; it includes members of the team focusing on meeting the minimum required safety standard (Fernandez-Muniz et al., 2014).

Additionally, Martinez-Córcoles et al. (2011) stated that safety participation refers to the voluntary behaviours that individuals demonstrate in a workplace to create and contribute to a safer working environment. These behaviours include helping co-workers, promotion of safety amongst work colleagues, participation in voluntary safety programmes in the workplace and taking initiatives in improving safety in the workplace. Safety compliance is therefore associated with ticking the right boxes and performing



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the activities only under instruction, whereas safety participation involves an element of individual empowerment and being proactive when performing these activities.

Linking transformational and transactional leadership to safety outcomes, Clarke (2013) explained how a transformational leader would apply each of the four characteristics of transformational leadership in the context of safety leadership:

- The leader acts as a role model and encourages followers to modify their behaviours and when the leader gives priority to safety, the followers are likely to modify their own behaviours to behave in a safe manner. This is supported by Mullen et al. (2011) who suggested that the leader who is high in idealised influence would focus on safety rather than what is profitable such as performance pressures.

- The leader inspires and motivates employees and this results in the leader having an ability to influence the followers' beliefs and values associated with safety. This fosters better participation in safety activities leading to better employee engagement. While motivating and inspiring the followers, the leader encourages the followers to go beyond the minimum required standards and achieve what seems unattainable (Mullen et al., 2011).

- The leader intellectually stimulates the followers who are therefore encouraged to develop and suggest new creative and innovative ways of improving safety objectives;

- Finally, the transformational leader who is high in individual consideration creates an environment where there is great concern for individuals resulting in the whole team showing concern for each other and their well-being.

Given the findings regarding how transformational leaders influence the safe behaviours of employees and that existing studies have found that this results in high employee safety participation, it is however unclear whether increased employee safety participation will result in better safety outcomes when compared with transactional leadership in the chemical industry. This presents a gap in terms of what we do not know regarding this research study.

Transactional leadership involves detailing clearly what the safety performance expectations are, setting and monitoring of safety targets and objectives and rewarding performance accordingly (Clarke, 2013). Performance tracking and rewards includes celebration for good results, punishment for not achieving objectives and providing corrective feedback; these kinds of contingent reward practices improve the followers'



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safety behaviour in the workplace (Fernández-Muñiz et al., 2014). The meta-analytic study by Clarke (2013) found that transactional leadership has a stronger association with safety compliance, in that compliance is driven through proactive monitoring of employees' behaviour, early identification of errors that could lead to incidents and close attention is paid to safety rules and regulations. However whilst transactional leadership drives safety compliance, this leadership style plays a significant role in shaping employee's perception of the significance of safety in the workplace. This review has limitations in that in assessing transactional leadership style, it focused on the active transactional leadership elements which are contingent reward and management by exception (active), and excluded the passive elements of management by exception (passive) and laissez-faire.

Zohar (2002a) earlier discovered that leadership based on contingent rewards, which is associated with transactional leadership, was associated with lower injury rates. Hoffmeister et al. (2014) supported the findings related to contingent reward found that in instances where the rewards and incentives are linked to performance, this would encourage safe behaviours of employees. Mullen et al. (2011) presented a different argument and raised a concern regarding the use of rewards to promote safety behaviours as this may drive undesired behaviours whereby employees do not report safety deviations due to fear of not getting the promised rewards. Therefore given what we know about the work conducted in understanding the impact of transactional leadership and its strong correlation with safety compliance and the use of contingent rewards, it is still not definite that transactional leadership will result in better safety outcomes.

As part of the conclusion, Clarke (2013) recommended that for effective safety leadership, leaders are to include the elements of both transformational and active transactional leadership. This argument is based on the premise that the combination of the two leadership styles will ensure positive engagement with safety through the application of the transformational style as well as high levels of safety compliance, mainly as a result of transactional leadership. A question still remains regarding the two leadership styles: which one of the two leadership styles will positively predict better safety outcomes in the chemical industry? Thus, in trying to understand the relationship between these two leadership styles with safety outcomes, the first hypothesis is:

*Hypothesis 1 (H1): Transformational and transactional leadership styles will positively predict safety outcomes, in that transformational leadership style will have a significant impact as compared to transactional leadership style.*



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## 2.4 Safety Culture

The concept of safety culture is an element of an organisation's culture (Guldenmund, 2000) and therefore the leaders have a significant role to play in creating it. In order to understand the basis of the definition of the safety culture and how leaders impact on the culture, a definition of the organisational culture from Schein (2004) is useful: he described an organisational culture as a pattern of shared basic assumptions that the group has learned as it solved its problems of external adaptation and internal integration. The definition of the organisational culture includes basic assumptions that are shared by the group and not only individuals.

Based on Schein's definition, the safety culture has been defined as a set of basic but deeper assumptions, core values and beliefs that the individuals possess that guide their behaviour with regard to safety in the workplace (Mearns & Flin 1999, cited in Dejoy et al., 2004). These assumptions, core values and beliefs guide the individuals, including leaders, and also the group's behaviour and their conduct in relation to safety. Guldenmund (2000) extended the argument by adding that the organisation's safety culture is also comprised by the perceptions and attitudes that employees hold in relation to safety in the workplace.

Hopkins (2006) developed the idea of culture further and described the organisational culture as the way things are done in the specific work environment which in turn, creates a set of expected behaviours of individuals within the organisation. Hopkins' definition as it applies to the safety context, suggests that there are existing and evolving expectations regarding the behaviour of individuals within the same group in relation to safety in an organisation.

The behaviours associated with creating a safety culture include that of management and leaders. The practices of management that contribute to an organisation's safety culture are suggested by Vredenburgh (2002) and these are worker participation, safety training, hiring practices, reward system, management commitment and communication and feedback. These practices were later streamlined in a latest study by Wiegmann, von Thaden, Sharma, Zhang and Gibbons (2004) and these include: organisational commitment, management involvement, employee empowerment, rewards or accountability systems and the reporting systems. These aforementioned five indicators which are discussed in detail are helpful for assessing the safety culture of the organisation and are used in this study.

### 2.4.1 Organisational Commitment

Vredenburgh (2002) described the commitment as the organisation's level of tolerance to risk and how it deals with the safety risks. The commitment and support by the upper



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levels of an organisation ensures that safety is identified as a core value by everyone in the organisation thus impacting on the employees' safe behaviours. Wiegmann et al. (2004) further stated that this commitment starts from the top levels of the organisation which includes the senior and upper levels of management.

The organisation therefore demonstrates its commitment by the attitudes, actions, decisions, support of the senior managers towards safety by giving safety the priority and commitments as any other business performance indicators which include the organisation's allocation of resources to safety and the prioritisation of safety over other performance indicators. Mannan, Mentzer, and Zhang (2013) suggested a model for communicating within an organisation to ensure clarity goals and expectations at all levels as shown in Figure 2.

**Figure 2: Communication of safety goals and policies across all levels (Mannan et al., 2013, p.1426)**


The authors further suggested that the organisational commitment to safety as a core value needs to be demonstrated by the consistent behaviours of all leaders in the organisation. Leaders need to be aligned and acting in a consistent manner in re-enforcing the importance of safety within the organisation which impacts the safe behaviours of employees.

### 2.4.2 Management Involvement

Management involvement refers to the participation of all levels of management in the organisation's daily activities; it is concerned with the engagement and communication that occurs between managers and employees regarding safety (Wiegmann et al., 2004). The involvement of management is largely demonstrated by the presence of the managers in the workplace, the engagement with employees regarding their safe behaviour and obtaining regular feedback from employees at all levels. Mannan et al.



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(2013) suggested that the leaders are to lead by example by involving themselves in safety activities such as accident investigations, safety training sessions and safety improvement initiatives.

### 2.4.3 Employee Empowerment

Employee empowerment is similar to employee participation and involvement. Wiegmann et al., 2004 stated that empowering employees involves creating a workplace where employees understand their roles in creating a safe environment, employees take initiatives in resolving safety issues and the managers create an environment where employees ensure involvement in safety decision-making processes. Hofmann and Morgeson (1999, cited in Fernández-Muñiz et al., 2014) suggested that when employees are empowered this results in more commitment to safety and in high levels of communication and quality relationships between employees and the leaders. This level of empowerment ensures open lines of communication (Mannan et al., 2013) which ensures that there is a continuous dialogue about safety thus ensuring higher levels of engagement.

### 2.4.4 Reward Systems

In creating an organisational safety culture, the manner in which safe and unsafe behaviours are dealt with (in terms of rewards or penalties) is important for influencing the safe behaviour of employees (Wiegmann et al., 2004). Individuals are often motivated by the consequences of a certain behaviour as a result, individuals are likely to behave in certain manner in order to obtain certain rewards. The rewards often entail safety incentive programmes, bonuses and recognition that are created to reinforce safe behaviours. Hoffmeister et al. (2014) supported the findings related to rewards and found that in instances where the rewards and incentives are linked to performance, this would encourage safe behaviours of employees.

### 2.4.5 Reporting Systems

Wiegmann et al., (2004) pointed out that an organisation with a good safety culture has a good reporting culture and established systems to encourage employees to report comfortably without fear. The reporting systems include the manner in which employees in an organisation feel free to report any safety related issues, including injuries and not hide this information from management. This is often referred to as the reporting culture. Mannan et al., (2013) suggested in order to create a good reporting culture, management needs to be open to bad news and find opportunities from the failures that are reported by the employees rather than blaming the individuals. The reaction from management when dealing with bad news has an impact on how the employees choose to report in future.



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## 2.5 Safety Culture and Leadership

In order to understand the relationship between safety culture and leadership, work by Giberson et al. (2009) was reviewed. The authors suggested that the organisational culture and leadership are thought to be highly related in an organisation's life and these are seen to be serving similar functions. An organisation's culture can be correlated with its leadership, particularly with leaders in the upper ranks such as the Chief Executive Officer (Bennis, 1986; Davis, 1984; Quinn and McGrath, 1984; Schein, 2004; Trice & Beyer, 1993 all cited in Giberson et al., 2009).

Mannan et al., (2013 p.1424) stated "leaders influence safety performance through their actions and their failures to act". Through the ongoing engagement with employees with regards to safety and their behaviours this creates a particular safety culture. The leader's influence on the safety culture has a direct influence on employees' attitudes and behaviour in relation to an organisation's ongoing safety, health and environmental performance (Choudhry, Fang & Mohamed, 2007). Therefore the safe and at risk behaviours that the employees often display are through observed actions and behaviours of their leaders.

The leader's influence on employees' behaviour is illustrated further in a study by Kapp (2012) on the influence of supervisor leadership practices and perceived group safety climate on employee safety performance. This study revealed that the supervisors that are perceived by employees to be putting a higher value on safety achieve greater levels of safety compliance from their employees than those supervisors who do not, thus, concluding that employees' safe behaviour tends to be largely influenced by the behaviour of their supervisors.

The indicators for assessing an organisation's safety culture often refer to the role of management at all levels and the interaction processes to ensure that a good safety culture is created within an organisation. If leadership is involved in daily operations discussing safety issues and taking suggestions this creates a more positive safety culture.

### 2.5.1 Linking Transformational and Transactional Leadership to Safety Culture

The relationship between leadership and organisational culture has been studied extensively and the effects on personal/organisational performance (Adkins & Caldwell, 2004; Blair, 2003; Cameron & Quinn, 1999; Chatman & Cha, 2003; Ford & Seers, 2006; Kwantes & Boglarsky, 2007; Parry, Thomson, & Sarah, 2003 all cited in Yuan & Lee, 2011). Transactional leaders create an organisational culture that is characterised by the following of rules, policies, standards; transformational leaders influence culture by creating a new vision for the organisation and re-aligning it to the organisational culture Bass (1985 cited in Bass & Avolio, 1993).



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Leadership is one of the key drivers of organisational performance and thus impacts on the organisation's culture, however there is limited evidence of the way in which these two leadership styles have been studied in terms of their influence on the safety culture.

Transformational and transactional leadership and the linkages with the safety culture is an area that has not been covered well in theory; a number of previous studies have been conducted in relation to transformational and transactional leadership styles and their impact on the safety climate and safety outcomes (Clarke, 2013; Martinez-Córcoles et al, 2011; Wu et al., 2008; Clarke & Ward 2006). There is thus a gap in terms of existing literature and this is the area where the proposed research contributes.

Given what is known from the review of the safety culture and the five indicators proposed for assessing the organisation's safety culture, it seems transformational leaders have a greater influence on followers which leads to a culture of better employee safety participation when compared to transactional leadership where a culture of safety compliance prevails. Based on the above, a second hypothesis is developed in order to understand how each leadership style leads to a particular safety culture in the workplace.

*Hypothesis 2 (H2): Transformational leadership will be associated with a more positive safety culture compared to transactional leadership which will be associated with a weak safety culture.*

## 2.6 Linking Safety Culture and Safety Outcomes

Morrow, Koves and Barnes (2014) have presented an argument that the beliefs of employees around the significance of safety are mainly shaped by the organisation's safety culture; and that in turn, the safety culture influences the employees' attitudes and the perceived norms about working safely. The authors continued to argue that employees who work in an environment where there is a strong safety culture are bound to prioritise safety above other competing demands.

This argument is supported by Neal and Griffin (2006), who added that the organisation's safety culture provides a foundation for the safe or unsafe behaviour of employees while performing their work; therefore a weak safety culture creates an environment where employees would perceive safety as not important, and thus would perform more unsafe behaviours that possibly increase the likelihood for negative consequences. A positive culture would result in an environment where safety is viewed as a priority by everyone.



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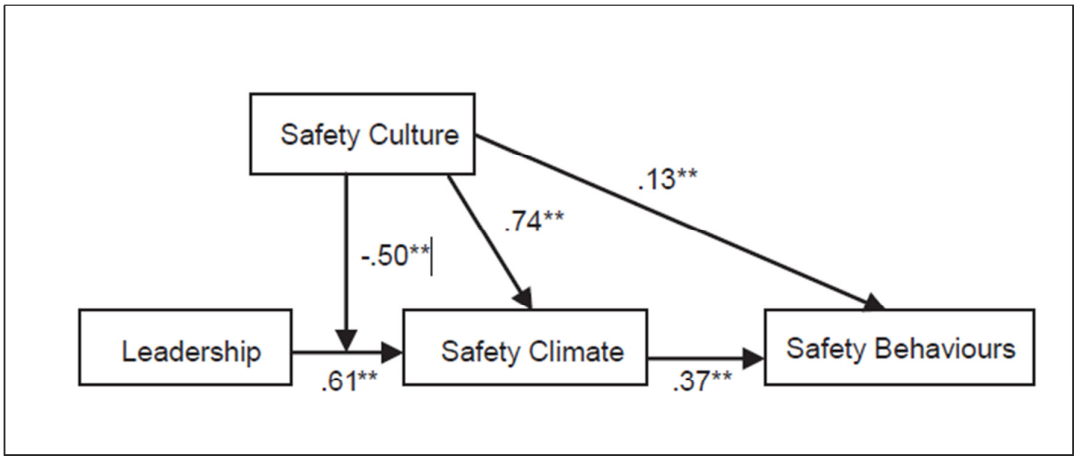
A model presented by Martinez-Córcoles et al (2011) is one model that reflects the major constructs that the study will review. The authors suggested the model to examine the impact of the safety constructs such as safety culture, leadership and safety climate on safety outcomes.

**Figure 3: Model linking relevant safety constructs to safety outcomes (Martinez-Córcoles et al., 2011)**




In relation to the model presented in Figure 3, Martinez-Córcoles et al (2011) found that the safety climate acts a mediator between leadership and safety behaviours, and that the safety culture has a moderator role in the relationship between safety climate and leadership which had a direct influence on safety climate and on safety behaviours. This model presents a good understanding of the role of leadership, safety culture and the impact on safety outcomes. This model is significant for understanding the role of safety culture in influencing the leadership style and safety outcomes.

In support of the above two conclusions based on the history and investigations of serious incidents such as Chernobyl and Bhopal, Morrow et al. (2014) further highlighted the need to use the safety culture as a performance indicator for safety performance and how interventions applied in time as part of the culture can prevent such disastrous events. This therefore further highlights that weak safety cultures create an opportunity for serious incidents to occur. It is against this background that a third hypothesis is developed:

*Hypothesis 3 (H3): A combination of transformational leadership with a positive safety culture and a combination of transactional leadership with a weaker culture will result in different safety outcomes; a positive safety culture combined with transformational leadership will have a more significant impact on safety outcomes compared to a combination of transactional leadership with a weak safety culture.*



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## 2.7 Conclusion

There is a need to better understand the determinants of safety performance in organisations so as to ensure improvement in workplace safety. Therefore, in order for organisations to deal effectively with the challenge of improving workplace safety, an understanding of the effects of transformational and transactional leadership styles safety culture on safety outcomes needs to be broadened. Good safety leadership is demonstrated when leaders focus on inspiring and promoting positive safety-related attitudes and behaviours in the workplace (Mullen et al., 2011), thus contributing to creating a safe workplace where the likelihood of injuries and fatalities is minimised.

Existing literature on safety leadership revealed that the behaviours of managers and leaders and the attention given to safety in the workplace reflects what is priority, and this influences the behaviour of the employees regarding the significance of safety (Hoffmeister et al., 2014). The impact of transformational leadership style on safety outcomes revealed that transformational leadership is strongly associated with employee safety participation and it is associated with employee voluntary behaviours that employees demonstrate at work to create a safer working environment (Martinez-Córcoles et al., 2011). This is therefore associated with better safety outcomes.

Clarke (2013) in a meta-analytic review found that transactional leadership is strongly associated with employee safety compliance and compliance is driven through the setting of clear performance expectations, control and monitoring of employees behaviour, early identification of errors and rewarding of performance. Zohar (2002a) discovered that leadership based on contingent rewards proved to be associated with lower injury rates. Therefore through the application of transactional leadership, higher levels of safety compliance are achieved and that will be associated with lower injuries. A question still remains regarding the two leadership styles: which one of the two leadership styles will positively predict better safety outcomes in the chemical industry?

Leadership is one of the key drivers of organisational performance and thus impacts on the organisation's culture. Pertaining to the safety culture, leaders influence safety behaviour through their actions and behaviours (Mannan et al., 2013, p.1424). Wiegmann et al., 2004 proposed five indicators for assessing the organisation's safety culture which include organisational commitment, management involvement, employee empowerment, rewards and the reporting systems and these will be used for this study.

The results of this study will assist in understanding and addressing the research questions associated with the research problem, which is the effect of leadership styles, safety culture on safety outcomes.



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# CHAPTER 3: THE RESEARCH QUESTIONS AND HYPOTHESES

## 3.1 Research Hypotheses and Questions

Based on the literature and the different constructs discussed in Chapter 2 (associated with transformational and transactional leadership, safety culture and the impact on safety outcomes), the proposed study aims to answer the following research questions and to test the associated hypotheses.

**The Main Research Question:**

Do transformational and transactional leadership styles lead to different safety outcomes?

**Research Question 1**: Do transformational and transactional leadership result in different safety outcomes?

*(H1):* Transformational and transactional leadership styles will positively predict safety outcomes, in that transformational leadership style will have a significant impact compared to transactional leadership style.

**Research Question 2:** What is the difference in the impact of each leadership style on the safety culture?

*(H2):* Transformational leadership will be associated with a positive safety culture compared to transactional leadership which will be associated with a weak safety culture.

**Research Question 3:** How does the combination of leadership style and different safety cultures impact on safety outcomes?

*(H3):* A combination of transformational leadership with a positive safety culture and a combination of transactional leadership with a weaker culture will result in different safety outcomes; a positive safety culture combined with transformational leadership will have a significant impact on safety outcomes compared to a combination of transactional leadership with a weak safety culture.

The researcher used the following analytical models illustrated in Figures 4 and 5 to test the relationships between the different components of the study.



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**Figure 4: Proposed analytical model for transformational leadership, safety culture and safety outcomes**

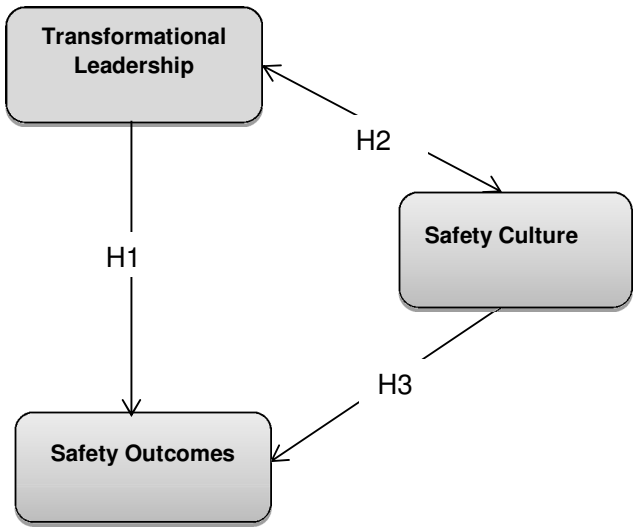
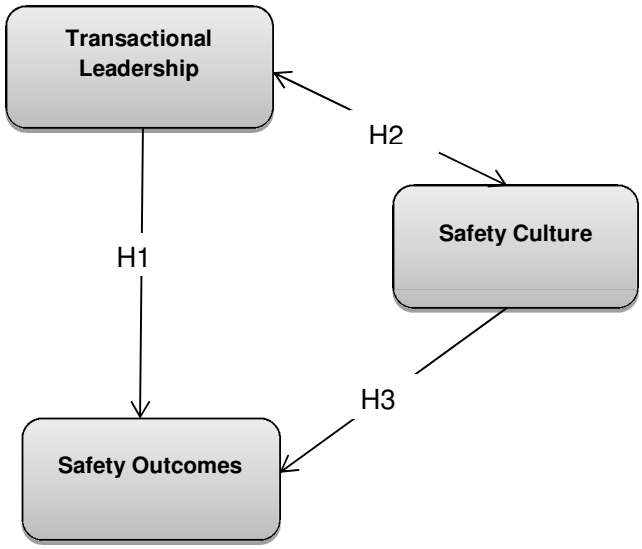



**Figure 5: Proposed analytical model for transactional leadership, safety culture and safety outcomes**




## 3.2 Conclusion

The research questions stated above help in understanding the impact of leadership style as it relates to transformational and transactional leadership, as well as safety culture, on the organisation's safety outcomes. Understanding the influence of these two leadership styles and safety culture on safety outcomes will help leaders and organisations to develop specific leadership interventions for improving safety performance. In addition, answering the research questions will enable leaders to understand their behaviours, practices and leadership styles and how these influence safety outcomes.



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# CHAPTER 4: RESEARCH METHODOLOGY

The previous chapters have provided a good illustration of the background and the aims of the research study, the theoretical review and the proposed research questions as these relate to transformational leadership, transactional leadership, safety culture and safety outcomes. This chapter outlines the proposed research design and methodology covering a discussion on the population and the sample, data collection method, data analysis techniques, the research study limitations and lastly, the ethical considerations.

The aim of the research study is to determine the effect of leadership style as it relates to transformational and transactional leadership as well as safety culture on the organisation's safety outcomes in the chemical industry. The study focussed on all individuals working for a chemical company at different levels and a sample of companies based in Durban was used to find answers to the research questions stated in Chapter 3.

## 4.1 Research Design

A deductive study approach was employed in that the general theory was reviewed in Chapter 2 in order to generate the hypotheses that seek to provide answers to the main research question and sub-research questions (Saunders & Lewis, 2012).

In terms of the design, the study was explanatory, since the aim of the study was to assess the relationships between transformational and transactional leadership styles, safety culture and the impact on safety outcomes. Saunders and Lewis (2012) have described the explanatory approach as useful where the researcher aims to focus on studying a situation or events in order to explain the relationships between the variables.

As part of reviewing the different designs, an exploratory qualitative approach was taken into consideration. The exploratory route may have been useful to seek clarity in understanding the underlying drivers for how individuals respond to different leadership styles and how these translate to safe behaviour which impacts on safety outcomes (Saunders & Lewis, 2012). However, the qualitative approach can be expensive and time consuming.

The research strategy took the form of a survey and a questionnaire was used to collect data. The choice of a survey method was largely due to the fact that it was easy to understand; it does however place a good deal of faith in the results which flow from surveys (Saunders & Lewis, 2012). This method is supported by Ghauri and



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Gronhaung (2010) who further stated that the survey method is an effective tool for assessing attitudes and descriptions. The study planned to explore perceptions and attitudes of respondents with regard to leadership styles as these relate to transformational and transactional leadership, safety culture and the impact on safety outcomes. The survey method was found to be suitable and the choice was further supported by previous studies related to safety leadership and safety culture (Clarke, 2013; Wu et al., 2008).

Surveys are found to be useful for reaching out to a wide range of participants and can be administered simultaneously to different participants. The use of standardised questionnaires allows for replication of the study in other locations to make comparisons. A disadvantage with this approach is that it is broad and, due to the nature of the structured approach, it often lacked details and depth. Another risk associated with the survey method is the response rate which was below the projected return (as is often the case with surveys).

### 4.2 Population

The population chosen for this study included all the chemical manufacturing organisations located in the Durban area. Saunders and Lewis (2012) have defined a population as a complete set of group members likely to be available for the research which has the same set of characteristics. There are 102 chemical manufacturing organisations in the Durban area and this list of chemical organisations located in Durban was obtained via the Durban Chemical Cluster (DCC). The list provided an comprehensive list of potential participants for the study.

The chemical companies in Durban were chosen because of relatively easy access to information and to the identified population. The researcher is based in Durban and works for a chemical manufacturing organisation operating in the south of Durban.

### 4.3 Unit of Analysis

The units of analysis were the individuals at all levels working for chemical manufacturing organisations, including their attitudes and perceptions of the leadership as it pertains to transformational and transactional leadership, safety culture and safety outcomes.

### 4.4 Sampling Method and Size

For the research study a sample of chemical companies was drawn by making use of probability simple random sampling. The sampling process involved selecting a sample of organisations from the chemical manufacturing organisations in Durban, from which



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there could be generalisation of the results back to the population (Trochim & Donnelly, 2001).

From the list of chemical manufacturing organisations in Durban provided by the DCC, the researcher discovered that companies were located in different parts of the town and location is important for access. Due to the large geographical spread of the chemical companies in the Durban area, the researcher targeted chemical companies located in the Umbogintwini Industrial Complex. The complex has approximately twelve chemical companies and these are located within 3km radius of each other and are chemical manufacturing companies with high, medium and low risks. On average there are more than 100 people employed per company.

An additional reason for selecting this industrial complex as part of the sample was due to convenience in that the researcher's organisation is located in the same complex. The researcher's company is considered as one of the largest employers since it employs an average of 150 people.

## 4.5 Research Instrument

### 4.5.1 Questionnaire Design

The questionnaire used for the research is attached in Appendix A and it comprised two sections. In the first section, Section A, respondents were asked to provide biographical information such as job level, gender, years of experience in the chemical industry, information on training received (leadership and safety related) and the level of education. The second section, Section B, contained a list of 40 statements where respondents were required to rate these statements using the 5-point Likert style from Strongly Disagree = 1 to Strongly Agree = 5. Some of the questions were reverse questions for which the scoring was reversed.

The 40 statements were developed on the basis of the literature reviewed and were associated with the three variables:

1. Leadership Style (Transformational and Transactional)

2. Safety Culture

3. Safety Outcomes

#### *4.5.1.1 Leadership Style*

Questions were derived from the literature review on transformational and transactional leadership and applied to the safety context in order to enable the testing of each leadership style on the safety outcomes. A combination of modified existing questions



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from the study conducted by Martinez-Córcoles et al. (2011) in a nuclear power plant and an adapted Multi-Leadership Questionnaire (MLQ) were used to construct the questions. Other questions were self-generated based on the literature review.

Questions One to Ten were concerned with the four transformational facets (charisma or idealised influence, inspirational motivation, intellectual stimulation and individual consideration in a safety context. Questions 11 to 20 considered the transactional leadership construct using the four facets (contingent reward, management by exception (active), management by exception (passive) and laissez-faire. The survey items are illustrated in Table 2 below.

**Table 2: Survey items used to characterise transformational and transactional leadership style**

| Transformational Items | Transactional Items |
|---|---|
| 1. My manager places a high value and belief in safety. | 11. I know the company's safety objectives. |
| 2. My manager gets involved in resolving safety issues and concerns. | 12. My manager sets high standards for safety. |
| 3. My manager leads by example. | 13. My manager recognises positive safety behaviour and rewards accordingly. |
| 4. My manager is positive about the company's safety performance. | 14. My manager emphasises the need to adhere to safety policies and procedures. |
| 5. My manager shows concern for how we feel. | 15. My manager takes proactive actions to prevent accidents from happening. |
| 6. My manager ensures that we all get involved in safety activities. | 16. My manager avoids making decisions when there are safety concerns. |
| 7. My manager encourages us to work together as a team in resolving safety concerns. | 17. My manager assigns responsibilities to each member of the team for achieving safety goals. |
| 8. My manager spends time teaching and coaching us regarding safety in the workplace. | 18. My manager makes it clear what we will get for achieving good safety performance. |
| 9. My manager understands each member of the team, our different needs, abilities and strengths. | 19. My manager follows up on mistakes, irregularities and deviations regarding safety. |
| 10. My manager is honest and trustworthy. | 20. My manager allows us to work in unsafe conditions until something goes wrong. |

#### *4.5.1.2 Safety Culture*

The organisation's safety culture plays an important role as a leading indicator to provide opportunities for acting proactively to avoid serious injuries or even fatalities in the workplace (Guldenmund, 2000). In order to understand the effect of safety culture on the safety outcomes, it was therefore important to assess the safety culture of an organisation.

The safety culture assessment entailed evaluating the attitudes and perceptions of respondents towards their organisation's safety culture. The safety culture items were measured using five indicators: organisational commitment, involvement of



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management, employee empowerment, rewards and reporting systems (Wiegmann et al., 2004). Questions 21 to 30 were concerned with measuring the safety culture constructs as illustrated in Table 3 below.

**Table 3: Survey items used to determine the safety culture**

| Safety Culture Items |
|---|
| 21. The company places production before safety.<br>22. There are occasions where management would allow employees to take shortcuts.<br>23. I trust that the company has an ability to take care of my safety and that of my colleagues.<br>24. As employees we take part in decisions regarding safety improvements in our workplace.<br>25. Our safety suggestions as employees are always taken into consideration by management.<br>26. Management in general does not show much concern for safety until something goes wrong.<br>27. The company allocates enough resources to safety.<br>28. Employees feel free to report any unsafe acts performed by themselves or by their fellow colleagues.<br>29. Senior Management visits the workplace often to engage us regarding safety.<br>30. The Senior Managers only show up in the workplace when there has been an accident. |

#### *4.5.1.3 Safety Outcomes*

Literature in safety research (Neal & Griffin, 2006; Christian et al., 2009; Martinez-Corcoles et al., 2011; Fernández-Muñiz et al., 2014) suggested two approaches to measure safety outcomes in an organisation: the first approach involves using accident rates and the second approach refers to the safety behaviours of individuals within an organisation.

The accident rates refer to the number of injuries or fatalities within an organisation and these metrics are normally used as key performance indicators for safety performance. The safety behaviours refer to safety compliance and safety participation (Clarke, 2013). The survey made use of a combination of questions to determine the behaviour of individuals, mainly safety compliance and safety participation.

The use of accident rates was not feasible since the survey was random and not targeted at a specific organisation, therefore it would not have been practical to associate each response to a particular organisation since it was anonymous. Questions 31 to 40 were concerned with measuring safety outcomes constructs as illustrated in Table 4.



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**Table 4: Survey items used to determine the safety outcomes**

| Safety Outcomes Items |
|---|
| 31. I participate in most of the safety activities such as incident investigations, review of procedures, health and safety meetings.<br>32. I personally feel empowered to stop a person when doing something not safe.<br>33. I think the company is doing well in terms of safety performance.<br>34. I am satisfied with the company's safety performance.<br>35. I have not been injured in the past 12 months.<br>36. I comply with the company's safety rules and procedures.<br>37. I do risk assessments because I am required to do so by the company.<br>38. I sometimes take shortcuts when I feel under pressure.<br>39. I have reported a near miss within the past 12 months.<br>40. I always raise safety awareness in my team. |

Due to the time available for the research, a review of existing secondary data from the targeted sample, such as the actual records for safety outcomes which is the number of occupational injuries, fatalities, occupational diseases and near misses for the years 2014 and 2015, was not conducted.

### 4.5.2 Pre-testing of the Questionnaire

Once the questionnaire was designed, prior to rolling out the survey, a pilot was conducted with four individuals with different roles in a chemical company; these included a senior manager, middle manager, first line supervisor and a shop-floor employee. The pre-test was conducted to simulate the actual survey and to determine whether the targeted participants would understand the questions as well as to identify other potential issues such as ambiguity in the questionnaire (Zikmund, 2003). After the pilot, minor changes to the original questionnaire were suggested and the questionnaire was adjusted.

## 4.6 Data Collection

The data collection process involved collecting information relevant to answering the research questions. To collect data, the researcher made use of a self-administered survey method involving a combination of both printed (paper) and online surveys. The researcher printed 310 questionnaires and the online survey was conducted via Survey Monkey and the link to the survey was distributed to the members of the Durban Chemicals Cluster by the cluster co-ordinator.



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The data collection took place in the period between beginning of August and mid-September 2015. Each questionnaire, both online and printed, included a consent letter explaining the purpose of the study and the confidentiality agreement. There were 215 printed and 38 online questionnaires that were received back from the targeted sample.

The printed surveys were used for the chemical companies located in the Umbogintwini Industrial Complex, South of Durban. The decision for choosing the complex was mainly due to the researcher's company being located in the same complex which provided convenient access to the members of this population, which had an impact on the response rate. Due to familiarity with the industrial complex, the researcher contacted via email all the environmental, health and safety managers in each company to introduce the research study and request their assistance with data collection. Of the twelve chemical companies in the complex that were approached, only three companies volunteered to take part in the study one of which was the researcher's company.

The printed questionnaires were personally administered by the researcher to the organisation for which the researcher works using various platforms such as departmental meetings, shift handover meetings, safety meetings and safety toolbox talks. In order to get buy-in, the researcher had to first consult with the Senior Leadership team to explain the purpose of the study and the benefits for the company. This kind of intervention proved useful since individuals in the organisation relate well with the researcher and this resulted in a better response rate.

Simultaneously, to obtain data from the other two companies, the researcher organised meetings with the managing director and the safety manager to explain the purpose of the study. A separate follow-up meeting was held with each safety manager to explain in detail the purpose of the study and each question. The safety managers at both these companies then administered the printed questionnaires to the employees in their respective organisations. The managers responsible for safety at both these companies had better access to employees and were familiar with the various processes and how to influence the employees which led to a relatively good response rate.

### 4.7 Data Analysis

Following collection, data was carefully analysed in order to answer the research questions and to test the hypotheses. Since the data collected from the questionnaires was quantitative in nature and could be attached to variables, statistical tests had to be performed for a clear view of the relationships (Saunders & Lewis, 2012).



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The process involved a number of steps which included processing the data, descriptive statistics, Cronbach's Alpha reliability testing, Pearson's test for correlation and multiple regression analysis.

### 4.7.1 Editing and Coding of Data

The initial processing stages included transferring the information from the paper form into Microsoft Excel. This stage involved coding the data whereby answers in the questionnaire were each given a numerical value. The Excel data workbook was later handed to an outsourced statistician who made use of Predictive Analytics Software (PASW), version 18, to perform various descriptive statistics and other tests to derive answers to the research questions and to test the research hypotheses.

### 4.7.2 Descriptive Statistics

The descriptive data analysis was conducted so as to obtain a general understanding of the data and to measure central tendencies associated with the data. The central tendency measures such as the mean, mode, standard deviation and response percentages were used to enable a broader understanding of the data.

### 4.7.3 Cronbach's Alpha

Cronbach's alpha test was conducted to check for internal consistency and to determine the reliability of the research instrument. Reverse questions were also used in the survey in order to check for consistency.

### 4.7.4 Pearson's Correlation Test

Pearson's correlation test was conducted to measure the strength of the association between two variables. The Pearson's correlation coefficient ranges from – 1 to 1, with 0 indicating no association and 1 representing a perfect association; the association can either be positive or negative (Tharenou, Donohue & Cooper, 2007).

### 4.7.5 Multiple Regression Analysis

The multiple regression analysis was conducted to test the research questions and the hypothesis. This was done to understand the extent of the relationship between the independent variables (transformational leadership, transactional leadership and safety culture) and the dependent variable (safety outcomes). The use of the multiple regression allowed the researcher to assess the contribution of each independent variable on the dependent variable without the interference of the other predictor variables (Tharenou et al., 2007). For the hypothesis testing a significance level of .05 and confidence level of 95% for the confidence interval was used.

## 4.8 Data Reliability and Validity

As part of any research study, it is important to ensure that findings are valid and reliable. Saunders and Lewis (2012) pointed out that data reliability is referred to as the



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extent to which data collection and analysis procedures produce consistent findings regardless of the source of information; validity is described as the extent to which the findings that are made as a result of the study are a true reflection of the concepts under study.

In order to determine the internal consistency of the research instrument, the Cronbach alpha test was conducted and results are illustrated in Table 5 below.

**Table 5: The Cronbach alpha coefficient**

| | Cronbach's alpha | Number of items |
|---|---|---|
| **Transformational leadership** | .832 | Q1 - Q10 |
| **Transactional leadership** | .843 | Q11 - Q20 |
| **Safety Culture** | .792 | Q21 – Q30 |
| **Safety Outcomes** | .786 | Q 31 – Q 40 |

## 4.9 Research Limitations

The following aspects were identified as limitations of this study:

### Response and Social Desirability Bias

The response bias occurs when respondents do not represent the actual truth and find ways of distorting it; the social desirability bias occurs when respondents aim to create a particular impression in the presence of the interviewer (Zikmund, 2003). Some of the respondents work in the same organisation as the researcher, therefore their responses might have not been truthful but more of what they think the researcher would like to hear or see.

### Order Bias

Order bias is a result of the manner in which the set of answers or questions sequence are positioned in a questionnaire (Zikmund, 2003). The first ten questions on the questionnaire were clear and distinct and linked to transformational leadership; the next ten focused on transactional leadership.

### Sample Characteristics

The sample characteristic refers to the nature of the sample, whether it was heterogeneous or homogenous. The sample had elements of both, however there was more homogeneity in that despite the different organisations that participated, the



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majority of the respondents were from chemical companies located in the same complex. The sample could be considered homogenous due to the close proximity of these companies to each other and in addition, it is likely that the leaders or managers move easily from one company to the other thus impacting on the organisation's safety culture.

**Language**

The questionnaire used for the study was written in English and therefore for certain individuals who do not use English as a first language, the questions could have been interpreted incorrectly.

**Use of the Explanatory Approach**

The use of the explanatory approach allows for the data to be generalised across the chemical industry in that the targeted sample contained organisations of different sizes and with different processes. In the South African context, whilst there is the potential to generalise to other industries, there could be other influences, such as different national cultures, geographical location, amongst others, that might play a role in impacting on safety culture and safety outcomes.

## 4.10 Ethical Considerations

Ethical considerations such as informed consent, confidentiality, anonymity, privacy and more were taken into consideration when conducting the research study. The research study was approved by the Research Ethics Committee at the Gordon Institute of Business Science; the approval is attached in Appendix B.

A consent letter combined with a questionnaire in Appendix A was sent out to all the research participants to request their permission to participate in the survey and the research objectives including a confidentiality clause and an option to withdraw from the survey was clearly stated. Confidentiality and anonymity was maintained at all times during the research process.

## 4.11 Conclusion

This chapter has described the methodology for the research study in order to obtain answers to the research questions stated in Chapter Three which is to determine the effect of leadership style as it relates to transformational and transactional leadership as well as safety culture on the organisation's safety outcomes in the chemical industry. This section covered details on and reasons behind the sample, sampling techniques used, data collection methods which included how the questionnaire was designed.



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The section also considered the research study limitations which might have had an impact on the results and the interpretation thereof. The next chapter is a presentation of the results obtained in an attempt to answer the research questions in order to meet the research objectives.



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# CHAPTER 5: RESULTS

## 5.1 Introduction

The purpose of this research is to assess how two different leadership styles (transformational and transactional leadership) and safety culture impact on safety outcomes in the chemical industry. This chapter therefore reports the results acquired through the study in answering the research questions specified in Chapter 3.

**Main Research Question for the Study:**

***Do transformational and transactional leadership styles lead to different safety outcomes?***

Prior to answering the main research question, the descriptive statistics describing the sample (population demographics) are presented, followed by the results of each research question and testing of the relevant hypotheses.

**Research Question 1:**

*Do transformational and transactional leadership styles result in different safety outcomes?*

The two hypotheses related to Research Question 1 are:

*(H1a): Transformational leadership style will positively predict safety outcomes significantly.*

*(H1b) Transactional leadership style will positively predict safety outcomes.*

**Research Question 2:**

*What is the difference in the impact of each leadership style on the safety culture?*

The two hypotheses related to Research Question 2 are:

*(H2a): Transformational leadership will be associated with a positive safety culture.*

*(H2b): Transactional leadership will be associated with a weak safety culture.*

**Research Question 3:**

*How does the combination of leadership style and safety culture impact on safety outcomes?*

The two hypotheses related to Research Question 3 are:



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*(H3a): Transformational leadership and safety culture will have a positive and significant impact on the safety outcomes.*

*(H3b): Transactional leadership and safety culture will have a negative impact on the safety outcomes.*

## 5.2 Survey Response

The data was gathered from respondents through the use of simple random sampling. As mentioned in Chapter 4, the data was collected through the use of self-administered and online surveys that were randomly distributed to participants who belong to different companies within the chemical industry in Durban. There were 253 participants that completed the questionnaire; three questionnaires were only 10% completed and could not be used. Therefore a total of 250 responses were used for data analysis.

## 5.3 Demographic Profile of Respondents

As part of the research study, six demographic variables were evaluated in order to obtain a profile of the respondents. These variables included job level, gender, years of experience in the chemical industry, information on training received (leadership if occupying a supervisory position and safety related training) and lastly, highest level of education completed.

### 5.3.1 Job Level

There were four job levels that were used during the study as represented in Figure 6. The results show that the majority 123 (55%) of the respondents were shop floor employees, followed by 45 (20%) first line supervisors. The management levels, both middle management and senior management numbered 39 (17%) and 17 (8%) respectively of the total respondents.



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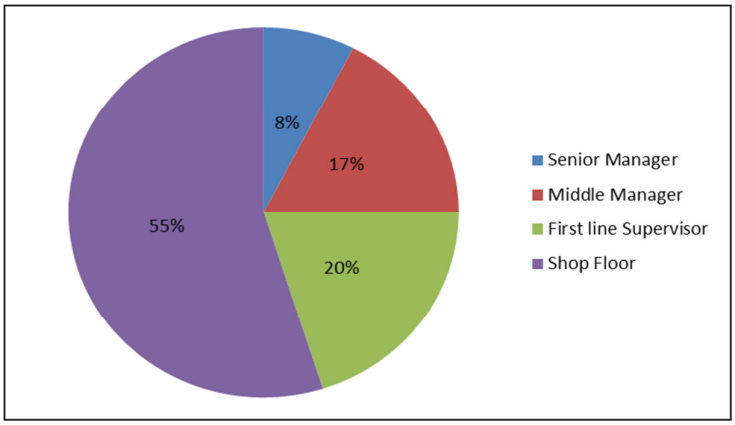
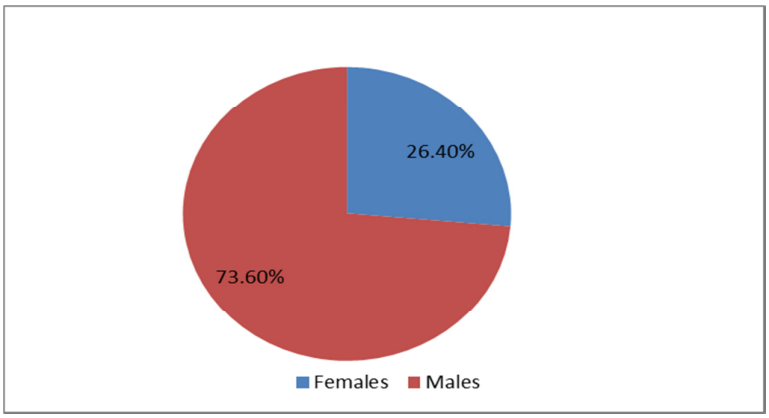
**Figure 6: Percentage of respondents based on job level**




### 5.3.2 Gender

The results in Figure 7 indicate that the questionnaire was answered by 63 females who accounted for 26.4% and 176 males which accounted for 73.6% of the total sample group.

**Figure 7: Percentage of respondents based on gender**




### 5.3.3 Years of Experience in the Chemical Industry

Figure 8 depicts the years of working experience of the respondents in the chemical industry. Sixty-seven (27%) respondents have worked in the industry for more than 15 years, followed by 61 (25%) that have worked for between 5 and10 years. Forty (16%) respondents have been working for 10-15 years and only 25 (10%) respondents have worked for less than a year in the industry.



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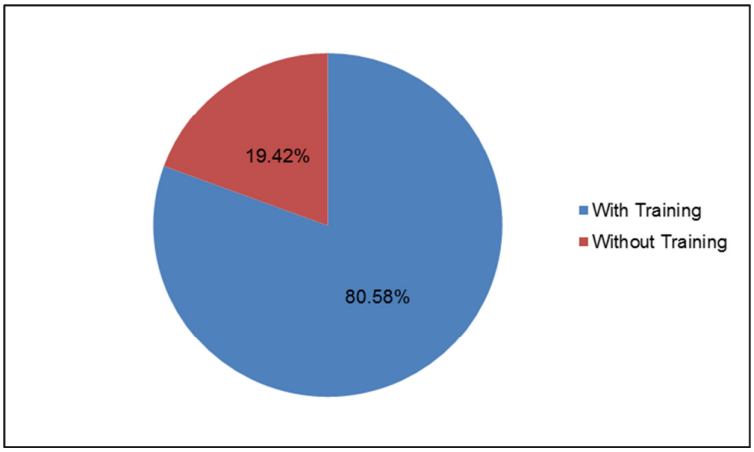
**Figure 8: Percentage of respondents based on years of experience in the chemical industry**


### 5.3.4 Leadership Training

Based on the total of 224 responses, 103 supervisors and managers completed the questionnaire and 80.6% of these supervisors and managers had received some leadership training while 19.4% had not received any leadership training as indicated in Figure 9 that follows.

**Figure 9: Percentage of respondents based on supervisors and managers who have undergone leadership training**




### 5.3.5 Safety Training

Based on the total of 224 responses, only 12, which represented 5.4% of the respondents, reported not having received any safety training, whereas the majority of the respondents 212 (94.6%) reported having undergone safety training as shown in Figure 10.



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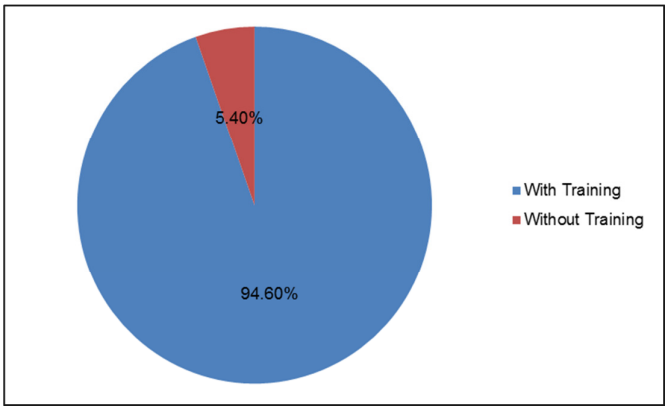
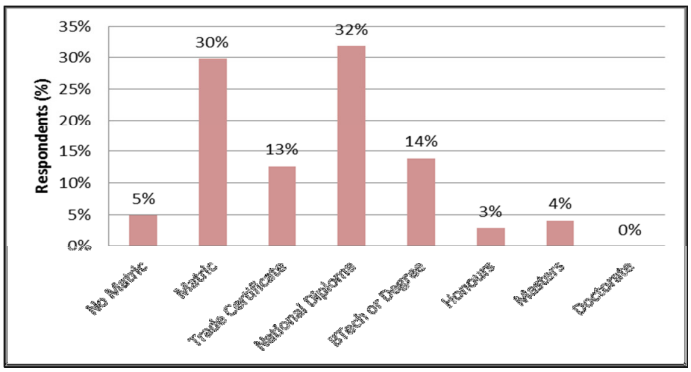
**Figure 10: Percentage of respondents who have undergone safety training**




### 5.3.6 Highest Level of Education

The results in Figure 11 indicate that 32% of the respondents have a National Diploma. Thirty percent of the respondents possess a matric qualification while 5% of the respondents do not have a matric. Only 21% of the respondents have a qualification higher than a degree or equivalent, including Masters. There were no respondents in the sample with a doctorate.

**Figure 11: Percentage of respondents based on highest level of education completed**




## 5.4 Descriptive Statistics

Descriptive statistics for each of the four main constructs was conducted. These included transformational leadership, transactional leadership, safety culture and safety outcomes.

### 5.4.1 Transformational Leadership

Transformational leadership has four facets and these include charisma or idealised influence, inspirational motivation, intellectual stimulation and individual consideration



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(Bass & Bass, 2009). The results show the application of the four facets that is useful in understanding transformational leadership and its role in influencing safety outcomes.

In Figure 12 the results indicate that 24% respondents strongly agreed and 54% agreed that their managers showed concern for how they feel; 36% strongly agreed and 56% agreed that their managers were positive about the company's safety performance. Fifty-four percent agreed and 30% strongly agreed that their managers lead by example. Over 40% of the respondents strongly agreed that their manager gets involved in resolving safety issues and concerns and over 47% agreed strongly and 45% agreed that their manager places a high value and belief in safety.

**Figure 12: Survey responses for transformational leadership items**

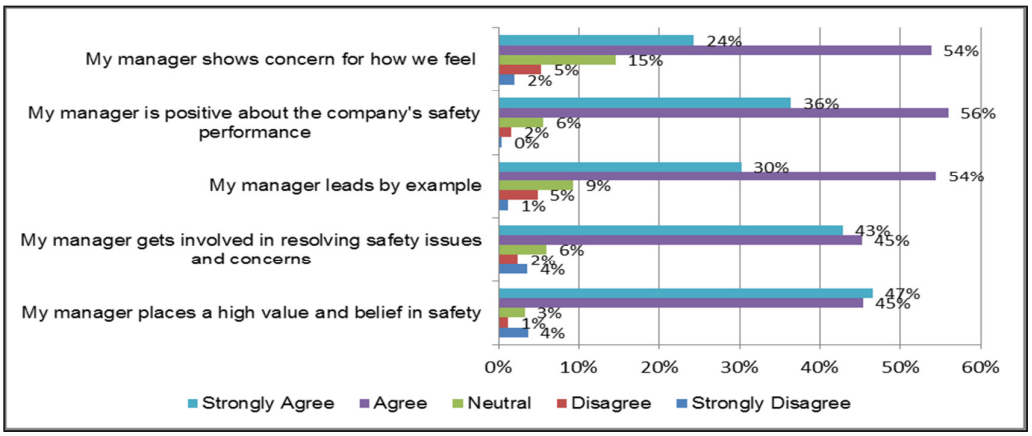


Figure 13 is a continuation of the results related to transformational leadership. The results indicate that 53% of the respondents strongly felt that their managers ensured involvement of the whole team in safety activities while only 3% disagreed and 46% agreed that their managers encouraged the individuals to work together in resolving safety concerns. In terms of teaching and coaching, which is part of the individual consideration facet, 41% of the respondents stated that their managers spent time teaching and coaching them regarding safety in the workplace. In terms of showing concerns for each member of the team, 49% of respondents indicated that that their managers had an understanding of each member of the team while 10% disagreed.



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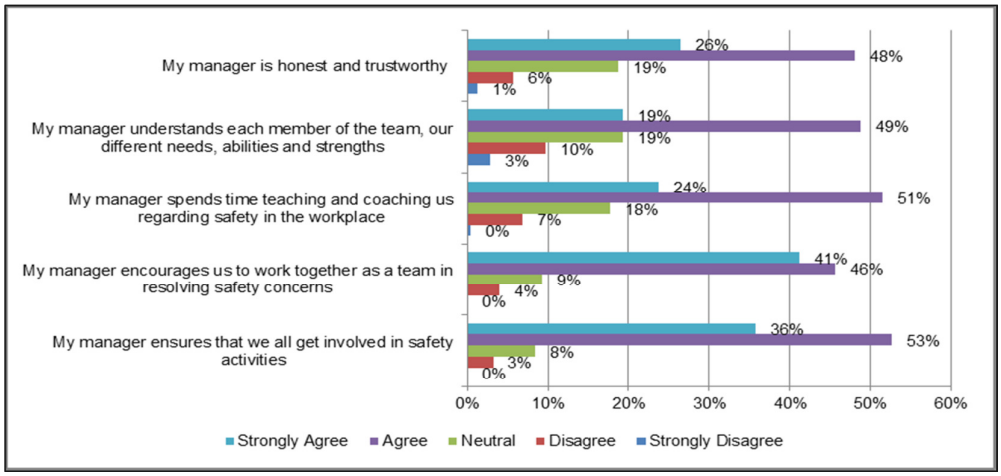
**Figure 13: Survey responses for transformational leadership items continued**




Figures 12 and 13 show that generally over 70% of the respondents indicated that their managers displayed four of the elements of transformational leadership (i.e. idealised influence, inspirational motivation, intellectual stimulation and individual consideration).

**Table 6: The descriptive statistics related to transformational leadership**

| Question | N | Mean | Median | Mode | Standard deviation |
|---|---|---|---|---|---|
| 1. My manager places a high value and belief in safety. | 247 | 4.300 | 4 | 5 | .886 |
| 2. My manager gets involved in resolving safety issues and concerns. | 250 | 4.212 | 4 | 4 | .929 |
| 3. My manager leads by example. | 248 | 4.077 | 4 | 4 | .832 |
| 4. My manager is positive about the company's safety performance. | 250 | 4.264 | 4 | 4 | .671 |
| 5. My manager shows concern for how we feel. | 247 | 3.931 | 4 | 4 | .881 |
| 6. My manager ensures that we all get involved in safety activities. | 249 | 4.209 | 4 | 4 | .726 |
| 7. My manager encourages us to work together as a team in resolving safety concerns. | 248 | 4.238 | 4 | 4 | .779 |
| 8. My manager spends time teaching and coaching us regarding safety in the workplace. | 249 | 3.912 | 4 | 4 | .846 |
| 9. My manager understands each member of the team, our different needs, abilities and strengths. | 248 | 3.722 | 4 | 4 | .975 |
| 10. My manager is honest and trustworthy. | 246 | 3.927 | 4 | 4 | .885 |

The facets associated with transformational leadership were measured using the 5-point Likert scale (strongly agree to strongly disagree) and each item was rated using the scale.

The top three statements that respondents mostly agreed with were:



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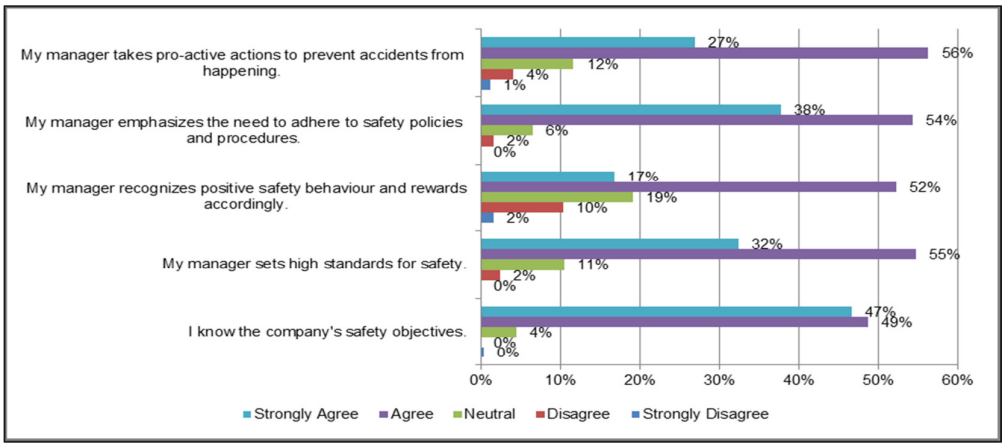
- "My manager places a high value and belief in safety" with a mean value of 4.299 and a standard deviation of .886.
- "My manager is positive about the company's safety performance" with a mean value of 4.264 and a standard deviation of .671.
- "My manager encourages us to work together as a team in resolving safety concerns" with a mean value of 4.238 and a standard deviation of .779.

### 5.4.2 Transactional Leadership

Transactional leadership is characterised by four facets and these include contingent reward, management by exception (active), management by exception (passive) and laissez-faire (Bass & Bass, 2009). The results show the application of the four facets that are useful in understanding transformational leadership and its role in influencing safety outcomes.

**Figure 14: Survey responses for transactional leadership items**




The results in Figure 14 indicated that more than 56% of the respondents felt their managers were proactive in taking actions to prevent accidents from happening; more than 56% of the respondents felt their managers set high standards for safety. This was followed by more than 52% of respondents feeling that their managers recognised positive safety behaviour and rewarded them accordingly. More than 47% of the respondents strongly agreed when asked if the company safety objectives were known to them.



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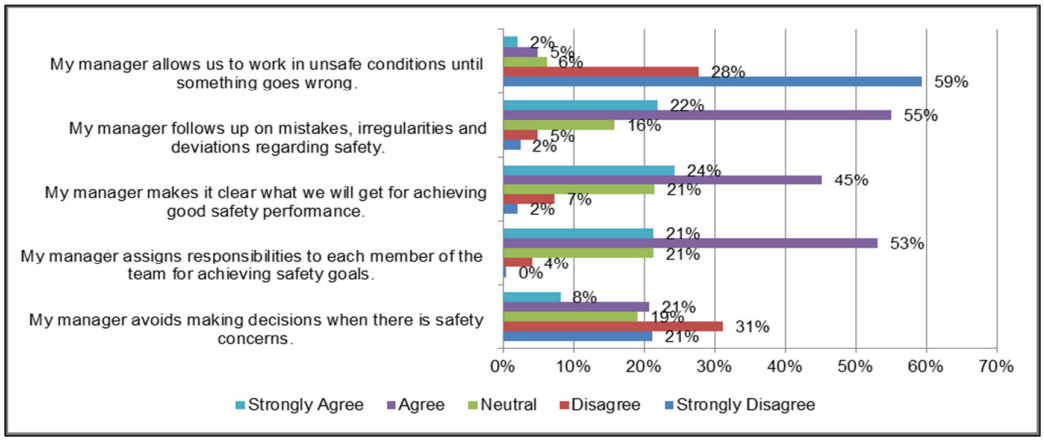
**Figure 15: Survey responses for transactional leadership items continued**




The results in Figure 15 indicated that 59% of the respondents strongly disagreed with the statement that their managers allow them to work in unsafe conditions whereas more than 7% reported that their managers do allow this. More than 55% of the respondents indicated that their managers followed up on mistakes and irregularities associated with safety. More than 53% of the respondents showed that their manager assigned responsibilities to each member so as to achieve safety goals. More than 21% of the respondents indicated that their managers avoided making decisions when there were safety concerns.



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**Table 7: Response description for each question related to transactional leadership**

| Question | N | Mean | Median | Mode | Standard deviation |
|---|---|---|---|---|---|
| 11. I know the company's safety objectives. | 247 | 4.409 | 4 | 5 | .616 |
| 12. My manager sets high standards for safety. | 247 | 4.170 | 4 | 4 | .705 |
| 13. My manager recognizes positive safety behaviour and rewards accordingly. | 251 | 3.721 | 4 | 4 | .916 |
| 14. My manager emphasizes the need to adhere to safety policies and procedures. | 247 | 4.279 | 4 | 4 | .654 |
| 15. My manager takes pro-active actions to prevent accidents from happening. | 249 | 4.036 | 4 | 4 | .808 |
| 16. My manager avoids making decisions when there are safety concerns. | 247 | 2.636 | 2 | 2 | 1.251 |
| 17. My manager assigns responsibilities to each member of the team for achieving safety goals. | 249 | 3.903 | 4 | 4 | .784 |
| 18. My manager makes it clear what we will get for achieving good safety performance. | 248 | 3.823 | 4 | 4 | .947 |
| 19. My manager follows up on mistakes, irregularities and deviations regarding safety. | 247 | 3.891 | 4 | 4 | .882 |
| 20. My manager allows us to work in unsafe conditions until something goes wrong. | 246 | 1.626 | 1 | 1 | .945 |

The facets associated with transactional leadership were measured using the 5-point Likert scale (strongly agree to strongly disagree) and each item was rated using the scale.

The top three statements that respondents mostly agreed with were:

- “I know the company's safety objectives” with a mean value of 4.409 and a standard deviation of .616.
- “My manager emphasises the need to adhere to safety policies and procedures” with a mean value of 4.279 and a standard deviation of .654.
- “My manager sets high standards for safety” with a mean value of 4.170 and a standard deviation of .705.

### 5.4.3 Safety Culture

The safety culture was measured by using five indicators: organisational commitment, involvement of management, employee empowerment, rewards and reporting systems.



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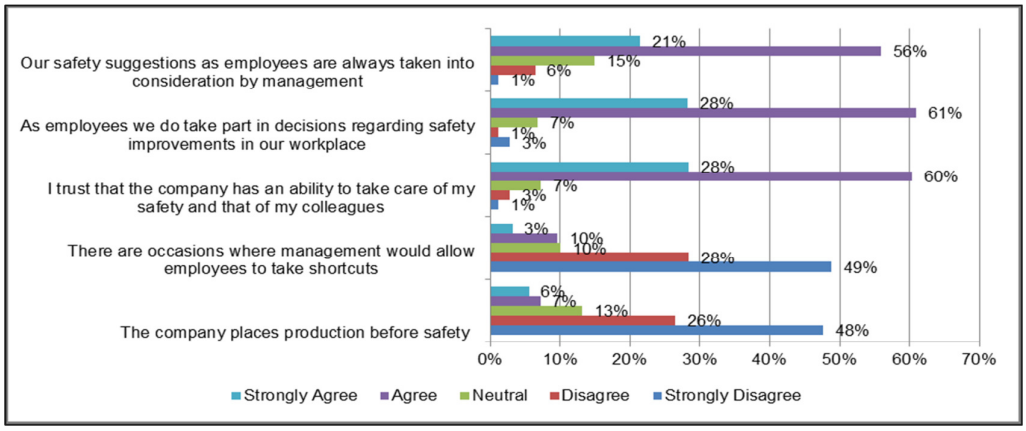
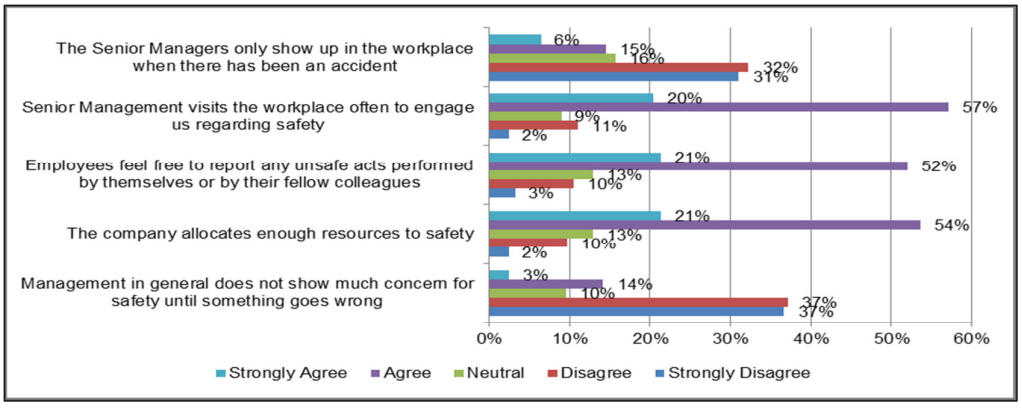
**Figure 16: Survey responses related to the safety culture assessment**




As shown in Figure 16, 61% of respondents agreed and 28% strongly agreed that they took part in the decisions regarding safety improvements in their workplace while 3% strongly disagreed; more than 60% of the respondents agreed that they trusted that the company had the ability to take care of their safety and that of other colleagues; over 56% of respondents agreed that their safety suggestions are taken into consideration by management. In terms of the company placing production over safety, 48% of respondents strongly disagreed and 26% disagreed which is a good indicator of a positive safety culture; only 7% of respondents disagreed. In addition 49% of the respondents strongly disagreed with the statement that there were occasions where management would allow employees to take shortcuts with only around 10% of the respondents agreeing to the statement.

**Figure 17: Survey responses related to the safety culture assessment continued**




In terms of management commitment, more than 32% of the respondents disagreed that senior managers showed up only when there had been an accident while more than 15% of the respondents agreed; 57% of the respondents revealed that the senior managers visited the workplace to engage with them regarding safety while more than 11% disagreed. In terms of resources allocation, more than 54% of the respondents



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agreed that their companies allocated enough resources to safety while only around 10% of the respondents disagreed.

**Table 8: Response description for each question related to the safety culture assessment**

| Question | N | Mean | Median | Mode | Standard deviation |
|---|---|---|---|---|---|
| 21. The company places production before safety. | 250 | 1.963 | 2 | 1 | 1.183 |
| 22. There are occasions where management would allow employees to take shortcuts. | 250 | 1.900 | 2 | 1 | 1.118 |
| 23. I trust that the company has an ability to take care of my safety and that of my colleagues. | 247 | 4.117 | 4 | 4 | .752 |
| 24. As employees we do take part in decisions regarding safety improvements in our workplace. | 248 | 4.105 | 4 | 4 | .801 |
| 25. Our safety suggestions as employees are always taken into consideration by management. | 247 | 3.899 | 4 | 4 | .850 |
| 26. Management in general does not show much concern for safety until something goes wrong. | 240 | 2.088 | 2 | 1 | 1.116 |
| 27. The company allocates enough resources to safety. | 248 | 3.819 | 4 | 4 | .956 |
| 28. Employees feel free to report any unsafe acts performed by themselves or by their fellow colleagues. | 248 | 3.778 | 4 | 4 | 1.002 |
| 29. Senior Management visits the workplace often to engage us regarding safety. | 245 | 3.820 | 4 | 4 | .961 |
| 30. The Senior Managers only show up in the workplace when there has been an accident. | 248 | 2.331 | 2 | 2 | 1.233 |

The top three statements that respondents mostly disagreed with were:

- “The company places production before safety” with a mean value of 1.963 and a standard deviation of 1.183.
- “There are occasions where management would allow employees to take shortcuts” with a mean value of 1.900 and a standard deviation of 1.118.
- “Management in general does not show much concern for safety until something goes wrong” with a mean value of 2.088 and a standard deviation of 1.117.



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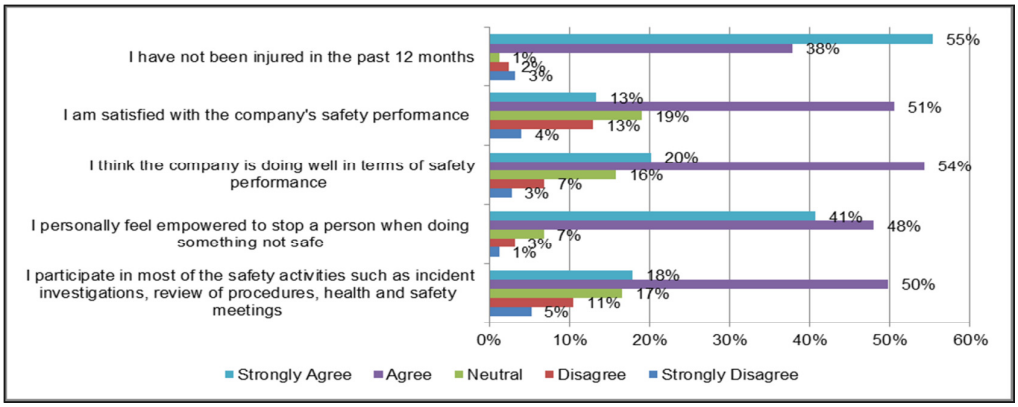
### 5.4.4 Safety Outcomes

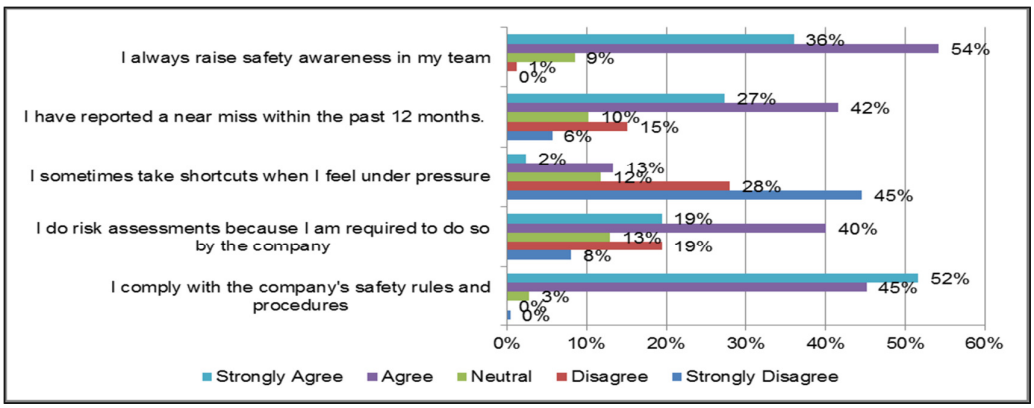
The safety outcomes were measured by evaluating the safe behaviour of respondents using safety participation and safety compliance as measures.

**Figure 18: Survey responses related to the safety outcomes**




Based on the results in Figure 18 above, more than 90% of the respondents reported that they had not been injured in the past 12 months; approximately 5% disagreed with the statement. In terms of satisfaction regarding the current safety performance, more than 60% of the respondents agreed, 19% neither agreed nor disagreed and more than 15% were not satisfied with the safety performance. More than 85% of the respondents felt empowered to stop others from doing something not safe with only 4% feeling less empowered. Regarding employee participation, approximately 68% of the respondents participated in most of the safety activities at work, 17% were neutral and 16% of the respondents reported not participating in most of the safety activities.

**Figure 19: Survey responses related to the safety outcomes continued**




In terms of safety compliance, 97% of the respondents reported compliance with the company's safety rules and procedures and only 3% of the respondents were neutral. Approximately 90% of the respondents reported that they raise safety awareness within



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their team, with only 1% disagreeing. About 69% of the respondents had reported a near miss in the past 12 months and more than 21% of the respondents disagreed. Approximately 73% of the respondents disagreed with the statement regarding taking shortcuts when feeling under pressure, 12% of the respondents were neutral and 15% of the respondents indicated that they do take shortcuts when feeling under pressure.

**Table 9: Response description for each question related to safety outcomes**

| Question | N | Mean | Median | Mode | Standard deviation |
|---|---|---|---|---|---|
| 31. I participate in most of the safety activities such as incident investigations, review of procedures, health and safety meetings. | 247 | 3.644 | 4 | 4 | 1.050 |
| 32. I personally feel empowered to stop a person when doing something not safe. | 248 | 4.238 | 4 | 4 | .814 |
| 33. I think the company is doing well in terms of safety performance. | 247 | 3.822 | 4 | 4 | .927 |
| 34. I am satisfied with the company's safety performance. | 247 | 3.563 | 4 | 4 | 1.008 |
| 35. I have not been injured in the past 12 months. | 246 | 4.394 | 4 | 5 | .894 |
| 36. I comply with the company's safety rules and procedures. | 248 | 4.476 | 5 | 5 | .595 |
| 37. I do risk assessments because I am required to do so by the company. | 247 | 3.433 | 4 | 4 | .228 |
| 38. I sometimes take shortcuts when I feel under pressure. | 247 | 2.012 | 2 | 1 | .147 |
| 39. I have reported a near miss within the past 12 months. | 245 | 3.698 | 4 | 4 | .184 |
| 40. I always raise safety awareness in my team. | 247 | 4.251 | 4 | 4 | .656 |

The top three statements that respondents mostly agreed with were:

- “I comply with the company's safety rules and procedures” with a mean value of 4.476 and a standard deviation of .595.
- “I always raise safety awareness in my team” with a mean value of 4.251 and a standard deviation of .656.
- “I personally feel empowered to stop a person when doing something not safe” with a mean value of 4.238 and a standard deviation of .814.

## 5.5 Cronbach’s Alpha Test for Internal Consistency and Reliability

The data for each of the sections of the questionnaire related to transformational, transactional leadership, safety culture and safety outcomes were checked for internal consistency and reliability. Since the questions were Likert-scale based, it was



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important to check for reliability of the scores. The Cronbach alpha scores measured were good. The scores are presented in Table 10 below:

**Table 10: Cronbach's alpha co-efficient**

| | Cronbach's Alpha | Number of items |
|---|---|---|
| **Transformational leadership** | .832 | Q1 - Q10 |
| **Transactional leadership** | .843 | Q11 - Q20 |
| **Safety Culture** | .792 | Q21 – Q30 |
| **Safety Outcomes** | .786 | Q 31 – Q 40 |

## 5.6 Results pertaining to Research Question 1

The following sections comprise testing the variables for associations for each of the research questions and the associated hypotheses.

*Research Question 1: Do transformational and transactional leadership result in different safety outcomes?*

### 5.6.1 Pearson's Correlation Test

In order to assess the correlation between leadership styles and safety outcomes, the Pearson's correlation co-efficient test was used to measure the strength of the association.

Table 11 presents the Pearson's co-efficient of transformational leadership and safety outcomes with an r value of .106 indicates that there is a weak positive correlation between transformational leadership and safety outcomes. The significance value (2-tailed) of .106 indicates that the correlation is not statistically significant since p >.05.

**Table 11: Correlation between transformational leadership and safety outcomes**

| | | Transformation | Safety |
|---|---|---|---|
| **Transformational** | Pearson's | 1 | .150 |
| | Sig. (2-tailed) | | .106 |
| **Safety Outcomes** | Pearson's | .150 | 1 |
| | Sig. (2-tailed) | .106 | |
| | N | 10 | 10 |

*** Correlation is significant at the 0.01 level (2-tailed)*

Table 12 presents the Pearson's co-efficient of transactional leadership and safety outcomes with an r value of -.331 which indicates that there is a negative and moderate correlation between transactional leadership and safety outcomes. The significance



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value (2-tailed) of .106 indicates that the correlation is not statistically significant since $p > .05$.

**Table 12: Correlation between transactional leadership and safety outcomes**

| | | Transactional | Safety Outcomes |
|---|---|---|---|
| **Transactional** | Pearson's | 1 | -.331 |
| | Sig. (2-tailed) | | .106 |
| **Safety Outcomes** | Pearson's | -.331 | 1 |
| | Sig. (2-tailed) | .106 | |
| | N | 10 | 10 |

*** Correlation is significant at the 0.01 level (2-tailed)*

Based on the results in Tables 11 and 12, it is clear that the transformational and transactional leadership are correlated differently with safety outcomes and these correlations are not statistically significant.

### 5.6.2 Multiple Regression Analysis

The regression analysis was conducted to measure the degree to which the two leadership styles – transformational (independent variable – $X_1$) and transactional leadership (independent variable – $X_2$) – impact on the safety outcomes (dependent variable – Y) and to test the following hypothesis.

($H_{01a}$): Transformational leadership style ($X_1$) will positively predict safety outcomes significantly.

($H_{1a}$): Transformational leadership style will not positively predict safety outcomes significantly.

($H_{01b}$): Transactional leadership style ($X_2$) will positively predict safety outcomes.

($H_{1b}$): Transactional leadership style will not positively predict safety outcomes.

The regression equation used was: $\hat{Y} = b_0 + b_1 X_1 + b_2 X_2$ and the statistical results after mathematical computation were as per Table 13.

**Table 13: Model summary for regression to determine impact of leadership style on safety outcomes**

| Case | R | R Square | Adjusted R Square | Standard Error of the Estimate | Number of observations |
|---|---|---|---|---|---|
| 1 | .412 | .170 | -. 068 | .740 | 10 |



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**Table 14: ANOVA for regression to determine the impact of transformational and transactional leadership on safety outcomes**

| Case 1 | df | Sum of Squares | Mean Square | F | Significance F |
|---|---|---|---|---|---|
| Regression | 2 | .781 | .391 | .715 | .522 |
| Residual | 7 | 3.825 | .546 | | |
| Total | 9 | 4.606 | | | |

According to Table 15, the regression equation outcome is $Y = 1.159639 + .931232X_1 - .33022X_2$. The table further illustrates the model summary for the regression pertaining to the impact of leadership style on the safety outcomes. The model reported a co-efficient of determination ($R^2$) of .170 indicating that the model explains 17% of the variance related to transformational and transactional leadership and its impact on safety outcomes.

**Table 15: Coefficients for regression to determine the impact of transformational and transactional leadership on safety outcomes**

| Case 1 | Coefficients | Standard Error | t- Stat | P-value | Lower 95% | Upper 95% |
|---|---|---|---|---|---|---|
| Intercept | 1.160 | 5.161 | .225 | .829 | -11.044 | 13.363 |
| Transformational leadership | .931 | 1.307 | .712 | .499 | -2.160 | 4.023 |
| Transactional leadership | -.330 | .297 | -1.114 | .302 | -1.031 | .371 |

Referring to Table 15, the contributions of the independent variables (transformational and transactional leadership) in predicting the safety outcomes are explained. The co-efficients (Beta) for the two independent variables ($X_1$) and ($X_2$) are significantly different, therefore the two leadership styles result in different safety outcomes. Based on the co-efficient (Beta) figures of .931 and -.330, there is a statistical difference between the two leadership styles in that transformational leadership has shown a strong positive relationship with a co-efficient of .931. Therefore the null hypothesis ($H_{01a}$) is true. Transactional leadership has an inverse relationship with a negative co-efficient of -.330. Therefore the null is rejected and the alternative hypothesis ($H_{1a}$) is accepted. Pertaining to these results for research question 1; there is a potential for Type 1 error since the null has been rejected when in actual fact it could have been true.



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## 5.7 Results pertaining to Research Question 2

*Research Question 2: What is the difference in the impact of each leadership style on the safety culture?*

### 5.7.1 Pearson's Correlation Test

A Pearson correlation test was conducted to assess the correlation between the two leadership styles and safety culture. According to Table 16, the Pearson's co-efficient between transformational leadership and safety culture is -.362 which indicates that there is a moderate negative correlation between transformational leadership and safety culture and the significance value (2-tailed) of .106 indicates that the correlation is not statistically significant.

**Table 16: Correlation between transformational leadership and safety culture**

| | | Transformational | Safety Culture |
|---|---|---|---|
| **Transformational** | Pearson's Correlation | 1 | -.362 |
| | Sig. (2-tailed) | | .106 |
| **Safety Culture** | Pearson's Correlation | -.362 | 1 |
| | Sig. (2-tailed) | .106 | |
| | N | 10 | 10 |

*** Correlation is significant at the 0.01 level (2-tailed).*

According to Table 17 the Pearson's co-efficient for transactional leadership and safety culture indicates that there is a moderate positive correlation between transactional leadership and safety culture with an r value of .344 and a significance value (2-tailed) of .106 indicates that the correlation is not statistically significant.

**Table 17: Correlation between transactional leadership and safety culture**

| | | Transactional | Safety Culture |
|---|---|---|---|
| **Transactional** | Pearson's | 1 | .344 |
| | Sig. (2-tailed) | | .106 |
| **Safety Culture** | Pearson's | .344 | 1 |
| | Sig. (2-tailed) | .106 | |
| | N | 10 | 10 |

*** . Correlation is significant at the 0.01 level (2-tailed).*

Based on the results in Tables 16 and 17, it is clear that the transformational and transactional leadership styles correlate differently with the safety culture.

### 5.7.2 Multiple Regression Analysis

The regression analysis was conducted to measure the degree at which the two leadership styles transformational (independent variable – $X_1$) and transactional



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leadership (independent variable – $X_2$) impact on the safety culture (dependent variable – Y) and to test the hypothesis.

($H_{02a}$): Transformational leadership will be associated with a positive safety culture.
($H_{2a}$): Transformational leadership will not be associated with a positive safety culture.

($H_{02b}$): Transactional leadership will be associated with a weak safety culture.

($H_{2b}$): Transactional leadership will not be associated with a weak safety culture.

The regression equation used was: $\hat{Y} = b_0 + b_1X_1 + b_2X_2$ and the statistical results after mathematical computation were as per Table 20.

**Table 18: Model summary for regression to determine impact of leadership style on safety culture**

| Case | R | R Square | Adjusted R Square | Standard Error of the Estimate | Number of observations |
|---|---|---|---|---|---|
| 2 | .581 | .338 | .148 | .895 | 10 |

Table 18 illustrated the model summary for the regression case pertaining to the impact of leadership style on the safety culture. The model reported a co-efficient of determination ($R^2$) of .338 indicating that the model explains 33.74% of the variance related to transformational and transactional leadership and its impact on safety culture.

**Table 19: ANOVA for regression to determine the impact of transformational and transactional leadership on safety culture**

| Case 2 | df | Sum of Squares | Mean Square | F | Significance F |
|---|---|---|---|---|---|
| Regression | 2 | 2.855 | 1.427 | 1.782 | .237 |
| Residual | 7 | 5.607 | .801 | | |
| Total | 9 | 8.461 | | | |

As per Table 20, the regression equation outcome is Y = 11.07172 - 2.40886$X_1$ + .53051$X_2$



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**Table 20: Coefficients for regression to determine the impact of transformational and transactional leadership on safety outcomes**

| Case 2 | Coefficients | Standard Error | t- Stat | P-value | Lower 95% | Upper 95% |
|---|---|---|---|---|---|---|
| Intercept | 11.072 | 6.249 | 1.772 | .120 | -3.704 | 25.848 |
| Transformational leadership | -2.409 | 1.583 | -1.522 | .172 | -6.152 | 1.334 |
| Transactional leadership | .531 | .359 | 1.478 | .183 | -.318 | 1.379 |

Based on the regression co-efficient (Beta) figures of -2.409 and .530, there is a high statistical difference between the two leadership styles in that transformational leadership has shown a strong inverse relationship to safety culture with a co-efficient of -2.409 meaning it cannot be associated with a positive safety culture. Therefore the alternative hypothesis ($H_{2a}$) is true and the null is rejected. Transactional leadership has shown a strong positive relationship with a co-efficient of .531 with the safety culture therefore the alternative hypothesis ($H_{2b}$) is true and the null is rejected. Pertaining to the hypothesis testing results there is a potential for Type 1 error since the null has been rejected and it could have been true.

## 5.8 Results pertaining to Research Question 3

*Research Question 3: How does the combination of leadership style and different safety cultures impact on safety outcomes?*

### 5.8.1 Pearson's Correlation Test

The correlation between safety culture and safety outcomes was assessed, as per Table 21 the Pearson's correlation co-efficient of -.426, which indicates a moderate negative moderate correlation and that it is not statistically significant since p>.05.

**Table 21: Correlation between safety culture and safety outcomes**

| | | Safety Culture | Safety outcomes |
|---|---|---|---|
| **Safety Culture** | Pearson's | 1 | -.426 |
| | Sig. (2-tailed) | | .106 |
| **Safety Outcomes** | Pearson's | -.426 | 1 |
| | Sig. (2-tailed) | .106 | |
| | N | 10 | 10 |



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### 5.8.2 Multiple Regression Analysis

The analysis was conducted to measure the degree to which the three independent variables, mainly the two leadership styles, transformational (independent variable – $X_1$), transactional leadership (independent variable – $X_2$), and safety culture (independent variable – $X_3$) impact on safety outcomes (dependent variable – Y) and to test the hypothesis.

($H_{03a}$): Transformational leadership and a positive safety culture will have a positive and significant impact on the safety outcomes.

($H_{3a}$): Transformational leadership and a positive safety culture will not have positive and significant impact on the safety outcomes.

($H_{03b}$): Transactional leadership and a weak safety culture will have a negative impact on safety outcomes.

($H_{3b}$): Transactional leadership and a weak safety culture will not have a negative impact on safety outcomes.

The regression equation used was: $\hat{Y} = b_0 + b_1X_1 + b_2X_2 + b_3X_3$ and the statistical results after mathematical computation were as per Table 24.

**Table 22: Model summary for regression to determine impact of leadership style on safety culture**

| Case | R | R Square | Adjusted R Square | Standard Error of the Estimate | Number of observations |
|---|---|---|---|---|---|
| 3 | .475 | .226 | -.161 | .771 | 10 |

According to Table 22, the co-efficient of determination ($R^2$) of .226 indicating that the model explains 22.6% of the variance related to transformational and transactional leadership, safety culture and how these impact on the safety outcomes.

**Table 23: ANOVA for regression to determine the impact of transformational and transactional leadership on safety culture**

| Case 3 | df | Sum of Squares | Mean Square | F | Significance F |
|---|---|---|---|---|---|
| Regression | 3 | 1.040 | .347 | .583 | .648 |
| Residual | 6 | 3.566 | .594 | | |
| Total | 9 | 4.606 | | | |



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As per Table 24, the regression equation was $Y = 3.538808 + .4136X_1 - .21622X_2 - .21489X_3$.

**Table 24: Coefficients for regression to determine the impact of transformational and transactional leadership on safety outcomes**

| Case 3 | Coefficients | Standard Error | t- Stat | P-value | Lower 95% | Upper 95% |
|---|---|---|---|---|---|---|
| Intercept | 3.539 | 6.478 | .546 | .605 | -12.312 | 19.390 |
| Transformational leadership | .414 | 1.573 | .263 | .801 | -3.435 | 4.262 |
| Transactional leadership | -.216 | .354 | -.610 | .564 | -1.083 | .651 |
| Safety Culture | -.215 | .326 | -.660 | .534 | -1.012 | .582 |

Based on the results in Table 24, transactional leadership has a regression co-efficient (Beta) of -.2162 and safety culture has a co-efficient (Beta) of -.2149. These have almost the same effect on safety outcomes but the relationship is weak and negative. Transformational leadership has a co-efficient (Beta) of .413 which indicates a moderate positive relationship. Transformational leadership has an opposite but double the effect on the safety outcome as compared to transactional leadership. The regression co-efficients for the three independent variables ($X_1$), ($X_2$) and ($X_3$) are significantly different therefore the two leadership styles with a combination of a safety culture result in different safety outcomes. Pertaining to the hypothesis testing results there is a potential for a Type 2 error since the null has not been rejected when in fact the alternate hypothesis may have been true.

## 5.9 Conclusion of Results

The results obtained in this study indicate that transformational and transactional leadership styles have a different impact on the safety outcomes and the statistical results revealed that transformational leadership has shown a strong correlation with safety outcomes. In relation to the safety culture, transformational leadership was not associated with a positive safety culture but transactional leadership showed a positive correlation with safety culture. The next chapter discusses in detail the results presented in this chapter in relation to the literature reviewed in Chapter 2.



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# CHAPTER 6: DISCUSSION OF RESULTS

## 6.1 Introduction

The data from the 250 respondents was analysed quantitatively and the results were presented in the previous chapter. The chapter aims to focus on discussing the findings from the previous chapter and link it to the relevant theoretical literature that was reviewed as part of Chapter 2 and the research questions identified in Chapter 3. The discussion presented in this chapter contributes to the existing body of knowledge around safety leadership by demonstrating the effect of transformational and transactional leadership, safety culture on the safety outcomes. The main research question of this study sought to determine whether transformational and transactional leadership lead to different safety outcomes. The findings of the study are discussed under the following headings:

6.1.1 Sample Demographics

6.1.2 Research Question 1

6.1.3 Research Question 2

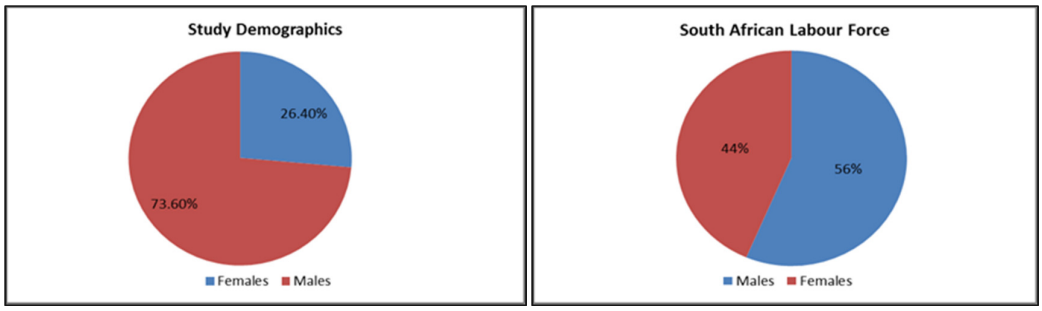
6.1.4 Research Question 3

6.1.5 Conclusion

## 6.2 Sample Demographics

Respondents included 26% females and 73% males; these results in the chemical industry differ from the national statistics for employed people: at the end of December 2014 there were 44% females and 56% males as per Figure 20 (Statistics South Africa, 2014). Therefore this suggests that the chemical industry is dominated by males.

**Figure 20: Study demographics and South African labour force**



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Regarding job levels, most of the respondents were from shop floor level (55%) followed by first line supervisors (20%), middle management (17%) and senior management (8%). This is a typical representation of most organisations in the country (Statistics South Africa, 2014). In terms of working experience, the majority of the respondents (43%) have been working in the chemical industry for more than ten years and only 10% of the respondents had worked for less than a year. These results could be partially attributed to the fact that these companies were located on the same complex.

In terms of leadership training 63% of the respondents occupying supervisory and management positions had received training and only 37% had not received leadership training. Regarding safety training, 94% of the respondents had received safety training; this is mainly due to the fact that most of the chemical companies have requirements for attending a safety induction in order to raise awareness about hazards associated with their processes to prevent harm. Regarding the levels of education, 5% of the respondents did not have matric, 30% of the respondents had only a matric certificate and more than 65% of the respondents had a post-matric qualification. This is representative of the national statistics.

Based on these results the research findings suggest that the chemical industry is dominated by males, mostly shop floor employees and people with high levels of working experience. The findings of this study may be applied to other industries that have similar demographics, for example the mining industry.

## 6.3 Research Question 1

*Do transformational and transactional leadership result in different safety outcomes?*

Research Question 1 aimed to understand the impact of transformational and transactional leadership on safety outcomes and whether these leadership styles lead to different safety outcomes. The results revealed that the two leadership styles impact on safety outcomes differently: transformational leadership has shown a strong positive relationship with safety outcomes whereas transactional leadership has a negative relationship.

The survey questions asked the respondents to rate the statements pertaining to the behaviour of their leaders to ascertain whether the leader makes use of a transformational or transactional leadership style. The results are discussed as per Tables 6 and 7.



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Regarding the results associated with the elements of transformational leadership, the respondents rated highly the statements related to the elements of idealised influence, inspirational and motivational and intellectual stimulation; these statements achieved a mean above 4.0. The findings support the work conducted on the application of transformational leadership in the safety context whereby it has been demonstrated that the leader acts as a role model and gives priority to safety, the leader inspires and motivates the employees through influencing the followers' beliefs and values, the leader intellectually stimulates followers to develop and suggest new creative ways of solving problems and lastly the leader shows concern for all individuals within the team (Clarke, 2013). Therefore under the guidance of a transformational leader, the employees are likely to be motivated, inspired and creative and willing to take part in safety initiatives to create a safe working environment for themselves and fellow colleagues.

An interesting finding is that the respondents rated the individual consideration element lower when compared with the other three elements of transformational leadership. The individual consideration element of transformational leadership refers to the ability of the leader to show concern for each member of the team and their well-being (Bass & Bass, 2009). This finding is supported by a conclusion from a previous study conducted by Hoffmeister et al (2014) who concluded that the act of coaching and mentoring which is associated with individualised consideration is not as significant when it comes to promoting safety when compared with the other elements. This variation associated with individualised consideration in this study may be explained by other factors which include language, culture and gender. These factors were not explored in detail for this research study and will be recommended as an area for further research.

In determining the extent to which leaders apply a transactional leadership style in the chemical industry, the respondents rated highly the contingent reward and management by exception (active) elements. Respondents largely did not agree with the statements that were associated with management by exception (passive) and laissez faire elements. The results indicated that the leaders within the sample did not often engage in passive behaviours when promoting safety amongst followers but preferred to be more active. These findings support Mullen et al. (2011) who concluded that in transactional leadership the elements of management by exception (passive) and laissez faire have been considered as ineffective and result in inactive forms of leadership.



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The low ratings in management by exception (passive) and laissez faire were also probably due to the nature of the chemical industry which is categorised as part of high reliability organisations (HROs). Due to the nature of the process in HROs, incidents that occur tend to have much more significant effects and can impact communities surrounding the operations (Martinez-Córcoles et al, 2011) and therefore the leaders need to be proactive in anticipating what can go wrong and ensure the necessary controls are in place to prevent devastating effects that may occur as a result of an incident. Also in the HROs there is a high pre-occupation with failure and leaders spend most of the time on early detection of problems to ensure the integrity of the process. Based on this finding, the use of passive behaviours related to management by exception (passive) and laissez-faire may not be applicable in the HROs.

An interesting finding is that the results pertaining to the rating of statements for both transformational and transactional leadership were different; but there were more statements of transformational leadership that had a mean above 4.0 when compared with transactional leadership. This could be an indicator that most leaders within the sample had a more transformational leadership style rather than a transactional leadership style.

This finding is backed up by the relatively few studies completed specifically for the effect of transactional leadership on safety performance compared with studies completed regarding the effects of transformational leadership on safety performance including safety outcomes. This assertion is supported by Clarke (2013) who also stated that there has been little research that has investigated the role of transactional leadership in relation to safety. However, in one study related to transactional leadership and its effects on safety outcomes completed by Zohar (2002a) it is reported that in situations where supervisors gave safety high priority and ensured that performance was strictly monitored and rewards driven, better transactional scores were found to be associated with lower injury rates. Therefore what seems to matter as far as is influencing safety outcomes is the leader's behaviour and priority given to safety amongst other competing priorities such as production and costs .

Correlation tests such as the Pearson's test, multiple regression analysis and hypothesis testing were conducted to determine whether transformational leadership positively predicted safety outcomes significantly compared with transactional leadership which has a normal positive impact. Clarke (2013) ascertained that the two leadership styles impact on safety differently and result in positive outcomes: transformational leadership is strongly related to safety outcomes associated largely



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with greater employee safety participation while transactional leadership is closely linked to safety outcomes that are associated with employee safety compliance.

The results of this study revealed that the two leadership styles impact on safety outcomes differently, in that transformational leadership has shown a strong positive relationship with safety outcomes whereas transactional leadership has an inverse relationship. Therefore if the leader uses a transformational leadership style, this will be associated with better safety outcomes compared with a leader that predominantly applies transactional leadership which would result in negative outcomes.

**Table 25: Statistical summary of results for transformational leadership and safety outcomes**

| | Cronbach Alpha | Pearson's Correlation | Regression Co-efficient |
|---|---|---|---|
| **Transformational Leadership** | .832 | .150 | .931 |
| **Safety Outcomes** | .792 | | |

Both the Cronbach alpha scores for transformational leadership and safety outcomes were above the benchmark of .70, thus the internal validity of the data is acceptable. The Pearson's correlation results showed a weak but positive association between transformational leadership and safety outcomes. There is a negative association between transactional leadership and safety outcomes as per Table 26 and this is stronger than for the transformational leadership variable.

**Table 26: Statistical summary of results for transactional leadership and safety outcomes**

| | Cronbach Alpha | Pearson's Correlation | Regression co-efficient |
|---|---|---|---|
| **Transactional Leadership** | .843 | -.330 | -.330 |
| **Safety Outcomes** | .792 | | |

The researcher hypothesised that both transformational and transactional leadership styles would positively predict safety outcomes, and that a transformational leadership style would have a more significant impact on safety outcomes when compared with a transactional leadership style. Pertaining to the results presented in Tables 25 and 26,



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it has been found that transformational leadership positively predicts safety outcomes significantly compared with transactional leadership which has a negative correlation. Based on these results the null hypothesis ($H_{01a}$) is therefore true and it is accepted, in that transformational leadership will positively predict safety outcomes significantly. Transactional leadership has shown an inverse relationship therefore the null is rejected and the alternative hypothesis ($H_{1a}$) is accepted.

**Conclusion to the Results Discussion pertaining to Research Question 1**

To answer Research Question 1, the findings of this study indicated that the two leadership styles (transformational and transactional leadership) resulted in different safety outcomes. In terms of hypothesis testing, the results revealed a statistical difference between the two leadership styles in that transformational leadership showed a strong positive relationship with safety outcomes therefore the null hypothesis ($H_{01a}$) is true. Transactional leadership showed a moderate negative relationship to safety outcomes therefore the null is rejected and the alternative hypothesis ($H_{1b}$) is accepted.

## 6.4 Research Question 2

*What is the difference in the impact of each leadership style on the safety culture?*

Research Question 2 aimed to understand the impact of transformational and transactional leadership on safety culture. The results revealed that the two leadership styles impact on safety culture differently, in that transformational leadership has demonstrated a negative relationship with safety culture whereas transactional leadership has a positive relationship with the safety culture.

Choudhry et al. (2007) suggested that the leader's influence on the safety culture had a direct influence on employees' attitudes and behaviour in relation to an organisation's ongoing safety, health and environmental performance. Therefore a safety culture assessment was conducted by asking the respondents to rate statements related to the prevailing safety culture in their organisations as per the five indicators suggested by Wiegmann et al. (2004). These indicators included organisational commitment, involvement of management, employee empowerment, rewards and reporting systems.

Based on the results in Table 8, it can be concluded that a high degree of commitment from management to safety in the participating organisations, an indication of a positive safety culture. A high level of organisational commitment to safety indicates that the



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organisation places a high value on safety, allocates enough resources to safety and this in turn impacts on the safe behaviour of employees thus resulting in lower injuries. The finding was supported by Vredenburgh (2002) who illustrated the importance of commitment and support by upper levels of an organisation in ensuring that safety is identified as a core value by everyone which in turn impacts on the safe behaviour of employees. In addition, placing safety as a core value ensures that when there are competing priorities and work pressure increases, leaders in an organisation are able to put safety first and this influences the safe behaviour of the employees thus reducing the likelihood of injuries.

Wiegmann et al. (2004) suggested that management involvement entails the participation of all managers in daily activities through engagement and communication with employees regarding safety. The level of management involvement in the daily organisational activities results proved to be high with respondents stating that senior managers visited their workplace often to engage with the employees regarding safety. These results are in line with the findings above regarding the commitment by the organisation to safety by the organisation's upper levels of management. This implies that manager involvement, visibility on the floor and not showing up only when there have been accidents ensures that there is a continuous engagement with employees regarding safety concerns which is expected to have an influence on the safe behaviour of employees thus resulting in reduced injuries.

Employee empowerment measures the extent to which employees are involved in creating a safer workplace. This indicator measured the participation and involvement of the employees in the safety activities in the organisation. The results in Figures 16 and 17 indicated that most of the employees felt empowered in that they were involved in the decisions regarding safety improvements in their areas of work. Involvement of employees in the decisions and acting upon the safety suggestions raised by employees ensures ownership of improvements thus influencing the safe behaviour of employees.

These results are in line with the findings by Hofmann & Morgeson (1999 cited in Fernández-Muñiz et al., 2014) who suggested that when employees are empowered there is higher commitment to safety and this results in high levels of communication and quality relationships between employees and the leaders. High levels of communication and good relationships between leaders and employees result in increased activities aimed at improving the safety in the workplace. The lack of employee empowerment and involvement results in low levels of employee participation, engagement and commitment to safety activities; this could result in lack



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of ownership which can promote more unsafe or at risk behaviours that may result in injuries.

Linked to employee empowerment is the reporting culture in an organisation, Wiegmann et al. (2004) ascertained that an organisation with a good safety culture also has a good reporting culture and well established systems to encourage employees to report without fear. The results in Figure 17 demonstrated that a high level of reporting as respondents indicated that there was no fear in reporting unsafe acts or behaviours performed by themselves or their fellow colleagues. A good reporting culture is important in ensuring a good flow of communication and information about accidents and injuries within an organisation. The sharing of information about safety deviations and unsafe behaviours ensures proactive actions to prevent potential injuries. Also, good reporting allows for the sharing of learning from the particular event and this has an impact on the safe behaviour of the employees.

Correlation tests such as the Pearson's test, multiple regression analysis and hypothesis testing were conducted to determine the effect of leadership styles on the safety culture. The researcher expected that the two leadership styles would impact on the safety culture differently, with transformational leadership being associated with a more positive safety culture and transactional leadership being associated with a weak safety culture.

**Table 27: Statistical summary of results for transformational leadership and safety culture**

| | Cronbach Alpha | Pearson's Correlation | Regression Co-efficient |
|---|---|---|---|
| **Transformational Leadership** | .832 | -.362 | -2.409 |
| **Safety Culture** | .792 | | |

The Pearson's correlation results as per Table 27 indicated that there is a negative correlation between transformational leadership and safety culture. Therefore transformational leadership does not result in a positive association with safety culture. Transactional leadership and safety culture have shown a positive correlation as per Table 28 which is indicative of a positive association between the two variables.



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**Table 28: Statistical summary of results for transactional leadership and safety culture**

| | Cronbach Alpha | Pearson's Correlation | Regression Co-efficient |
|---|---|---|---|
| **Transactional Leadership** | .843 | .344 | .530 |
| **Safety Culture** | .792 | | |

The statistical results in Tables 27 and 28 revealed that the two leadership styles impact on the safety culture differently: transformational leadership has shown a moderate negative relationship with safety culture whereas transactional leadership has a positive relationship with safety culture. Therefore application of a transformational leadership style will result in a weaker safety culture compared with a leader that applies transactional leadership which would result in a positive safety culture. The results are reported to be statistically insignificant as per Table 20, therefore there could be other factors that may have had an impact therefore the null cannot be rejected.

This is an unexpected result regarding the relationship between the two leadership styles and safety culture, in particular the effect of transformational leadership on the safety culture. The researcher expected that transformational leadership would result in a positive safety culture, considering the behaviours of a transformational leader that are associated with an ability of the leader to be able to create a compelling vision, to be a role model, motivational, stimulating and show concern for the welfare of the team. All these characteristics of transformational leadership are complementary to employee empowerment, organisational commitment and management involvement safety culture indicators thus have an impact on creating a positive safety culture. However, transactional leadership has been shown to have a more positive relationship with safety culture. This could be attributed to the elements of transactional leadership that are associated with active behaviours such as contingent reward and management by exception (active).

The meta-analytic study by Clarke (2013) found that transactional leadership had a stronger association with safety compliance, in that compliance is driven through proactive monitoring of employees' behaviour, early identification of errors that could lead to incidents and close attention being paid to safety rules and regulations. Based on the results, an environment that is compliance driven results in a more favourable safety culture. This finding raised an important element in influencing employees:



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employees reacted differently to the two leadership styles which thus impacted on their safe behaviours differently. Due to limitation of the study related to the explanatory nature, the study results did not provide a full explanation for why transactional leadership would result in a positive safety culture when compared to transformational leadership. Clarke (2013 p.35) stated that "active transactional leadership not only ensures safety compliance, but it has an important role in shaping employees' perceptions regarding the importance of safety." This is mainly as a result of a transactional leader's strong focus on compliance with safety rules and policies, well established formal systems for managing safety and regular tracking of performance. The performance would be linked to rewards and incentives and this would encourage safe behaviours of employees (Hoffmeister et al., 2014).

The linking of performance to rewards creates a sense of clarity and awareness of safety targets and objectives which in turn would encourage employees to behave safely thus creating a positive feeling or perception about the workplace. Whilst this is the implication of the findings, further work in understanding the role of contingent reward in creating a safety culture will be recommended as an area for future research.

**Conclusion to the Results Discussion pertaining to Research Question 2**

In answer the Research Question 2, the findings indicated that the two leadership styles (transformational and transactional) have different impacts on the safety culture. In terms of the hypothesis test the expectation was that transformational leadership would result in a positive culture; the results revealed that transactional leadership results in a positive safety culture when compared with transformational leadership which has an opposite effect on the safety culture. Regarding the impact of transformational leadership on safety culture, the null ($H_{02a}$) is rejected and the alternative hypothesis ($H_{2a}$) is accepted. In terms of transactional leadership, the null ($H_{02b}$) is rejected and the alternative hypothesis ($H_{2b}$) is accepted.



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## 6.5 Research Question 3

*How does the combination of leadership style and safety culture impact on safety outcomes?*

Research Question 3 aimed to understand the impact of a combination of transformational leadership with safety culture on the safety outcomes; and a combination of transactional leadership with safety culture on the safety outcomes. The results in Table 21 revealed that safety culture had a moderate negative correlation with safety outcomes. However, when combined with the leadership style, transformational leadership and safety culture resulted in a positive relationship with safety outcomes whereas transactional leadership and safety culture had a negative relationship with the safety outcomes.

A conclusion made by Morrow et al. (2014) was that the beliefs of employees around the significance of safety are mainly shaped by the organisation's safety culture and in turn the safety culture influences the employees' attitudes and the perceived norms about working safely. The findings associated with safety culture and safety outcomes indicated a negative correlation between the two variables though it was statistically insignificant; the results indicated that there was a missing link between the beliefs and perceptions associated with the significance of safety and how these impact on the safe behaviour of employees in the workplace.

Kapp (2012) found that employees' safe behaviour tended to be largely influenced by the behaviour of their supervisors. The results revealed that transformational leadership and safety culture resulted in a positive relationship with safety outcomes and also that transactional leadership and safety culture had a negative relationship with the safety outcomes. These are in line with the conclusions made by Kapp: the leader's behaviour towards safety has an impact on employees and their behaviour.

Two of the elements of transactional leadership, management by exception (passive) and laissez faire have been found to be ineffective forms of leadership. The behaviours associated with management by exception (passive) include not being proactive (the leader would intervene only when standards are not met) and the laissez faire element is associated with the leader avoiding making decisions and not taking responsibility for the safe behaviour of the employees (Bass & Bass, 2009). The lack of pro-activeness and involvement associated with these two elements could probably explain the variation in the results. Due to the passive and reactive nature of these two elements, these are contradicting or not in support of the indicators of a positive safety culture which are associated with high levels of organisational commitment, management



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involvement, employee empowerment and culture and the safe behaviour of employees.

Additionally, for this study the safety outcomes were characterised as safety participation and safety compliance. Martinez-Córcoles et al. (2011) earlier defined safety participation as the voluntary behaviours that individuals demonstrate in a workplace to create and contribute to a safer working environment, and these include taking part in safety initiatives and improvements whilst safety compliance is associated with ticking the right boxes and performing the activities only under instruction. Linking the passive and inactive elements of transactional leadership it is clear that by applying these elements to influencing the safe behaviour of employees these would not result in improved safety participation or safety compliance.

**Table 29: Statistical summary of results for transformational leadership, transactional leadership, safety culture and safety outcomes**

| | Cronbach Alpha | Regression Co-efficient |
|---|---|---|
| **Safety Outcomes** | .786 | |
| **Safety Culture** | .792 | -.215 |
| **Transformational Leadership** | .832 | .414 |
| **Transactional Leadership** | .843 | -.216 |

Both the Cronbach alpha scores for safety culture and safety outcomes were above the benchmark of .70 thus the internal validity of the data is acceptable. The Pearson's correlation results showed a negative association between safety culture and safety outcomes. The researcher expected that the two leadership styles combined with safety culture would impact on the safety outcomes differently.

A multiple regression analysis was conducted to assess the impact of the two leadership styles and safety culture on safety outcomes. The results as per Table 29 revealed that the two leadership styles have a significant statistical impact on safety outcomes. The combination of the two leadership styles with safety culture impacted on safety outcomes differently: transformational leadership with a co-efficient of .413 combined with safety culture with a co-efficient of .2149 resulted in a double effect on the safety outcomes compared with transactional leadership which is -.2162 and safety culture .2149.



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Therefore the application of a particular leadership style whether transformational or transactional leadership within an existing organisational safety culture will result in an impact on the safety outcomes, with a combination of transformational leadership and safety culture resulting in the most favourable outcome compared with transactional leadership which has shown a negative relationship.

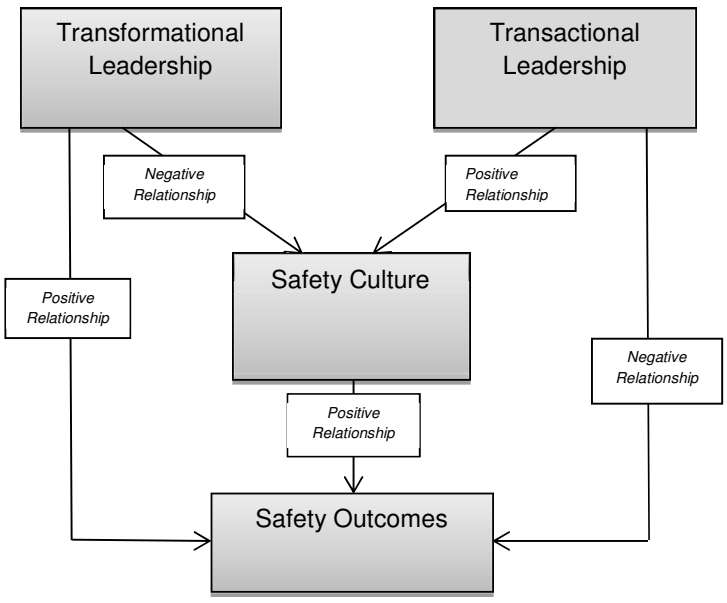
**Conclusion to the Results Discussion pertaining to Research Question 3**

To answer Research Question 3, findings indicated that the combination of leadership style and safety culture resulted in a different impact on safety outcomes: transformational leadership with safety culture had a significant impact on safety outcomes compared with transactional leadership. Regarding the impact of transformational leadership on safety culture, the null ($H_{02a}$) is rejected and the alternative hypothesis ($H_{2a}$) is accepted. In terms of transactional leadership, the null ($H_{02b}$) is rejected and the alternative hypothesis ($H_{2b}$) is accepted.

## 6.6 Conclusion to the Discussion of Results

This chapter provided answers to the research questions proposed in Chapter 3 and the findings from previous studies were used to interpret the results reported in Chapter 5. The analysis and interpretation of the results using existing literature has revealed interesting findings related to the two leadership styles, safety culture and their impact on safety outcomes and the key findings are presented diagrammatically in Figure 21.

**Figure 21: Final model depicting the effect of transformational leadership, transactional leadership, safety culture on safety outcomes**



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As shown in Figure 21, the research study has revealed that transformational leadership has shown a positive relationship with safety outcomes whereas transactional leadership has a negative relationship with safety outcomes. Transformational leadership is associated with positive safety outcomes which are likely to result in increased safe behaviour which is associated with lower injuries, compared with transactional leadership which tends to result in negative safety outcomes that are likely to result in unsafe behaviour which may increase the likelihood of more injuries. The passive forms of transactional leadership have proven not to be effective in influencing safety behaviour.

The results of the study also revealed that the two leadership styles impact differently on safety culture. Transactional leadership due to its nature of being linked to contingent rewards has demonstrated a positive relationship with safety culture compared with transformational leadership that demonstrated a negative relationship with safety culture. However, a combination of transformational leadership and safety culture results in a significant positive effect on safety outcomes compared with a combination of transactional leadership and safety culture.



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# CHAPTER 7: CONCLUSION

## 7.1 Introduction

The main aim of this research study was to understand the impact of transformational, transactional leadership styles and safety culture on safety outcomes in the chemical industry in South Africa. The previous chapter discussed the main findings of the study according to existing literature. This chapter aims to summarise the key findings of the research as well as the implications for relevant stakeholders such as business and academia. The recommendations are based on the role of leadership style, safety culture and the relationship with safety outcomes. The limitations that may have affected the outcomes of the study are discussed and lastly, recommendations for future research are made in order to progress the knowledge and theory associated with leadership style, safety culture and safety outcomes.

## 7.2 Main Findings

Good safety leadership is demonstrated when leaders focus on inspiring and promoting positive safety-related attitudes and behaviours in the workplace (Mullen et al., 2011) thus contributing to creating a safe workplace in order to minimise the likelihood of injuries and fatalities.

The study aimed to fill the gap in the area of safety leadership and safety culture by establishing the effect of transformational and transactional leadership on safety outcomes in the chemical industry. It also aimed to provide further insights into the role of transactional leadership style in relation to safety since this topic has not been researched vastly. The key findings of this research study are discussed below:

### 7.2.1 The role of transformational, transactional leadership style in predicting safety outcomes

The study has suggested that transformational leadership has a strong positive relationship with safety outcomes. If a leader has a transformational leadership style, employees are likely to be motivated, inspired, creative and willing to take part in safety initiatives to create a safe working environment for themselves and fellow colleagues thus reducing the likelihood of injuries (Mullen et al., 2011). This is in line with the findings by Clarke (2013) who concluded that under the guidance of a transformational leader, the employees are likely to be motivated, inspired and creative and willing to take part in safety initiatives to create a safe working environment for themselves and fellow colleagues.



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The study has revealed that transactional leadership has a negative relationship with safety outcomes. Transactional leadership has been linked to increased safety compliance whereby employees perform mandatory safety activities, focusing on meeting the minimum required safety standard (Martinez-Córcoles et al., 2011). These results on transactional leadership triggered an interesting finding regarding the influence of the two inactive passive elements (management by exception (passive) and laissez-faire). It will be interesting to discover to what extent the two elements impact on the findings. Continued investigation into these two elements is recommended for further research.

### 7.2.2 The impact of leadership style on safety culture

Transformational leadership has shown a negative relationship with safety culture compared with transactional leadership which has shown a positive relationship and this could be attributed to the elements of transactional leadership that are associated with active behaviours such as contingent reward and management by exception (active) which are complementary to the safety culture assessment indicator used.

However, the combination of transformational leadership and safety culture resulted in a double effect on safety outcomes compared with transactional leadership and safety culture. Based on these results, in order to derive better safety outcomes the leaders are to apply both leadership styles. This finding is supported by a conclusion made by Clarke (2013) who recommended that for effective safety leadership, leaders are to include elements of both transformational and active transactional leadership. Results for both the leadership styles indicated that these two leaderships styles impact on safety culture and safety outcomes differently.

Although the findings of the study are not very conclusive and cannot be taken as the only point of view, these findings therefore give practical indications that leadership styles are perceived to have some correlation with safety culture and outcomes.

## 7.3 Implications for Business

This research study has provided an understanding of the effect of leadership styles on the safety culture and safety outcomes. The implication to organisations is that in their safety planning and modelling, there should be a strong focus on leadership styles which is reflective of the combination of both transactional and transformational attributes. The two leadership styles result in different impacts on safety outcomes and also on the safety culture. Organisations must also invest in long-term planning and monitoring of their safety culture and outcomes. For this it would be practical to



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establish a baseline and set realistic targets using key variables such as leadership styles in order to influence the safe behaviour of employees.

The survey sample included respondents from different companies and the responses showed a certain level of similarity in terms of perceptions and attitudes. This presents a good opportunity for the surveyed companies to build from the employees' responses in building a community of practice for the leadership cadres of the surveyed companies.

This research has implications for the training and development departments within organisations. In light of the research findings it is important for organisations to develop specific safety leadership interventions and programmes that will have an impact on assisting leaders to influence the behaviours of employees as far as safety is concerned.

This research study also has implications for safety practitioners. The field of safety management is evolving with policies, procedures and standards playing a significant role in creating a safe workplace. The research study has revealed that there is a need to put effort in focusing on the organisation's leadership and their behaviours towards safety. Most important is how these leaders are influencing the behaviours of employees in relation to safety. Also, safety practitioners need to learn to adapt and be proactive in order to remain relevant in future in the safety field.

## 7.4 Implications for Academia

The study has provided valuable contributions to the body of knowledge in the area of safety leadership. Meaningful findings have been presented that are relevant for understanding how leaders influence the safe behaviour of employees to ensure that the likelihood of accidents, injuries and fatalities is minimised. In line with the accident prevention theories, the findings have opened up new opportunities related to understanding human behaviour and the role of leadership. The role of active and passive forms of transactional leadership in influencing safety behaviour requires further exploration.

## 7.5 Limitations of this Research Study

Based on the findings, the limitations of this research study include:

- While the study referred to safety outcomes, it did not make use of real data e.g. actual injuries, fatalities data from the participating organisations, and it only



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measured the safety outcomes through statements in the survey. For future studies to be able to draw conclusive relationships regarding the leadership style and the actual performance of the organisation in relation to the people's perceptions, it might useful to use actual safety performance data. Also to assess the behaviour of employees on safety participation and safety compliance, it depended on self-reported behaviours rather than actual evidence such as near miss reports, incident investigation databases. This could have been influenced by bias, whereby employees would want to look good or be seen to be behaving in a safe manner.

- The nature of the study also proved to be a limitation in that the study was undertaken as a snapshot of perceptions and opinions at a certain period and as such does not track the continuous and ongoing perceptions of respondents. The respondents' perceptions and opinions of the status at the time of the survey may have been influenced by other work factors.
- Also it is imperative to note the study did not take into consideration the actual events of incidents to investigate whether the causes were in any way related to any particular leadership style. Additionally the study did not review previous incident investigation reports to be able to assess the extent at which leadership has been mentioned as a root cause or contributing factor.
- The participants in this study were members of different chemical organisations however these organisations are located in the same industrial complex. Therefore the sample had the potential to be homogenous. T
- The language used during the data collection was English therefore for certain individuals who are not well conversant with English, there is a possibility that the questions could have been interpreted incorrectly thus impacting on the results. In future studies, it will be useful to consider the use of a professional translation company.
- The use of the explanatory approach allowed for the data to be generalised across the chemical industry in that the targeted sample contains organisations of different sizes and with different processes. However, in the South African context while there is a potential to generalise to other industries there could be other influences, such as differences in national cultures, geographical location, amongst others that might play a role in impacting on safety culture and safety outcomes.



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## 7.6 Recommendations for future research

The study was by no means conclusive and there are several issues that warrant further research and the limitations stated previously also provide opportunities for further work to be conducted in the field of safety leadership. One area of further research is related to the limitation of this study incorporating a snapshot of perceptions and opinions at a given period of time. It would be interesting to conduct a periodical or seasonal study over a longer period of time in order to determine and analyse the trend over time of safety culture and safety outcomes. Furthermore it would be ideal to conduct more in-depth surveys of all the selected companies taking into consideration their real safety records over time including the assessment of leadership styles prevalent in each organisation.

In addressing concerns related to the active vs passive forms of leadership, it is recommended that further work needs to look into the role of active and passive forms of transactional leadership in influencing safety outcomes. This includes investigating the role of contingent rewards in creating a safety culture.

Transformational and transactional leadership and the linkages with safety culture are areas that have not been covered well in theory; a number of previous studies have been conducted in relation to transformational and transactional leadership styles and their impact on the safety climate and safety outcomes (Clarke, 2013; Martinez-Córcoles et al, 2011; Wu et al., 2008; Clarke & Ward, 2006) but there is a lack of studies in understanding the effect of leadership styles on the safety culture.

Lastly, in relation to the individual consideration element that is associated with transformational leadership, it will be useful to understand the role of other factors such as gender, language and culture in influencing the safe behaviour of employees.



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# APPENDICES

## Appendix A: Questionnaire with a Consent Letter

Gordon Institute of Business Science
University of Pretoria

**EXAMINING THE IMPACT OF TRANSFORMATIONAL AND TRANSACTIONAL LEADERSHIP, SAFETY CULTURE ON SAFETY OUTCOMES IN THE CHEMICAL INDUSTRY IN SOUTH AFRICA**

**CONSENT LETTER**

Dear Sir/Madam

My name is Lihle Sibiya and I am currently studying towards a Masters of Business Administration (MBA) with the Gordon Institute of Business Science (GIBS), University of Pretoria. As part of my studies, I'm conducting research on understanding the impact of different leadership styles, the company's safety culture on safety outcomes in the chemical industry in South Africa.

I would like to invite you to participate in this survey and your participation is voluntary and you can withdraw at any time without any penalty. Your responses will remain confidential and anonymous. The attached questionnaire should not take no more than 20 minutes to complete and there are no costs to you as a participant.

By completing the survey, you indicate that you voluntarily participate in this research. If you have any concerns pertaining to this study, please contact my supervisor or myself. Our details are provided below.

**Researcher:**
Name: Lihle Sibiya
Email: lihle_sibiya@huntsman.com
Phone: 083 999 6158

**Research Supervisor:**
Name: Prof Johan Olivier
Email: fisheagle@imaginet.co.za
Phone: 083 452 5539



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## QUESTIONNAIRE

### SECTION A – Biographical Information

*We understand the sensitivity of the questions in this section, however this information will assist in making comparisons between groups.*

| | | |
|---|---|---|
| **Current Job level** | Senior Manager | |
| | Middle Manager | |
| | First line supervisor | |
| | Shop-floor | |
| | | |
| **Gender** | Female | |
| | Male | |
| | | |
| **Years of Experience in the chemical industry** | Less than 1 year | |
| | 1 to 3 years | |
| | 3 to 5 years | |
| | 5 to 10 years | |
| | 10 to 15 years | |
| | More than 15 years | |
| | | |
| **If you are a supervisor or manager, have you received any leadership training?** | Yes | |
| | No | |
| **Have you attended any safety training?** | Yes | |
| | No | |
| | | |
| **Highest level of education completed (please tick one box)** | No Matric | |
| | Matric | |
| | Trade Certificate | |
| | National Diploma | |
| | Bachelor of Technology / Bachelor's Degree | |
| | Honours Degree | |
| | Masters Degree | |
| | Doctorate | |



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## SECTION B

Please indicate your level of agreement or disagreement with each of these following statements.

*Manager refers to your immediate supervisor.*

| ***Only tick one box in each line*** | **Strongly Disagree** | **Disagree** | **Neither Agree/ Disagree** | **Agree** | **Strongly Agree** |
|---|---|---|---|---|---|
| 1. My manager places a high value and belief in safety. | | | | | |
| 2. My manager gets involved in resolving safety issues and concerns. | | | | | |
| 3. My manager leads by example. | | | | | |
| 4. My manager is positive about the company's safety performance. | | | | | |
| 5. My manager shows concern for how we feel. | | | | | |
| 6. My manager ensures that we all get involved in safety activities. | | | | | |
| 7. My manager encourages us to work together as a team in resolving safety concerns. | | | | | |
| 8. My manager spends time teaching and coaching us regarding safety in the workplace. | | | | | |
| 9. My manager understands each member of the team, our different needs, abilities and strengths. | | | | | |
| 10. My manager is honest and trustworthy. | | | | | |
| 11. I know the company's safety objectives. | | | | | |
| 12. My manager sets high standards for safety. | | | | | |
| 13. My manager recognises positive safety behaviour and rewards accordingly. | | | | | |
| 14. My manager emphasises the need to adhere to safety policies and procedures. | | | | | |
| 15. My manager takes pro-active actions to prevent accidents from happening. | | | | | |
| 16. My manager avoids making decisions when there is safety concerns. | | | | | |
| 17. My manager assigns responsibilities to each member of the team for achieving safety goals. | | | | | |
| 18. My manager makes it clear what we will get for achieving good safety performance. | | | | | |
| 19. My manager follows up on mistakes, irregularities and deviations regarding safety. | | | | | |



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| Only tick one box in each line | Strongly Disagree | Disagree | Neither Agree/ Disagree | Agree | Strongly Agree |
|---|---|---|---|---|---|
| 20. My manager allows us to work in unsafe conditions until something goes wrong. | | | | | |
| 21. The company places production before safety. | | | | | |
| 22. There are occasions where management would allow employees to take shortcuts. | | | | | |
| 23. I trust that the company has an ability to take care of my safety and that of my colleagues. | | | | | |
| 24. As employees we do take part in decisions regarding safety improvements in our workplace. | | | | | |
| 25. Our safety suggestions as employees are always taken into consideration by management. | | | | | |
| 26. Management in general does not show much concern for safety until something goes wrong. | | | | | |
| 27. The company allocates enough resources to safety. | | | | | |
| 28. Employees feel free to report any unsafe acts performed by themselves or by their fellow colleagues. | | | | | |
| 29. Senior Management visits the workplace often to engage us regarding safety. | | | | | |
| 30. The Senior Managers only show up in the workplace when there has been an accident. | | | | | |
| 31. I participate in most of the safety activities such as incident investigations, review of procedures, health and safety meetings. | | | | | |
| 32. I personally feel empowered to stop a person when doing something not safe. | | | | | |
| 33. I think the company is doing well in terms of safety performance. | | | | | |
| 34. I am satisfied with the company's safety performance. | | | | | |
| 35. I have not been injured in the past 12 months. | | | | | |
| 36. I comply with the company's safety rules and procedures. | | | | | |
| 37. I do risk assessments because I am required to do so by the company. | | | | | |
| 38. I sometimes take shortcuts when I feel under pressure. | | | | | |
| 39. I have reported a near miss within the past 12 months. | | | | | |
| 40. I always raise safety awareness in my team. | | | | | |

**This is the end of the survey and thank you for your participation.**



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## Appendix B: Ethical Clearance Letter

**Gordon Institute of Business Science**
University of Pretoria

Dear Thembelihle Sibiya

Protocol Number: **Temp2015-01761**

Title: **EXAMINING THE IMPACT OF TRANSFORMATIONAL AND TRANSACTIONAL LEADERSHIP, SAFETY CULTURE ON SAFETY OUTCOMES IN THE CHEMICAL INDUSTRY IN SOUTH AFRICA**

Please be advised that your application for Ethical Clearance has been APPROVED.

You are therefore allowed to continue collecting your data.

We wish you everything of the best for the rest of the project.

Kind Regards,

Adele Bekker



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